6th International Conference on New Business Models

New Business Models in a Decade of Action:

Sustainable • Evidence-based • Impactful

NEW BUSINESS MODELS @ HALMSTAD 2021

Full Conference Proceedings

9-11 June 2021 | Halmstad University, Sweden
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HALMSTAD UNIVERSITY

NEW BUSINESS MODELS @ HALMSTAD 2021

Colophon

Edited by Fawzi Halila and Maya Hoveskog, with support from Alireza Esmaeilzadeh and Harvey Blanco.

Conference Chairs Associate Professor Maya Hoveskog and Associate Professor Fawzi Halila.

We thank the numerous authors and reviewers without whom these proceedings would not have been possible!

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Words of Welcome

Dear Participants,

Welcome to the 6th International Conference on New Business Models (NBM@Halmstad2021) titled New Business Models in a Decade of Action: Sustainable, Evidence-based, Impactful. Halmstad University and its employees are very happy to host and organize the sixth edition of this successful global conference.

As you know, the COVID-19 pandemic situation forces us to host an online event, and unfortunately it prevents us to seize the opportunity to meet you in person, and offer you a pleasant visit to our beautiful city and its surroundings. However, the challenge has not reduced our ambition to aim for a high-quality conference, and we believe that we have managed to create an interesting "digital smörgåsbord" with a Swedish touch where you can easily find many interesting research papers, listen to impactful keynotes speakers, and actively participate in workshops and panel debates.

The conference brings together researchers and practitioners from various cultural and professional backgrounds to create positive impact by fostering the development, diffusion, and adoption of new sustainable business models in various contexts. We are proud that the conference features 89 contributions where 81 different institutions and 30 different nationalities are represented. It makes us very hopeful about the future.

We hope that during the conference week, an intense and bright exchange of insights, ideas, and concepts will take place. After all, the aim of an academic conference is to debate, enrich work in progress and accumulate knowledge to solve complex societal issues. Furthermore, we hope that besides discussing research work at the conference itself, the conference will provide sufficient input for the special issue of the Journal of Cleaner Production on “Assessing and forecasting the sustainability impact of new ventures”; and the special issue of Business and Society Review on “Ecosystems for Social Innovation”, and possibly also a book publication. Of course, we also hope that the abstracts submitted for this conference will find their way into other international journals and relevant publications.

Organizing an international event requires joint efforts and support from many engaged and competent partners. It would have been impossible without the encouraging and constant support of all the members of the NBM conference board, the NBM community, keynote speakers, panel debates facilitators and panelist, our session chairs, workshop organizers, and our reviewers! Thank you!

Furthermore, we would like to say thank you to all our sponsors, the support IT and communication teams at Halmstad University and finally, thank you very much to all of you participating! We hope that you enjoy this conference organized online by Halmstad University!

After the conference we will hand over to Professor Laura Michelini and her team, who will organize the 7th International Conference on New Business Models in Rome, Italy, (NBM@Rome2022). We are already looking forward to meeting you next year.

Halmstad, 17th May 2021

Fawzi Halila and Maya Hoveskog
NBM@Halmstad 2021 Chairs

Call for Contributions

New Business Models in a Decade of Action: Sustainable, Evidence-based, Impactful

It is no doubt that humanity faces many uncertainties to wellbeing and prosperity from growing worldwide challenges. The Sustainable Development Goals (SDGs) by the United Nations (UN) are a blueprint intended to guide the global efforts towards achieving a better and more sustainable future for all. Yet, five years after the SDGs were adopted by all UN Member States, the progress towards the urgently needed radical social and economic transformation is far from advancing at the speed or scale required. Thus, at the beginning of 2020 UN announced the Decade of Action for accelerating sustainable solutions to all the world's biggest challenges by mobilizing more governments, civil society, businesses and calling on all people to make these Global Goals their own.

On that background, after completing the first series of five conferences on new business models (NBM@Toulouse 2016; NBM@Graz 2017; NBM@Sofia 2018; NBM@Berlin 2019; NBM@Nijmegen 2020), we have learned a lot about the development and implementation of "business models for sustainability" (Schaltegger et al., 2016) or "new business models" (Jonker, 2016) contributing to ecological, social, and economic value creation. At NBM@ Nijmegen (2020) once more it became clear that we, as a research community, have advanced business models for sustainability as a scholarly field and accumulated a significant body of knowledge over the last couple of years. However, one question still seems insufficiently tackled – how to accelerate the practical implementation of this body of knowledge in different contexts to enable all kinds of organizations to undertake business model innovation for sustainability, in a transdisciplinary setting involving multiple stakeholders for transition towards a future-fit society? Thus, the 6th International Conference on New Business Models focuses on business model innovation for the SDGs. In particular, we aim to provoke interesting conversations on sustainable, evidence-based and impactful business models, linking research and practice, to uncover when, how, and why new business models are enacted and who becomes involved in various sets of contexts which might be either taken for granted or not familiar.

Along with the parallel tracks of academic papers, the program will include plenary talks and debates on how we can better enable impactful business models for sustainability in practice.

Themes and Topics

The 6th International Conference on New Business Models will continue to explore relevant themes and topics building on the insights from previous conferences:

Theme 1: Exploring the system level. Topics in this theme are, for example, business models for circular economy; new business models and sustainable transitions; ecosystem emergence and new business models; the natural ecosystem services and new business models.

- Track 1.1: Developing Collective Business Models enabling Social and Economic Transition, Track chair: Jan Jonker
- Track 1.2: Ecosystems in Support of Sustainability, Track chairs: Nikolay Dentchev, Abel Diaz Gonzalez
- Track 1.3: Fostering Mutually Nourishing Collaboration for Transformative Change, Track chairs: Eugenia Perez Vico, Marie Ahlgren
- Track 1.4: Business Models for the Circular Economy, Track chairs: Niels Faber, Jan Jonker, Abhishek Agarwal
- Track 1.5: Natural Ecosystem Services as Enablers for the Transition to Sustainable Business Models, Track chairs: Anna Hansson, Niklas Karlsson, Marie Mattsson

Theme 2: Exploring the sectoral and organizational levels. Topics in this theme are, for example, tools and frameworks for business modeling and experimentation for sustainability; SDGs as framework for business activities; new business models in times of crisis; cooperative business models; new business models and corporate strategic management; new business models and governance.

- Track 2.1: Corporate Strategic Management and Sustainable and New Business Models, Track chairs: Romana Rauter, Yuliya Snihur
- Track 2.2: Design Thinking, Actor Engagement, and Legitimation in the Context of Circular Business Model Innovation, Track chairs: Francesca Ostuzzi, Katrien Verleye, Fatima Khitous
- Track 2.3: Entrepreneurship and Sustainable Business Models, Track chair: Jonas Gabrielsson
- Track 2.4: New Business Models in Times of Crisis, Track chairs: Jaione Ganzarain Epelde, Urtzi Uribetxebarria Andres, Ion Iriarte Azpiazu
- Track 2.5: Data-driven Business Models for Sustainability in Emerging Fields, Track chairs: Magnus Holmén, Lauri Paavola, Maya Hoveskog
- Track 2.6: Business Model Experimentation for Sustainability, Track chairs: Nancy Bocken, Lars Jacob Tynes Pedersen, Sveinung Jørgensen, Jan Konietzko, Marc Dijk, Ilka Weissbrod, Maria Antikainen
- Track 2.7: New Business Models in an International Context, Track chairs: Svante Andersson, Petri Ahokangas

Theme 3: Exploring organizational impact. Topics in this theme are, for example, sustainable business model patterns; evidence-based business models; strategic impact measurement.

- Track 3.1: Assessing and Managing the Sustainability Performance of Business Models, Track chairs: Florian Lüdeke-Freund, Romana Rauter
- Track 3.2: Sustainable Business Model Patterns for a Decade of Action, Track chairs: Florian Lüdeke-Freund, Tobias Froese

Theme 4: Exploring theoretical and methodological foundations. Topics in this theme are, for example, intellectual roots of new business models research; innovative methodological approaches for new business model research. Confirmed tracks so far are:

- Track 4.1: Theoretical and Intellectual Roots of Business Model Research, Track chair: Jonas Gabrielsson
- Track 4.2: Ethnographic Research and New Business Models, Track chair: Sarah Pink

We invite participants from various disciplines (e.g., management, entrepreneurship, innovation, environmental studies, organization studies, transition theory, design studies, change management, or policy studies) to address a broad variety of domains (e.g., energy, mobility, health, agriculture, food, finance, or retail) from a broad variety of perspectives (e.g., theoretical, conceptual, or empirical).

NBM@Halmstad 2021 is hosted online by the Center for Innovation, Entrepreneurship and Learning research (CIEL), Halmstad University. The conference will take place online from 9th to 11th June 2021.

For any inquiries, please contact: nbm2021@hh.se

We are looking forward to your contributions and seeing you at NBM@Halmstad 2021!

Maya Hoveskog and Fawzi Halila, Conference Chairs

17 November 2020

References

Jonker, J. (2016). *New Business Models, creating value together*. Doetinchem (NL): Our Common Future Foundation.

Schaltegger, S., Lüdeke-Freund, F., Hansen, E.G. (2016). Business models for sustainability: Origins, present research, and future avenues. *Organization & Environment*, 29(1), 3-10.

Conference Programme

	Pre-conference Day - 7 June
10.00-12.00	Workshop: Richer Business – a new digital tool for gender equal organizations and operations
14.00-17.00	Workshop: Power Tools for Collaborative Modelling of Socioeco-Sustainment
15.00-17.00	Workshop: Using Patterns to Design Sustainable Business Models
	Pre-conference Day - 8 June
09.30-10.15	Workshop: The future of sustainable entrepreneurship research
11.00-11.45	Workshop: The future of sustainable entrepreneurship teaching and consultancy
15.00-17.00	Workshop: Experiment ideation for circular service business models – **CANCELED**
15.00-17.00	Workshop: Co-Creating a collection of sustainable business model design practices to support start-ups
	Pre-conference Doctoral Workshop - 9 June
8.30-8.40	Welcome!
08.40-9.40	Guest Expert panel I **Historical roots of business model research -** Charles Baden-Fuller, Cass Business School, UK **From business models to business model impacts in smart cities and communities -** Joan Enric Ricart, IESE Business School, Spain **Insights from research on business models for sustainability and impact -** Minna Halme, Aalto University, Finland **Insights on transferring research results into practice -** Nancy Bocken, Maastricht University, Netherlands
09.40-09.50	Break
09.50-11.00	Student Research Presentations
11.00-11.10	Break
11.10-12.00	Guest Expert panel II **Practical advice on publishing and handling reviewer comments -** Jonatan Pinkse, University of Manchester, UK **Early career advice -** Stefan Schaltegger, Leuphana University, Germany **Networking and community building -** Jan Jonker, Radboud University, The Netherlands

***All times are in Central European Summer Time (CEST).**

	Conference Day 1 - 9 June			
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13.55-14.00	Break			
14.00-14.25	Keynote: ***New Sustainable Business Models: Do They Have System Level Impacts and When?*** Minna Halmé (Aalto University School of Business, Finland)			
14.25-14.35	Break			
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18.00-18.10	Thank you for today			
18.10-20.00	Social happening			

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11.50-13.20	**Parallel Sessions nr. 6**				
	Track 3.2: Sustainable Business Model Patterns for a Decade of Action	**Track 2.1: Corporate Strategic Management and Sustainable and New Business Models**	**Track 2.2: Design Thinking, Actor Engagement, and Legitimation in the Context of Circular Business Model Innovation**	**Track 2.5: Data-driven Business Models for Sustainability in Emerging Fields**	**CFP Journal presentation**
	Track chairs: *Florian Lüdeke-Freund, Tobias Froese*	*Track chairs: Romana Rauter, Yuliya Snihur*	*Track chairs: Francesca Ostuzzi, Katrien Verleye, Fatima Khitous*	*Track chair: Magnus Holmén*	*Moderator: Niels Faber*
	Value Proposition Patterns for Smart Service Innovation Authors: Ebel, Martin; *Jaspert, David; Poeppelbuss, Jens	**Role of Organization in Enabling Business Model Transformation for Sustainability** Authors: *Wunder, Thomas; Kasseckert, Andreas	**Engaging Consumers in The Circular Transition by Designing Sharing Businesses** Authors: *De Bruyne, Marie-Julie; Verleye, Katrien	**Early Phase Development of Innovation Ecosystems** Author: *Knutsson, Håkan	
	Sustainable Business Model Patterns for Degrowth: Grasping Degrowth In Organizational Designs and Logics Authors: *Froese, Tobias; Richter, Markus; Hofmann, Florian	**Pushing the Boundaries: Exploring the Relationship between Organisational Demarcation Lines, Corporate Sustainability and Business Model Innovation** Authors: *Pedersen, Esben Rahbek Gjerdrum; Rosati, Francesco; Skjold, Else; Andersen, Kirsti Reitan	**Pricing and Revenue Models in the Sharing Economy** Author: *Curtis, Steven	**ICT and Business model innovation in the Agricultural sector: A Systematic Literature Review** Authors: *Zalkat, Ghazal; Barth, Henrik; Ulvenblad, Per-Ola; Ulvenblad, Pia	

	The Problem Space as the Missing Link in Business Model Patterns Author: *Ebel, Martin	**Making Sense of Circularity** Author: *Heldt, Lisa	**Value Co-Creation Through Actors Engagement for The Implementation of Circular Economy Solutions in The Chemical Sector** Authors: *Xevgenos, Dimitris; Meca, Sandra; Panteleaki Tourkodimitri, Kallirroi; van der Gaast, Wytze; Cano, Miguel	**Realizing Make-by-Customer Supply Chains through Additive Manufacturing** Author: *Wagner, Carsten	
		Decarbonizing the Business Model. Transition Barriers for Global Manufacturing Companies Authors: *Van Campfort, Nele; Balestrucci, Federica; Åkesson, Jennie; Garcia Botero, Gustavo; Chirumalla, Koteshwar	**Re-Modelling Fashion Through Scenario Planning** Authors: *Forst, Laetitia; Vladimirova, Doroteya; Williams, Dilys; Evans, Steve	**Tensions of Managing Inter-Platform Complementarity: A Case Study of Digital Care Pathway Ecosystem** Authors: *Mohamed, Mahmoud; Ahokangas, Petri; Pikkarainen, Minna	
13.20-14.20	LUNCH				
14.20-15.20	Panel debate: ***Can Ideas Change the World? Business Model Categories as Tools for Addressing the Sustainable Development Goals*** moderated by Sergio Alves and Sujith Nair, Umeå School of Business, Sweden				
15.20-15.30	Break				
15.30-15.55	Keynote: ***Doing Meaningful Research*** Mats Alvesson, (Lund University, Sweden)				
15.55-16.30	Closing session, 35 min				

Workshop: Richer Business – a new digital tool for gender equal organizations and operations

Workshop objective and value added

The workshop aims to provide a hands-on experience of the tool Richer Business. We will go through what the meaning of Richer Business models is and how they are connected to the building blocks of customer value, capital, competency, collaboration, communication, and culture. The attendants get the opportunity to reflect on their business models, beyond the mere financial values, and can try the tool for further work, developing their own richer business model in the own organization.

Tool overview

Since May 2020, when the tool Richer Business tool was released in Swedish, more than 250 people from the business community, academia and public authorities have joined our webinars to learn more about equal business and organisational models. The English version of the tool was successfully launched Autumn 2020. https://richerbusiness.eu/.

The tool is making use of gender-aware business models means, making the most of the diversity found amongst people, ideas, and individual motivations, in the development of new products, services and value chains. When different perspectives converge, the result is a broader understanding of the needs for development found in companies and organisations.

The tool also helps us discover which solutions have a high potential for improving the quality of life and well-being of people. Furthermore, it provides us with the conditions necessary to develop solutions which are sustainable from financial, social, and environmental perspectives. Thus, Richer Business models can contribute to fulfilment of the global sustainability goals set out in the UN Agenda 2030, whilst helping us deal with society's challenges related to, for example, health, work, integration, digitalisation, environmental issues.

Workshop facilitators:

Prof. Jeaneth Johansson, Halmstad University, Center for Innovation, Entrepreneurship and Learning Research & Luleå University of Technology, Entrepreneurship & Innovation, email: Jeaneth.Johansson@hh.se

Prof. Maria Udén, Luleå University of Technology, Industrial Design, email Maria.Uden@ltu.se

Workshop: A Workshop: Power Tools for Collaborative Modelling of Socioeco-Sustainment

Workshop objective and value added

Business Models are designed - intentionally and/or by default - by factors that affect the way in which the firm operates in relationship to business' actors, purpose, place and definition of success over time. The Business Model, when reviewed as a single unit framework is effective in the experimentation of innovation within that firm (Weiller and Neely, 2013) however may or may not identify the interdependencies of a business within an ecosystem context (Moore, 1993). Understanding that Business Models have co-relationships to ecosystem innovation, and that ecosystems have a co-relationship to Business Model design, firms can no longer self-declare that it can be sustainable without reference to its whole value network (Jones and Upward, 2015).

Jones and Upward, co-creators of the ontology for strongly sustainable business models (Jones and Upward, 2016) and the Flourishing Business Canvas v2.0, provided practitioners' feed-back globally on working with Flourishing Business Canvas v2.0. From these discussions, a Research through Design (Zimmerman, Forlizzi and Evenson, 2007) methodology in conjunc-tion with a rigorous expert review, deconstruction, and heuristic evaluations from the domain of HCI, was used to propose a new design language (based upon Rheinfrank and Evenson, 1996) for the Flourishing Business Canvas and ongoing Flourishing Toolkit project.

The workshop will allow participants the opportunity to explore the outcomes of this research through design methodology. Participants will interact and interact with the new dialogic de-sign tools and design system developed to do multi-modal modelling with the Flourishing Business Canvas.

Tool overview

The Flourishing Business Canvas 2.0 is a systemic, visual modelling artifact that evolved from Antony Upward's research into Strongly Sustainable enterprise design in 2013.

Workshop facilitators:

Nicole Norris, Manager Centre for Changemaking and Social Innovation, Georgian College, Barrie, Canada, nicole.norris@georgiancollege.ca
Quentin Evans, Centre for Changemaking and Social Innovation, Georgian College, Barrie, Canada,

Workshop: Using Patterns to Design Sustainable Business Models

Workshop objective and value added

During this 2-hours workshop, participants will learn to apply sustainable business model design patterns to an innovation or business idea tackling an SDG challenge. Using an online collaboration platform, you generate and prioritise ideas to advance a business model in a sustainability-oriented manner.

Pre-selected SDG challenges will be given to the workshop participants at the beginning of the online modelling session. Access to an online workspace (Mural) will be provided during the workshop. The participants do not have to prepare the workshop or to sign-up to Mural before the event. All required inputs and tools will be provided by the workshop facilitators during the event.

Tool overview

Patterns and modelling tool (the www.uxberlin.com/businessinnovationkit) can be made accessible for participants to reuse after the workshop. A preview of business model patterns can be accessed here.

Workshop facilitators:

Florian Lüdeke-Freund, Professor for Corporate Sustainability, ESCP Business School, fluedeke-freund@escp.eu

Henning Breuer, Head of UXBerlin – Innovation Consulting and Professor for Business Psychology at HMKW Berlin.

Workshop: Two events on Sustainable Entrepreneurship

Workshop objective and value added

The role of sustainable entrepreneurship in the transition towards a sustainable and a circular society is increasingly acknowledged. To date, a number of universities has research teams, education and consultancy programs dedicated to an ever-increasing list of research questions and societal challenges related to sustainable entrepreneurship. The field of sustainable entrepreneurship has evolved from a first generation in the beginning of the century into a second generation in the past decade. Recent developments, radical innovations and ongoing debates on sustainable entrepreneurship witnessed a wide variety of new challenges that has important implications for research, teaching and consultancy paradigms.

The objectives of the two sessions is to identity and discuss the new research, teaching and consultancy paradigms. The added value of the two sessions is the identification of radical innovations in the field of sustainable entrepreneurship and the identification of potential collaboration between scholars from all over the world.

The two sessions align with the presentation of a new book proposal: the De Gruyter Handbook of Sustainable Entrepreneurship Research. The two sessions enable participants to learn about the aim and scope of the Handbook and to explore potential chapter contributions.

Workshop facilitators:

Prof. Gjalt de Jong, University of Groningen – Faculty Campus Fryslan – Centre for Sustainable Entrepreneurship in a Circular Economy – g.de.jong@rug.nl

Workshop: Experiment ideation for circular service business models

Workshop objective and value added

How do you get customers to bring back products after use? How to get them to reduce their food waste? How can you increase customer retention while extending the lives of products?

These kinds of questions can be answered by conducting business model experiments. An experiment is a low cost, relatively low resource way to learn about possible future value propositions for your business. In this workshop, you will learn about the design of circular business model experiments, those specifically developed to slow, close, narrow, and regenerate resource loops in the pursuit of the circular economy. This can help you to reduce uncertainty in the business modelling process, make meaningful interventions to business model elements and stop relying on intuition only. In the workshop, we will develop ideas for circular service business model experiments. You will go home with a method to develop experiments in your team, which will help you to take evidence-based decisions on the best way forward.

Workshop facilitators:

Prof. Nancy Bocken, Maastricht Sustainability Institute, School of Business & Economics, Maastricht University,Nancy.Bocken@maastrichtuniversity.nl

Jan Konietzko, of Maastricht Sustainability Institute, School of Business & Economics, Maastricht University Netherlands

Research project linked to the workshop: www.circularx.eu

Workshop: Co-Creating a Collection of Sustainable Business Model Design Practices to Support Start-ups

Workshop objective and value added

Start-up entrepreneurs today are designing innovative and sustainable business models aligned with the SDG's. For a transition towards a green economy innovation plays a central role and start-ups are one of the key actors in the development and market introduction of sustainable innovation.

This collaborative insight gathering workshop will explore diverse perspectives on successful practices currently being used by start-up entrepreneurs in the design of their sustainable business models. The workshop consists of two parts. During the first part of the workshop, a global panel of practitioner experts will share stories, approaches, methods, tools, and initiatives that they have developed and experienced while working with start-ups entrepreneurs. The second part is an interactive co-creation session, where all workshop attendees will share their experiences working with or supporting start-ups, being in a start-up or experienced and interested in new business model design. All the insights shared during the workshop will be compiled into collection of SDGs aligned sustainable business model design practices to support start-ups. The collection will be available after the workshop to all workshop attendees.

Workshop facilitators:

Ondine Hogeboom, Co-Director Lean4Flourishing with help of global panel of experts, ondine@lean4flourishing.biz

Keynotes

Business Model Impacts in Smart Cities and Communities: Relational Business Models

JOAN ENRIC RICART

As cities around the world face critical challenges, digital platform business models bring the potential for positive transformation leveraging digital technologies. Blocking this potential can be grievous for cities but allowing digital platform operations without fulfilment of their SVP can have even worse consequences. Finding the right balance and solutions through productive interactions between the digital platform business model and urban ecosystems is, therefore, imperative. The welfare of many city dwellers around the world depends on adequate platform co-design (of the "Relational" Business Model) to assure delivery on the promises embedded in its SVP.

Joan E. Ricart, Fellow of the SMS and EURAM, is the Carl Schrøder Professor of Strategic Management at the IESE Business School, University of Navarra. In this school, he has also Director of the Doctoral Program (1995-2006), Associate Dean for Research (2001-2006), and Associate Director for Faculty and Research (2006-2014) and Chairman of the Strategic Management Department (1993-2016).

He was the Founding president of the European Academy of Management (EURAM). He has been President of the Strategic Management Society (SMS), and Vice-president of the Iberoamerican Academy of Management. He was the academic director of the EIASM and member of the research committee of the EFMD.

Joan E. Ricart holds a Ph.D in Managerial Economics, Northwestern University; Ph.D. in Industrial Engineering, Universitat Politècnica de Catalunya; and Ph.D. in Economics and Business Administration, Universitat Autònoma de Barcelona.

Joan E. Ricart has a wide and recognized international experience as lecturer. Throughout his career, he has been visiting Professor in many Business Schools around the world: IPADE (Mexico); IAE (Argentina); IDE (Ecuador); UNISA (South Africa). He has also supervised several doctoral theses and research projects.

He has published several books and articles in leading journals as Strategic Management Journal, Harvard Business Review, Journal of International Business Studies, Econometric or Quarterly Journal of Economics. He is co-academic director of IESE Cities in Motion and academic director of the UN center of excellence of PPP for Cities. His current work focuses on cities, business models, offshoring, and sustainability.

Keynotes

New Sustainable Business Models: Do They Have System Level Impacts and When?

PROF. DR. MINNA HALME

In the contemporary world, the persistence and urgency of complex interconnected sustainability challenges pertaining to global socio-ecological systems, such as poverty, inequality, climate change and lack of access to clean water and energy, are inescapable. The need for businesses to advance systemic solutions to these challenges and build a sustainable future for all has been widely extolled. New sustainable business models have been suggested a one means for tackling complex system-level sustainability challenges. But do they have the expected system-level impacts and under what circumstances? In this talk Minna will present a framework for assessing the potential of sustainable business models to advance system-level change, as well as show indicative findings from a qualitative comparative analysis of 14 large European firms, including such as Skanska and BMW, identifying conditions that advance the system-level impact of new business models.

Minna Halme is professor of Sustainability Management at Aalto University School of Business. Her research focuses on sustainability innovations, co-creation of sustainable innovation, sustainable business models and frugal innovation for poverty alleviation (The New Global Project). She has participated in several European research projects and heads a number of national ones. She teaches Sustainability Management at Aalto's Master programmes, in executive education and in the CEMS MIM program. She is Associate Editor of Organization & Environment, and member of the editorial boards of Business Strategy and the Environment, Technovation and Scandinavian Journal of Management. She has published in several refereed journals. Academy of Management has acknowledged her papers with All-Academy Best International Paper award, the ONE Unorthodox Paper award and three Best Paper awards.

She is member of Finland's Sustainable Development Expert Panel, and of Advisory Boards of Finland's largest retailer SOK and the Central Chamber of Commerce. She has held memberships in e.g. UN Secretary-General's High-level Panel on Global Sustainability and Finnish Government Foresight2030 group. She is co-founder of Aalto University's cross-disciplinary Aalto Sustainability Hub, and Aalto Global Impact, and has received the Academy of Finland award for the societal impact of her research.

Keynotes

Building Business Models for the Future: Incorporating Alignment, Preparedness and Sustainability

PROF. DR. THOMAS RITTER

Based on the wealth of research on the nature of business models and their importance, business models are increasingly seen as a central issue to address "grand challenges" such as coping with the Covid-19 pandemic and climate change. This keynote speech will advocate for the need of business-model alignment, and how such an understanding can guides strategic decision-making in the face of a crisis. The understanding of alignment enables higher levels of preparedness which can increase the robustness of businesses. In addition, sustainability will be discussed as a business-model requirement that needs to be addressed from both a within-the-model and around-the-model perspective.

Thomas Ritter is Professor of Market Strategy and Business Development at the Copenhagen Business School. For many years, he has been researching business models and the role of customers in innovation. In 2008, he published the booklet "Alignment Squared" which details a way to map and analyse business models that is frequently used in many firms and organizations. He also co-edited a special issue on business models for Long Range Planning. More recently, he has been leading three larger research projects on the role of data and digitization on business models, the integration of products, services, and data as well as the use of data for developing growth strategies. Since March 2020, he has been analysing the impact of the coronavirus crisis on business models—the business model workbook is the most downloaded item at the Copenhagen Business School. His work has been widely published in Industrial Marketing Management, Journal of Product Innovation Management, Journal of Business Venturing, Long Range Planning, HarvardBusinessReview.org, and Journal of Service Research, amongst others. Beyond research, Thomas Ritter is a highly rated lecturer and executive educator in strategic management and business development. He also supports start-ups and established firms in their business model development.

Keynotes

The Role of the Emerging "Purpose Ecosystem" in Accelerating Business Models Aligned with Achieving the UN SDGs

ASSOCIATE PROF. DR. WENDY STUBBS

The private sector has long been seen to play a critical role in addressing sustainability challenges and providing potential solutions to address the UN Sustainable Development Goals (SDGs). Yet there are questions whether businesses can address the complexities involved in interconnected sustainability issues. There are also concerns that private sector engagement with the UN SDGs simply reflects new efforts to enhance social legitimacy through 'rainbow-washing'.

This talk will focus on new business models that have emerged that aim to drive wider systems change and to advocate for businesses to reconsider and broaden their fundamental 'raison d'être': integrating social and environmental objectives into their organisational purpose, strategies and practices. An ecosystem of actors and intermediaries is emerging to support these new business models to facilitate purpose-driven businesses; connect and bring together purpose-driven actors from multiple areas; and, educate new and potential businesses to be social and environmental 'change-makers'. This Ecosystem represents an innovative form of governance which may have the potential to drive wider purposeful change by endorsing and accelerating business models aligned with achieving the UN SDGs.

Wendy Stubbs is an Associate Professor in the School of Social Sciences at Monash University in Melbourne, Australia. Her research seeks to understand how business can more holistically address its environmental, social and economic responsibilities. Her PhD (2006) in corporate sustainability developed a 'sustainability business model' that integrates sustainability into the core business model. This research is recognised as pioneering in the field of business models for sustainability, and her research continues to explore business models that are grounded in the principles of sustainability. Current research projects include Australian Research Council (ARC) funded project "sustainability transformation pathways for small to medium enterprises (SMEs)"; and the role of "purpose ecosystems" as a private governance mechanism to achieve the Sustainable Development Goals (SDGs).

Keynotes

I freed Nelson Mandela: Cause and Effect in Business Model Innovation and Sustainability Transitions

PROF. DR. PETER WELLS

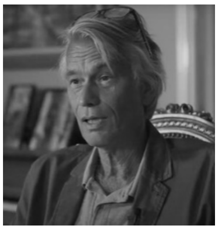
What connects the fragmented, isolated, ephemeral, and puny moments of organisational innovation with the grand sweeping march of history punctuated by emblematic events. Alternatively, how do the profound shifts observable in society constrain or enable organisational innovation? This talk initiates a new challenge for research into business model innovation for sustainability: is such innovation a stepping-stone to a brave new world, and if so, how can we prove it?

Peter Wells has an MSc in Planning and a PhD on the socio-economic consequences of military R&D. He is Director of the Centre for Automotive Industry Research and Professor of Business and Sustainability at Cardiff Business School. His research and publishing interests are focused on the global automotive industry, mobility studies including electric bicycles and car-sharing, and on sustainable business models in the circular economy. He has contributed 76 academic journal papers, 6 books, 33 book chapters, 5 edited books, 81 reports in the public domain, 183 academic and industry conference papers, 270 industry journal and website papers, and 68 other Internet papers. He has conducted or participated in over 70 research projects. He has recently completed two major research projects: A H2020 study on car sharing called STARS and an EPSRC study on recycling car batteries called ReLib. Peter is currently a visiting professor at UnB and FGV (Brazil).

In terms of academic disciplines his work has ranged across spatial industrial development, economics, organisational theory, industrial ecology, technological change, socio-technical transitions theory, business model innovation and sustainability. His research and consulting on the automotive industry has involved companies throughout the value chain, national and international government bodies, and NGOs.

Keynotes

Doing Meaningful Research



PROF. DR. MATS ALVESSON

Research often suffers from repeating more or less the same messages all the time, at best doing footnote-adding studies. An alternative to conventional studies is to examine and challenge implicit dominant assumptions in a field. The talk makes a case for assumption-challenging research, with the potential to produce novel and interesting research ideas and questions.

Mats Alvesson is Professor of Business Administration at the University of Lund, Sweden, at University of Queensland Business School, Australia and at Cass Business School, London. Research interests include critical theory, gender, power, management of professional service (knowledge intensive) organizations, leadership, identity, organizational image, organizational culture and symbolism, qualitative methods and philosophy of science.

Recent books include Return to Meaning. For a Social Science with Something to Say (Oxford University Press 2017, w Yiannis Gabriel and Roland Paulsen), Reflexive Leadership (Sage 2017, w Martin Blom and Stefan Sveningsson), The Stupidity Paradox (Profile 2016, w André Spicer), Managerial Lives (Cambridge University Press 2016, w Stefan Sveningsson), The Triumph of Emptiness (Oxford University Press 2013), Qualitative Research and Theory Deveopment (Sage 2011, with Dan Kärreman), Constructing Research Questions. (Sage 2013, w J Sandberg) Interpreting Interviews (Sage 2011), Metaphor We Lead by. Understanding leadership in the real world. (Routledge 2011, ed with Andre Spicer), Understanding Gender and Organizations (Sage, 2009, 2nd ed with Yvonne Billing), Reflexive Methodology (Sage, 2017, 3rd ed, with Kaj Skoldberg), Changing Organizational Culture (Routledge 2015 2nd ed, with Stefan Sveningsson).

Panel debate: Practical use of sustainable business model innovation tools in the Innovation ecosystem

Panel facilitator:
Peter Uppman, Innovation Strategist, Region Halland, Sweden,
peter.uppman@regionhalland.se

Panel description and relevance

For a decade the Swedish innovation ecosystem, especially the incubators and science parks, have used the Business model canvas and other similar tools in the coaching of startups. As the demand for sustainable business model innovation is increasing, the tools and models used also need to change accordingly.

The focus of this panel is on the existing and established practices and tools for sustainable business model innovation. In this panel, the panelists will discuss and illustrate how their organizations work with business model innovation tools such as Sustainable Business Model Canvas, exploring the challenges and rewords when considering sustainability in the business modelling process. A special attention will be paid on how to make business models more inclusive and encompassing social aspects, along with environmental and economic ones. Some enablers for sustainable business model innovation will also be discussed – data, ecosystems driving innovation and collaborative partnerships. Being anchored in the existing practices and having a rich experience, the panelists are bringing many practical examples and illustrations from their ongoing work.

Panelists

ANNA PETERSSON, Head of Innovation, High Five, Halmstad Business Incubator AB

LENA MIRANDA, CEO Linköping Science Park, Chair at Swedish Incubators & Science Parks

MURAT SAMANCI, Innovation Specialist, S3i - Sustainable Investments in Infrastructure and Innovation (UNOPS)

Panel debate: The Role of Sustainable Business Models for a Regenerative and Distributive Economy

Panel facilitators:
Bill Baue, Senior Director r3.0
Ralph Thurm, MD r3.0 (Impulse), r.thurm@r3-0.org

Panel description and relevance

This panel discusses the role of academic research and engagement on sustainable business models in a regenerative & distributive economy. That includes discussion about:

- embracing ‚back-casting from an ideal‘. This is not new and was developed by The Natural Step in quite some depth. It has given us at r3.0 a solid basis for the design of our work ecosystem. Wouldn't that be ideal for the design of academic programs that delivers towards what's really needed for a regenerative & distributive economy? What's holding us back? How to come to that ideal?
- overcoming missed academic visibility in a couple of areas that are decisive for our future: sustainability context (threshold & allocations), multicapitalism (which capitals, interrelation of capitals, clarification that multicapitalism is not a prolongation of capitalism), further work on the ideal of a regenerative & distributive economy (what's the ‚ideal‘?), interrelations in complex systems, etc. All of this is necessary ‚infrastructure‘ to discuss NBMs bridging between the existing and an envisaged regenerative & distributive economy.
- the recognition of multi-level problem solving. r3.0 created a Work Ecosystem that allows to near all problems from the perspectives of science, behaviour, finance, growth/debt, system value, fractal economies, education and governance. It needs much more multidisciplinary collaboration in the academic world to aim to solve any of the great issues of our time. How can this be done? And what would it mean for NBMs? What sort of institutions and collaborations are needed? What institutional barriers might conflict with multi-disciplinary problem solving?

Panelists

- **ANDERS BJØRN**, Horizon Postdoctoral Fellow at the Department of Management, Concordia University, Canada. He is interested in how we can develop methods for setting corporate environmental targets that are better aligned with sustainable levels of ecosystem impact. Additionally, he is looking into how stronger likes between the scholarship of business and environmental sustainability science can be created. His studies showed that sustainability reports really deploy thresholds & allocations are very rare (only 0.258 %) as well as revealed that SBTI uses self-developed carbon emission methodologies over scientifically-proven ones.

- **RAZ GODELNIK**, Associate Director & Assistant Professor Design & Management Parsons School of Design, New York. His work explores sustainable business models and how companies can respond effectively to the climate crisis. He is involved in research projects focusing on developing sustainable business models, climate action, and sustainability-as-unusual tools and frameworks for business (Sandbox Zero). Parsons is a member of the r3.0 Academic Alliance.
- **NANCY BOCKEN**, Professor in Sustainable Business Maastricht Sustainability Institute, Maastricht University. She is also visiting professor at Lund University, Sweden and LUT University Finland, and Fellow at the Cambridge Institute for Sustainability Leadership. Nancy's research evolves around the broad field of Sustainable Business, including topics like sustainable business models, business experiments, Circular Economy, sufficiency, and closing the 'idea-action' gap in sustainability through novel tools and approaches. She is the Principal Investigator of Circular X which focuses on ‘experimenting with circular service business models’.
- **ROMANA RAUTER**, Associate Professor on Sustainability and Innovation Management, University of Graz, Austria. In her research she explores ways of how companies can advance on sustainability which includes, amongst others, managing and measuring sustainability innovations or developing new and sustainable business models. Recently, Romana acted as a guest editor for the Journal of Cleaner Production and the Journal of Business Models, and is Co-Chair of the NBM Conference Series.

Panel debate: Mission-oriented Innovation Policies and Sustainable Business Models

Panel facilitator:
Thomas Magnusson, professor of innovation sciences at Halmstad University and professor of industrial management at Linköping University,
thomas.magnusson@hh.se

Panel description and relevance

Taking international and national targets on carbon neutrality as a starting point, this panel will discuss how governmental agencies put mission-oriented innovation policies into practice to support sustainable businesses development. Mission-oriented innovation policies refer to policies that addresses grand societal challenges. Such policies depend on purposive and systematic interventions to stimulate technological, institutional, and business-model innovation. By means of mission-orientation, governments and their agencies intervene to create and shape markets, thus providing direction for both new enterprises and established business firms. Mission-oriented innovation policies are more complex than traditional market-failure approaches to innovation policy. They assume a dynamic and reflexive governance process where policy interventions using different kinds of instruments align with business development. It has implications for the operationalization, follow-up, and evaluation of interventions, going from ex ante to experimental approaches. The panel discussion will touch upon a broad range of interventions and policy instruments, ranging from R&D funding, investment support and subsidies, to regulation, public procurement, and information campaigns.

Panelists

OSKAR JONSSON is innovation manager at the Swedish Environmental Protection Agency, where he works with decision support. His focus is mainly on mission-oriented bottom-up innovation processes and how to align local initiatives with national and international policies. Oskar has business experience from the energy sector.

CHARLOTTE LEJON is department head at the Swedish Energy Agency working with business development, commercialization, and entrepreneurship. Charlotte is well-informed of the targets of the Swedish Energy Agency and she has extensive experience from business modeling and sustainable development efforts.

DANIEL RENCRANTZ is department head for data-driven development & AI at the Innovation Management Division of the Swedish Innovation Agency – Vinnova.

Daniel is occupied with the use of AI as an enabling technology for sustainable business. Previously, he has been responsible for Vinnova's program Challenge-driven innovation.

MARIE AHLGREN is head of Customer and Business Development at Almi Företagspartner AB. Marie leads the development of Almi's offerings of finance and advisory services for SMEs, start-ups, and scale-ups throughout Sweden. Previously she has worked with business development in starts-ups and in global tech companies such as General Electric and Cap Gemini.

Panel debate: Can Ideas Change the World? Business Model Categories as Tools for Addressing the Sustainable Development Goals

Panel facilitators

Sergio Alves and Dr. Sujith Nair, Umeå School of Business, Economics and Statistics at Umeå University, Sweden, sergio.alves@umu.se

Dr. Sujith Nair, Umeå School of Business, Economics and Statistics at Umeå University, Sweden

Panel description and relevance

Concepts like Sustainable or Circular Business Model are not only academic constructs but also terms increasingly found in practitioners' discourse regarding sustainability issues. From a research perspective, we can define this empirical phenomenon as Business Model Categories (BMCs), i.e., ideas, shared by practitioners, of how firms can create and capture value in particular ways. While studies that explicitly address BMCs are scarce, the literature still offers some insights. It suggests that BMCs can shape firms' behavior (e.g., by working as 'templates' during business model innovation processes) and that different actors (e.g., scholars and consultancy firms) contribute to the emergence of BMCs. Thus, BMCs can potentially be an important tool to address the Sustainability Development Goals, and scholars and other actors can play an important role in enabling it. Despite this, the topic of BMCs remains largely unexplored. Consequently, this panel aims to provide insights on BMCs by exploring three topics. The panel will discuss what BMCs are and how they become established ideas amongst practitioners. It will also address how BMCs can affect firms into becoming more sustainable. Finally, the panel will explore what scholars and practitioners can do to enable BMCs' emergence and impact. Time will also be allocated for questions from the audience. We hope that the discussion can enrich and advance the academic understanding of BMCs in the context of sustainability and provide practitioners with actionable advice into how BMCs can be used, in their daily work, to address the Sustainability Development Goals.

Panelists

DR. TATIANA DIA is a Lecturer in Strategic Management at Lancaster University (UK). Her research interests fall into three major areas. Firstly, she is interested in the social construction of business models, particularly in how new business models emerge as market categories. She studies this phenomenon in the context of sharing economy. Secondly, she is interested in strategy tools and the role they play in strategic cognition. She brings in insights from psychology and cognitive sciences to conduct experimental research on strategic cognition. Finally, Tatiana is interested in how ontological orientations relate to the relevance of research for practice.

DR. HERMAN I. STÅL is an Associate Professor/Senior Lecturer in Business Administration at the School of Business, Economics, and Law in Gothenburg. He teaches and does research on business model innovation, collaboration, and leadership for environmental sustainability. His articles have appeared in such journals as European Management Journal, Journal of Cleaner Production, Scandinavian Journal of Management, and Sustainable Development.

DR. KATHERINE WHALEN is a Researcher in Sustainable Business at RISE Research Institutes of Sweden. Her work focuses on developing products and business models to extend product lifetimes. Katherine hosts the popular circular economy podcast Getting in the Loop, recognized by GreenBiz as a top sustainability podcast. She has expertise in circular economy education, having created two serious games and contributed to the online course 'Circular Economy - Sustainable Materials Management'. Katherine received her Ph.D. in Industrial Environmental Economics from Lund University (Sweden) and holds degrees from Delft University of Technology (NL) and Webb Institute (USA).

Conference Tracks

Theme 1: Exploring the system level

TRACK 1.1. DEVELOPING COLLECTIVE BUSINESS MODELS ENABLING SOCIAL AND ECONOMIC TRANSITION
Track chair: Jan Jonker

TRACK 1.2. ECOSYSTEMS IN SUPPORT OF SUSTAINABILITY
Track chairs: Nikolay Dentchev, Abel Diaz Gonzalez

TRACK 1.4. BUSINESS MODELS FOR THE CIRCULAR ECONOMY
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TRACK 1.5. NATURAL ECOSYSTEM SERVICES AS ENABLERS FOR THE TRANSITION TO SUSTAINABLE BUSINESS MODELS
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Theme 2: Exploring the sectoral and organizational levels

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TRACK 2.3. ENTREPRENEURSHIP AND SUSTAINABLE BUSINESS MODELS
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Track chair: Sarah Pink

Track 1.1.

Developing Collective Business Models enabling Social and Economic Transition

Track 1.1. Developing Collective Business Models enabling Social and Economic Transition

Track Chair: Jan Jonker
Nijmegen School of Management, Netherlands

Addressing urgent socio-economic sustainability challenges, large-scale transitions are needed. Transition management (TM) is a management approach to foster and create fundamental multi-level changes enabling relevant actors to anticipate and adapt better. Central stands a collective participatory process of visioning, learning, and experimenting. These transitions are, however, locked-in in technological uncertainties, static business models, strongly institutionalized behaviour by configurations of citizens, companies, and governments, fluctuating policies, and actively changing costs and risks by new actors and businesses. So far, the TM approach has not yet been successful in achieving the aspired large-scale systemic changes.

Transitions have a fundamental impact on the traditional way business operates and leads to changes in the business proposition and – model. In this track, we link TM and the development of collaborative business models as a means for a transition towards sustainability. The concept of collaborative business model innovation is presented as an actionable approach towards sustainable transition. With 'collaborative' is meant that different actors shape their business model together. This collective endeavour leads to an array of innovations, including value creation, relations, and revenue models. The result is often beyond the individual organizational benefit. For the constituents involved, it often also implies a change of mind-set. Conceptually we expand from a single firm to multiple organizations collectively creating value and from one actor to an array of engaged societal and business actors. The process of organizing a business model as a collaborative activity between actors is seen as the central carrier for a transition.

Recently we published a White Paper providing a concise overview regarding transition thinking and collective business modelling. This can be found here:

https://repository.tudelft.nl/view/tno/uuid:7361e81d-ad35-4ed2-affb-a6baff36de24

For this track, we welcome a limited number of conceptual as well as empirical papers positioned at the crossroad of transition management and collective business modelling. Especially contributions based on cases such as Living Labs, large-scale (regional) experiments or Communities of Practice (CoPs) are most welcome.

The Infrastructure Transition Canvas as a mediating tool in urban infrastructure transformation

Claudia Hohmann[1,2,*], Bernhard Truffer[2,3]

[1] Fraunhofer Institute for Systems and Innovation Research ISI, Germany; [2] Faculty of Geosciences, Utrecht University, The Netherlands; [3] Eawag, Swiss Federal Institute of Aquatic Science and Technology, Switzerland

*claudia.hohmann@isi.fraunhofer.de

Extended abstract

Global (climate) change and other environmental concerns continue to gain in importance. These developments are amongst others the result of high amounts of greenhouse gas emissions, the pollution of air and water, and resource depletion (e.g. Rockström et al., 2009; Steffen et al., 2015). These changes exert strong pressure on the existing design of urban infrastructure, for example through increasing heavy rainfall events, resource depletion, droughts, or urban heat islands. The conventional design of urban infrastructure is often inadequate to cope with these challenges. The required transformation that is enabling more sustainable forms of provision and use of urban infrastructure services is composed of complex, intertwined and long-term processes. An important prerequisites for the transformation of urban infrastructure is to find new approaches to management (e.g. Bohnsack et al., 2014; Boons et al., 2013; Kiparsky et al., 2016).

In this context, we apply the BM concept as a means to bridge disruptive innovation, managerial strategy and decision-making, and the creation of effective, efficient, and agile organizational designs (Fjeldstad & Snow, 2018). The concept of business models (BM) has especially flourished since the rise of the internet boom and e-commerce, with a lot of new firms eschewing conventional ways of doing business (Chesbrough & Rosenbloom, 2002). Today, the BM perspective integrates a variety of academic perspectives. The concept is especially influenced by information and technology management, strategy, and organization theory (Wirtz et al., 2016). Besides these basic theories, the concept is increasingly gaining relevance in the context of environmental sustainability and social entrepreneurship (Massa et al., 2017).

However, when searching for new BMs that can contribute to solve the grand societal and environmental challenges, the conventional BM perspective falls too short. The reasons are as follows: First, the economic value generation processes take on an important role, so far mainly in the private sector and for focal firms (Feger & Mermet, 2020). In the conventional BM perspective, value is often conceptualized as a "uni-directional flow between a business and its customers, emphasizing the creation of value for customers in exchange for economic value for the business" (Freudenreich et al., 2020, p. 3). Second, solutions that have the potential to solve the grand societal and environmental challenges require disruptive forms of innovation that go beyond incremental enhancement and have the potential to create whole new markets. For this purpose, the whole set of relevant actors have to be taken into account instead of focusing on a focal firm only (Rohrbeck et al., 2013).

Our research interest focuses mainly on new management approaches and organizational designs for local governments and utilities as the main actors responsible for the provision of urban infrastructure in many OECD countries. The objectives of these organizations differ fundamentally from those of privately organized companies, which are often in the focus of BM research. To address their differing objectives and to take into account the complex nature of urban infrastructure transformation, we apply the Infrastructure Transition Canvas (ITC) (Hohmann & Truffer, submitted). The ITC is conceptually based on insights from recent research on BMs for sustainability and studies on sustainability transitions. Instead of focusing on the strategy of a singular actor (focal firm), the ITC considers the whole range of key actors, their roles, and value considerations in the urban infrastructure transformation process, as well as the relevant stakeholders. The ITC itself is a static tool, but in our research, it is applied as a support tool for new management approaches and organizational design that allow for disruptive innovation in urban infrastructure. In the prevailing management approaches of local governments and utilities in OECD countries, important tasks are divided into departments that act largely independently of each other, e.g. road construction, urban water management (UWM), or the management of municipal green spaces. These structures have allowed to develop a high level of expertise and competence in the past. Yet, they often prevent a multidisciplinary and integrative management approach that turn out to be a prerequisite for urban infrastructure transformation. The main research question we aim to answer with our research is: How can the ITC as a static tool (that is informed by BM research) support the development of adequate management approaches to promote the sustainability transformation of urban infrastructure?

As empirical domain, we consider the current configuration of UWM as a suitable case on which climate change and environmental issues exert strong pressure. One way to relieve the burden on the sewage system during heavy rainfall events is to decouple rainwater from the central sewer, e.g. by implementing blue-green infrastructure (BGI) components. BGI has been identified as a promising and appropriate intervention to address the impacts of climate change and other environmental challenges in urban contexts (Willems et al., 2020). Despite the widely recognized benefits of BGI, their uptake by local government and utilities has been low due to implementation barriers encountered at the local level (Jerome et al., 2017). The planning, implementation and long-term operation of BGI leads to challenges for local governments and utilities. The main reason is that the integration of BGI creates new responsibilities and liabilities that are often not adequately addressed in existing management approaches and organizational designs. In our research, we have applied the ITC retrospectively in two empirical cases in Germany. In both cases, we analyzed infrastructure innovation projects in the context of BGI measures. By applying the ITC in expert workshop and interviews, we could identify the underlying actor structure and further elements that were / is necessary for the success of the innovation projects.

In the workshop and interviews, interdisciplinary cooperation and new organizational designs at municipal level were identified as a necessary prerequisite in order to be able to cope with the resulting requirements. One important aspect of these collaborations is the connection of specialist expertise and key resources of various key actors. In this direction, agile administration is discussed and increasingly applied implicitly or explicitly as a suitable management approach in which the focus is not set on standard processes of individual departments, but focus on the project goals of interdisciplinary teams. To structure innovation projects in agile administration and to provide clarity and transparency, the ITC can offer a suitable tool that can be applied in different contexts and at different hierarchical levels. In the expert workshop and interviews, we figured out that the tool is suitable for complex innovation projects in which many different actors need to be involved. According to the experts, the ITC can be used internally for project definition, project structuring, and project coordination, and externally for project communication. In that sense, the tool was evaluated as a guideline or template that can be used for orientation in innovation projects that have to be designed very individually. Regarding the limits of the tool, some of the interviewed experts agreed that the use of the tool does not make sense if the project is already clearly structured at the project start. Furthermore, they agreed that the tool would probably not be applied in standardized municipal processes in which the procedure is clearly defined from the outset, e.g. in fine proceedings. One expert described "human factors" as an obstacle to the successful application of the tool. It depends on the project team whether a project can be successful or not. Superior success factors are the team spirit and the team composition. In this regard, the tool can only be a supporting factor.

With the ITC, we have applied a tool that can identify the elements that are needed to support an agile management approach in urban infrastructure transformation. The tool is particularly effective in situations where cooperation between stakeholders is required and where the processes deviate from standard situations. However, the tool has so far only been applied to UWM cases in retrospective analysis. Further research is needed to test broader applicability and the limitations of the tool.

Keywords

Business models for sustainability, collaboration, infrastructure transitions, urban water management, socio-technical systems

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Towards shaping sustainability transitions through collaborative business modelling: a conceptual approach from transition to ecosystem innovation

Milou Derks[*,1,2], **Frank Berkers**[1,2]

[1]TNO - Netherlands Organisation for Applied Scientific Research; [2]University of Technology Eindhoven

*milou.derks@tno.nl, milouderks@hotmail.com

Abstract

Sustainability transitions are purposive: deliberate attempts to take on complex interdependent societal or ecological challenges such as climate change and depletion of resources. Such transitions often require deliberate collective action and new configurations of value chains. Involving insights from collaborative sustainable business modelling (CSBM) literature can contribute to shape or accelerate such transitions, since business models focused on collaboration and multiple value creation can span the whole value network, connecting multiple actors from suppliers to customers, while focusing on more than just financial value. We propose to view sustainability transitions as a process that implies ecosystem change through value network innovation, which can be steered through CSBM. In this way we bring a much-needed business model and value network perspective into the study of sustainability transitions, which has been lacking so far. In this article we first establish the conceptual link between CSBM and transition research by describing both as a process of change towards a new (sub)system. We argue that a purposive sustainability transition implies an ecosystem change, induced by innovations in value networks and business models. The value network forms the bridge between individual organisations and the wider ecosystem and can be influenced through individual- and collaborative sustainable business modelling. We continue by discussing the mechanisms through which CSBM can contribute, in theory, to ecosystem changes. Namely, through designing and evaluating experiments, building social networks, scaling innovations and breaking through the regime. We end with expressing the need for more research in this area, especially on empirical studies.

Keywords

Collaboration; business modelling; sustainability transitions; value network; ecosystem

1. INTRODUCTION

A growing number of societal, ecological, economically complex and interdependent challenges, such as climate change and depletion of resources, require large socio-technical transitions to a more sustainable means of operation in various sectors. Take, for example, energy provision, transport, health, and food. Such sustainability transitions are large-scale, complex, multi-actor and trans-institutional change processes that take place simultaneously between organisations and institutions at multiple levels and locations. Moreover, they require organisations and institutions to simultaneously change their means of operation, involving collaboration for mutual re-alignment. As is found by Brehmer et al. (2018), who in their study on 64 sustainable business models, find that environmental and social innovations cannot be realized by single organizations. They are the result of the governance and positioning the locus of control of value transfers outside a focal organization, in a network of business model actors and customers. Unfortunately, sustainability transitions are often blocked by a combination of factors, such as technological uncertainties, static organisational models, institutionalized stakeholder behaviour, lack of willingness or ability to collaborate, fluctuating policies and changing circumstances (Geels & Turnheim, 2010; Turnheim & Geels, 2012; Unruh, 2000, 2002).

In sustainability transitions businesses have an essential role, since sustainability transitions require new configurations of value chains or even new suppliers, processors and distributors. Business models can span the whole value chain connecting multiple actors from suppliers to customers and have the potential to disrupt entire sectors. Multiple studies have argued, both conceptually and empirically, that innovative business models can play a key role in accomplishing the necessary alignment among large groups of actors (Bidmon & Knab, 2018; Matthyssens et al., 2006; Sabatier et al., 2012; Wells, 2013). Business model innovation scholars research ways to enhance advantage and value creation by making changes both to an organisation's value proposition to customers and to its underlying operating model. In business model innovation literature, the subfields of collaborative and sustainable business modelling focus on reaching sustainability goals through a value network approach. These subfields come conceptually closest to the sustainability transitions field of study with its focus on societal values and participative approaches. Nevertheless, the advantages that collaborative and sustainable business model literature can offer are leveraged insufficiently in transition literature and existing transition approaches, which do not include network of firms perspectives (Bidmon & Knab, 2018; Bocken et al., 2014; Gorissen et al., 2016). Improved interaction between the fields of transition studies and collaborative and sustainable business model innovation can lead to new insights for more successful transition policies and strategies, including more effective support to businesses and other value network actors in contributing to transitions.

Both the fields of (collaborative and sustainable) business model innovation and sustainable transitions have repeatedly called for research at their intersection (Bidmon & Knab, 2018; Bocken et al., 2014; Bolton & Hannon, 2016; Gorissen et al., 2016; Jonker, 2017; Loorbach et al., 2010; Loorbach & Wijsman, 2013; Petzer et al., 2020; Sarasini & Linder, 2018; van Waes et al., 2018; Wainstein & Bumpus, 2016). In business model innovation literature, sustainable business models (SBM) are conceptually closest to embracing a transition perspective by focusing explicitly on making societal impact through business models. Sustainable business models consider a wide range of stakeholder interests related to environmental and societal aspects (Bocken et al., 2014), similar to transition frameworks. Two important insights from SBM literature are that (i) business models that include insights from sustainability transition studies can better overcome challenges, such as financial and institutional obstacles (Elmustapha & Hoppe, 2020), and (ii) sustainable business model innovation can be a key driver in accelerating transitions, such as the transition towards a low carbon energy system (Wainstein & Bumpus, 2016). What stands out is that, as observed by Bidmon & Knab (2018) and Boons et al. (2013), very little has been written on what role business models play and *through which mechanisms* such business models can contribute to sustainability transitions. Bidmon & Knab take the first steps towards filling this gap by pointing out two ways in which business models (BMs) can play a role in scaling innovations in sustainable transitions and one way in which BMs can hinder such scaling, illustrated by three cases (Bidmon & Knab, 2018). However, they only focus on contributions of BM in upscaling innovations. No focus is on the business modelling process and the role this process can play to shape transitions.

For their part, authors of transition studies have expressed both the importance of collaboration between a wide variety of actors as well as the need to include an organisational perspective and business model thinking in transition frameworks (Kern et al., 2015; Loorbach et al., 2010; Loorbach & Wijsman, 2013; Pel et al., 2020; Sarasini et al., 2016; Sarasini & Linder, 2018; Schmitz, 2017; van Waes et al., 2018). For example, Kern et al. (2015) emphasize the central role of public-private actor networks in upscaling innovations. Furthermore, Loorbach & Wijsman (2013b) argue that businesses and industries that are able to move beyond solely optimizing their individual performance (while minimizing negative environmental and social impacts) and actively innovate towards sustainability transitions, can lead and profit. Thus creating a competitive advantage which will strengthen their position in the market. In transitions, the importance of inclusion of a business model perspective is also underlined by Sarasini et al. (2016b). They combine a business model perspective with core concepts and constructs from transition theory to derive four research topics to be addressed in order to examine the dynamics of business model innovation in sustainability transitions. These research topics include the need to understand how business modelling concepts and activities can be used to support transition managers.

In both transition studies and business model literature, stakeholder participation processes are considered to be of key importance (Farla et al., 2012). Furthermore, in sustainability transition studies and sustainable business model literature focus is placed on creating public and collective value. This is where the fields intersect and can benefit from each other. In transition studies, a wide variety of stakeholders is considered, but studies suggest that although active continuous collaboration is necessary it can be challenging to orchestrate (Mutoko et al., 2014; Proka et al., 2018; Soma et al., 2018). Stakeholder approaches in business model literature typically have also been confronted with difficulties to address the tension between collective value and individual value, as these tensions affect all actors differently (Oskam et al., 2020). To ensure stakeholders jointly identify opportunities as well as plan and execute sustainable innovations together, the collaborative sustainable business modelling (CSBM) *process*[1] can be a powerful approach in transition processes (Gorissen et al., 2016; Rohrbeck et al., 2013). CSBM can facilitate multiple organisations to act in an orchestrated fashion by focusing on jointly creating not only financial, but also other values such as social and environmental value. The outcome of the CSBM process can lead to monetizing collaboration in a favourable individual and overall business model, allowing more opportunity for collaboration with partners such as governments and NGOs.

In light of the above, this article aims to contribute towards a better understanding of 'how CSBM can be used to shape or accelerate purposive sustainability transitions'. We formulate the following research questions: (1) how can the sustainability transitions approaches and CSBM innovation perspectives be linked conceptually? and, (2) through which mechanisms can CSBM contribute to sustainability transitions? We address these research questions by systematically integrating key concepts from business model innovation literature such as ecosystem and value network in sustainable transition studies.

First, in section 2, we start by a brief discussion of the four most prominent frameworks to analyse and govern sustainability transitions as identified by Markard et al. (2012). We continue with a brief description of purposive sustainability transitions and its key characteristics according to both established and new literature works (Smith et al., 2005; Welch & Yates, 2018). We close section 2 with an overview of key concepts in CSBM such as value network and ecosystem. Section 3 forms the core of our scientific contribution and starts with a description of how purposive sustainability transitions implies an ecosystem change induced by value network innovation. Such a perspective on transitions makes the essential role organisations have in realizing transitions explicit and (partly)

[1] CSBM is used to denote collaborative models with a multiple value focus, while CBM is used to indicate the larger field of collaborative business models. Whenever C(S)BM is used, it means that the statement is applicable to both CBM as well as CSBM

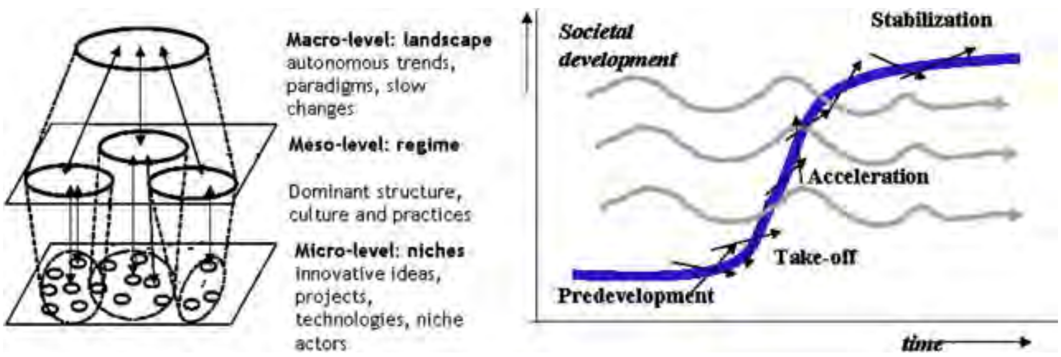
controllable, since value network innovation can be steered through CSBM. The section closes with a detailed description of the exact mechanisms in which CSBM could contribute to sustainability transitions. Section 4 concludes by proposing to include an ecosystem perspective in formulating and implementing sustainability transitions to make the role of organisations explicit and incorporate aspects of CSBM in attempts to realize such transitions.

2.THEORETICAL BACKGROUND

2.1 Purposive Sustainability Transitions

The field of transition studies tries to increase knowledge of complex socio-technical transitions – why they occur or don't occur, why they are aborted or fail to take off, and how they unfold when they do occur. Sustainability transitions are defined as "long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption" (Markard et al., 2012), and are the result of interacting developments at different levels (niche, regime and landscape). Sustainability transitions often take a very long predevelopment phase, wherein there is a gradual build up of pressures in the dominant regime. Such pressures can stem from internal dysfunctional regimes, increasing competition of alternatives (e.g. solar panels, electric cars) or changing external contexts (such as climate change). Such pressures can then start to reinforce each other, making room for a system change. Transition research visualizes transitions as a process of multi-levels (Frank W. Geels, 2002) and multi-phases (J Rotmans & et al, 2001).

Figur 1: *MULTI-LEVEL AND MULTI-PHASE MODELS (Frank W. Geels, 2002; J Rotmans & et al, 2001)*



Markard et al. (2012) identify transition management, strategic niche management, technological innovation systems and the multi-level perspective, as the four most prominent frameworks to analyze and govern sustainability transitions. Transition management takes a governance approach (Kemp et al., 2007; Kemp & Loorbach, 2006), where strategic niche management focusses on niche processes in a safe environment shielded from major competition. Technological Innovation Systems (TIS) studies the emergence and growth of new technological innovations (Hekkert et al., 2007; Markard et al., 2015), and the Multi-Level Perspective describes how innovations in the niche scale and breakthrough the regime. The concepts of socio technological regime and niche are what connects these four strands (van Mierlo & Beers, 2020).

In this paper we focus on purposive sustainability transitions, which are transitions wherein actors deliberately try to bring about structural change with a clear sustainability focus (Markard et al., 2016; Smith et al., 2005). Such transitions are characterised by active involvement of regime actors. According to Smith et al. (2005), regime members are bound together in relationships of resource interdependency and understanding these interdependencies is essential in any attempt to transform the regime.

Due to the importance of vision development, actor alignment and strategy dynamic, transition management is often suggested as a framework for purposive sustainability transitions (Gopakumar, 2010; Loorbach, 2010; Smith et al., 2005). However, as pointed out by Rauschmayer et al. (2015) transition management does not consider the role of individual organizations as potential drivers of transitions. More information on transition management can be found in Box 2.

Transition Management

Transition Management studies and practices the deliberate attempt of bringing about structural change in a stepwise manner. It tries to utilize existing dynamics to steer these dynamics towards transition goals relevant for society (Jan Rotmans & Kemp, 2003). Focal actors attempting a purposive sustainability transition should develop a clear problem definition, vision and transition agenda. Furthermore, focus should be on executing the first niche experiments and joint projects (Loorbach, 2010) as well as mobilizing the necessary actors and forming new coalitions to execute larger pilots/experiments with promising innovation(s). Through evaluation, monitoring and learning, the innovation(s) will start to mature. Based on evaluation, adjustments should be made to e.g. the collective vision and transition agenda (Loorbach, 2010). The most promising innovations should be stimulated to scale up.

2.2 Collaborative sustainable business modelling

From business models to value networks and business ecosystems

A business model describes how an organisation is structured and how value is created and captured. In conventional business model theory, the central focus is on a single organisation and the way in which this organisation creates value. The way in which the specific business model can be set up is influenced by economic and institutional factors.

The definition of value often revolves around a financial interpretation; sustainability is hardly included, if at all (Osterwalder et al., 2005). Although conventional theory takes a rather organisation-centric perspective, interactions and transactions between different actors in the supply chain regularly take place in order to create value for end-users/customers. To make these interactions explicit, Stabell and Fjeldstad came up with the concept of the value network (1998). The value network illustrates the *links* between actors and shows tangible and intangible value transactions (e.g. the money flows, contractual information or other types of exchanges). It shows how companies and organisations are involved in the value creation process (Allee, 2000; Leavy, 2012). The business ecosystem concept naturally evolves from the value network concept (Leviäkangas & Öörni, 2020). The business ecosystem is a system comprising a community (or communities) of organisations and their physical, market and regulatory environment, at a specified scale, in which there are continuous fluxes of knowledge, finance and value taking place in an interactive open manner (Ågerfalk & Fitzgerald, 2008; J. F. Moore, 2006). The business ecosystem takes a more holistic approach than value networks and includes all relevant stakeholders such as governmental actors, non-governmental actors, regulators, competitors and often comprises several, potentially competing, value networks.

An innovation ecosystem is a business ecosystem wherein organisations interact with an explicit focus on developing, adopting, and implementing new products, services or processes (Adner, 2016; Barnett, 2011). In these definitions, the innovation ecosystem, is indeed a subset of organisations in the wider ecosystem and also one that changes its superseding business ecosystem. Note that there are many different definitions of these three key concepts and it is beyond the scope of this paper to align these. However, it is generally accepted that an individual organisation and its direct network, can be considered as the value network, and that such networks are also parts of a wider network, which we refer to as the business ecosystem, consisting of value networks.

Collaborative sustainable business modelling

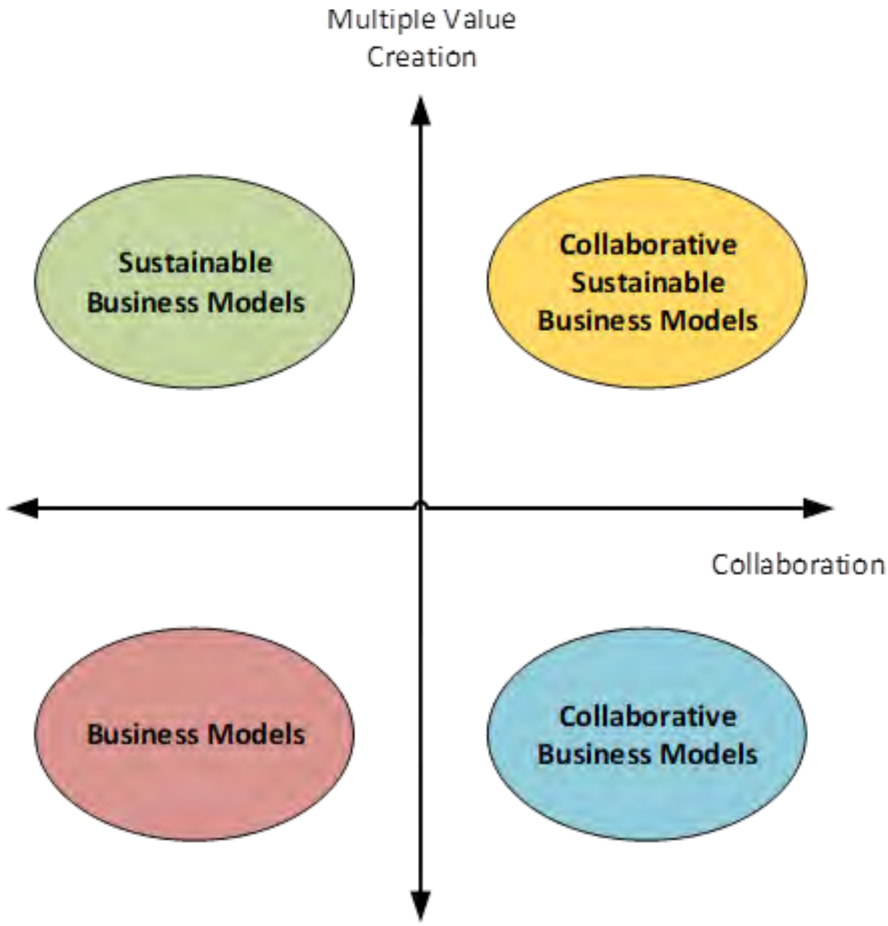
Value network and business ecosystem approaches become especially useful when considering innovation for sustainability (Evans et al., 2017). A subfield within business modelling literature that explicitly focusses on both sustainability and takes a holistic ecosystem approach is 'collaborative sustainable business modelling (CSBMs). CSBM is fundamentally different from regular business modelling in two key aspects; (i) CSBM focusses on creating multiple types of value (e.g. social, environmental, financial) and (ii) CSBM actively involves stakeholders to strengthen the whole value network. Although the fields of collaborative business modelling and sustainable business modelling come closest to CSBM, there are some key differences regarding the elements of multiple value creation and the way in which stakeholders are involved. Note that the distinction between these concepts is rarely made in existing literature and terms are often used interchangeably. Furthermore the distinction between a collaborative sustainable business model and the process of modelling is worth highlighting. The business model is then considered as a description or a design, whereas the process is a participative sequence of activities including context analysis, design, evaluation and implementation of a collaborative sustainable business model.

In this remainder of this section, we zoom in on the different types of business modelling concepts. **Fel! Hittar inte referenskälla.** positions the output these concepts, based on the two parameters of collaboration and multiple value creation.

Sustainable Business Modelling (SBM) requires companies to proactively create value for society by finding profitable solutions to social and ecological challenges (Masud et al., 2019). The aim is to incorporate sustainability objectives integrally into the business model by using a broader concept of value. The concept of including a broader notion of value is also referred to as 'triple bottom line' (people, planet, profit) and 'multiple value creation' (Nosratabadi et al., 2019).

Collaborative Business Modelling (CBM) has an inter-organisational design approach with the aim of creating value for not just the individual company but for the whole value network (Mäkinen & Dedehayir, 2012). As a result, the design process becomes community-centric, with value creation taking place through collaborations in hubs, networks and chains (Jonker & Faber, 2019). CBM is a participatory process, in which ideally all actors of the value network participate leading to intertwined, aligned business models and long-term contracts on how to do business within the value network (Rohrbeck et al., 2013). Such an approach is valuable in contexts where multiple organisations are subject to change as is the case in purposive sustainability transitions.

Figur 2: *BUSINESS MODEL CLASSIFICATION BASED ON THE PARAMETERS 'COLLABORATION' AND 'MULTIPLE VALUE CREATION'.*



CSBM focusses on creating and capturing value for the whole value network, just as CBM. The main difference is that CSBM aims to 'create multiple value' focussing on the 'triple bottom line' (Ordonez-Ponce et al., 2020). The focus on multiple value creation might mean that the participating organisations take greater responsibility towards society and nature. Companies proactively design the collaborative sustainable business model to create ecological, economic and social value for the community and network partners. The aim of the organisations is to contribute to problem solving within the domains of sustainability, circularity and inclusiveness; and therefore can play a key role in facilitating sustainability transitions (Evans et al., 2017; Schaltegger et al., 2016).

The perspective taken with regard to value creation makes a fundamental difference in designing a business model. Conventional business models are designed from the perspective of single, financial value creation within a company's production chains (Osterwalder et al., 2005). Collaborative sustainable business models, on the other hand, focus on creating multiple values in close collaboration with partners in the value network (Jonker & Faber, 2019). Stakeholders together can identify complex problems rather than limiting their scope to individual internal economic business challenges. By looking at problems from a collective perspective, stakeholders can take coordinated action, allocate the necessary resources while ensuring equitable sharing of costs and benefits (Kais & Islam, 2016).

CSBM approaches

Various approaches focus on developing a CSBM (Abhari et al., 2016; Brehmer et al., 2018; Bullinger et al., 2017; Costa & Da Cunha, 2015; Geissdoerfer et al., 2016; Karlsson et al., 2019; Mlecnik et al., 2019; Oskam et al., 2018; Pereira & Caetano, 2015; Rohrbeck et al., 2013). Although these approaches vary in maturity, each approach describes a learning process consisting of steps to come to mutual value creation, capture and delivery in order to build mutual beneficial value propositions and prevent contradictory incentives in the value network (Oukes et al., 2020). Several studies have been conducted in which such approaches were successfully applied to practical cases (Brehmer et al., 2018; Dembek et al., 2018; Gorissen et al., 2016; Mlecnik et al., 2019; Solaimani et al., 2015).

However, none of these approaches are aimed at accelerating or shaping purposive sustainability transitions (Brehmer et al., 2018; Elmustapha & Hoppe, 2020; Oukes et al., 2020). Gorissen et al. (2016) come closest to such an approach. Nevertheless, Gorissen et al. (2016) do this by using the business modelling canvas developed by Osterwalder & Pigneur (Osterwalder et al., 2005), which does not focus on shaping collaboration nor multiple value creation. This might explain the challenges of lack of shared sense of urgency, transparency and trust between partners that Gorissen et al. (2016) encountered. We believe that although CSBM approaches are not designed for application to purposive sustainability transitions, aspects from CSBM might contribute to accelerating or shaping purposive sustainability transitions.

3. CONTRIBUTIONS OF COLLABORATIVE SUSTAINABLE BUSINESS MODELLING TO PURPOSIVE SUSTAINABILITY TRANSITIONS

3.1 Linking purposive sustainability transitions and collaborative sustainable business modelling

As mentioned in the introduction, there are only few works that link transition studies to business modelling. Typically transitions are considered at the macro and meso-economic level (Dopfer et al., 2004), ranging from global economy to entire industries, sectors or regions. Collaborative sustainable business modelling generally focusses on the micro and meso-economic levels, from a single organisation to complete supply chains or value networks. Value networks have the potential to change large scale ecosystems, and thus affect the macro-economic level (Kapoor, 2018; Leviäkangas & Öörni, 2020). Although the level of scale and system approach are quite different, both have the ambition to guide organisations to a meaningful change. We will now align these conceptual approaches, using systems thinking.

Sustainable transitions focus on changing subsystems for the benefit of society (Kemp et al., 2007). As such, in many purposive sustainability transitions, organisations play an important role by actually changing their business models in order to change the subsystem. Although the phrasing of the processes and concepts in the summary of the dominant concepts of transition studies in section 2.1 do not refer directly to the concept of organisations, it should be clear that it is intended to promote change by guiding organisations to organize in a new way (Kern et al., 2015; Sarasini et al., 2016). Many studies discuss the roles of stakeholders (Mutoko et al., 2014; Soma et al., 2018; van Scheppingen et al., 2012). Yet, it can be stated, that explicit activities of shaping the value creation and specifically the value capturing, and thus new linkages between organisations, are largely unaddressed and more or less left to the private consideration of organisations. This is evidenced by the very limited number of works considering both transition studies and business modelling as described in the introduction. In that sense, transition studies, considers a system of organizations, in which the internal organization is out of scope. Business model and business model innovation literature, in contrast, revolves around the reconfiguration of organisations and their constituting elements, e.g. resources, activities, specifically focused at value creation and value capturing (Al-Debei & Avison, 2010; Geissdoerfer et al., 2018). The works of Oskam et al. (2020) and Brehmer et al. (2018) illustrate that in context of sustainability this requires inclusion of a wider range of organisations and relations than just the focal organization. Organizations that, in context of transition, need to adopt new practices, standards, implement new technologies, use different resources, change behaviors, meet new requirements and comply with new regulations, generate better product qualities, in other words require sustainable business models. Specifically when it comes to ambitions in which substantial sustainability impacts are targeted, some form of scaling is inevitable (Cancellieri, 2018; M.-L. Moore et al., 2015). For example, one of the key scaling mechanisms for scaling start-ups is by establishing partnerships, or even M&A (mergers and acquisitions), with corporates, who are often also putting forward different dominant practices. It can be said that parties involved in niche innovation will in their scaling in context of transition, in one way or another encounter parties having a position in the regime. Be it through partnerships, be it through developing standard practices, or formal standards, be it through platforms, be it through non-competitive sector wide collaboration, scaling of sustainable innovations requires coherent business model innovations (ter Haar & Simons, 2019).

In a similar fashion, the niche is considered as a force for change, whereas the regime is considered as a consolidating force. This distinction is useful in studying the change and the status quo respectively, as well as to identify and engage with organisations that are involved in the dominant practices or the organisations that are involved in innovation and experimentation. But in practice organisations contribute and can have positions in both the niche and the regime which makes the concept difficult to operationalize (ten Pierick & van Mil, 2009), as organisations as a whole, not just the R&D parts or subsidiaries, will have to shape and adopt changes. Dealing with change and status quo, ambidexterity, has become an important theme in business strategy (O'Reilly & Tushman, 2004). Not only organisations can be part of both regime and niche, value networks and scaling mechanisms also link niche and regime actors in novel ways, and thus requiring coherent business model innovations.

The business modelling literature in principle considers the business model, value networks and business ecosystems as cascading systems of organisations, in which the organisation remains an integral and addressable entity (Al-Debei & Avison, 2010; Allee, 2000; Leviäkangas & Öörni, 2020; J. F. Moore, 2006), whereas in transition studies niche and regime are overlapping 'subsystems' organised around differing practices. Consequently, transition studies and business modelling are systemic approaches of a different nature, with different system elements: landscape, regime and niches (and experiments within the niches) versus the three cascading levels: organisations (represented by (focal) organisation-level business models and their constituting elements), value networks and ecosystems. Following practical systems thinking advice "*In practice, the best plan is to consider a trio of viable systems at any one time: the organisation we wish to study, that within which it is contained, and the set of organisations contained by it - one level of recursion down"* (Beer, 1984), it follows that the value network should be the system of study, interlinking the individual organisational perspective to the targeted ecosystem level.

As both transition and business model innovation are about change, it is important to understand the processes through which these system levels change. Organisations change through strategy making processes and business model innovation (Latilla et al., 2020). Value networks change through individual and collaborative business model innovations (Arana & Castellano, 2010; Heikkilä & Heikkilä, 2013). Consequently, we consider transitions to be an ecosystem change that can be induced by scaling value network level innovations. The approach to support transitions by means of collaborative business modelling should be seen as an as of yet underexplored approach to supporting transitions.

In summary, we have seen that transition studies and business modelling view systems differently. Business modelling puts forward an organisational change and cascading systems perspective in which the value network is a critical level where innovation in and between organisations can be shaped, in which niche, regime and niche/regime actors are related. The value network also serves as a level that upon scaling changes the ecosystem. Ter Haar and Simons (2019) illustrate how actors collaboratively address common challenges in order to achieve such a market transformation.

Box 3 illustrates the importance of business modelling as well as the relationship between value network and ecosystem change in a practical example.

Example of Transition Case fit for CSBM: Transition of the North Sea

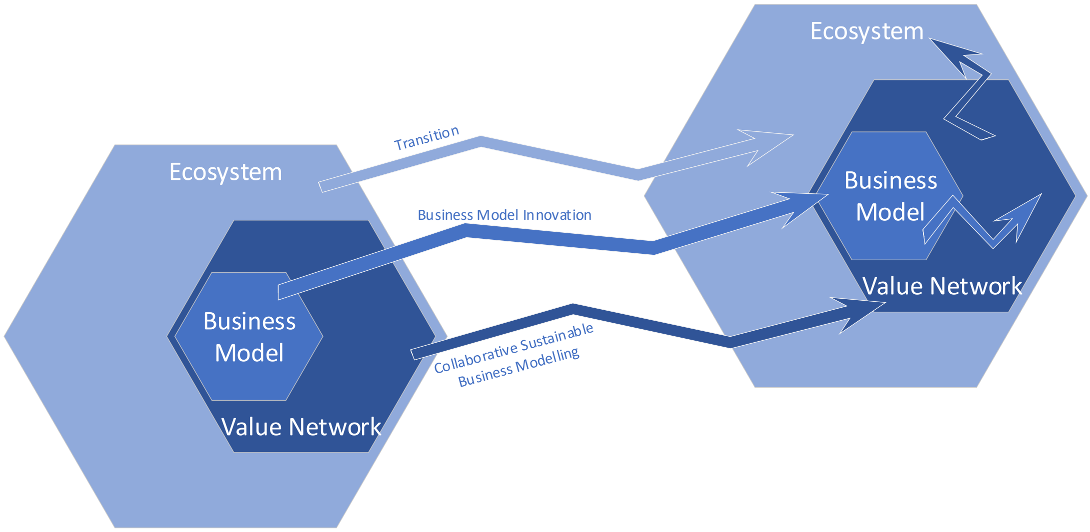
To move towards a climate-neutral energy system that is reliable and affordable, 30 European parties are working in a project group on transforming the North Sea into a pioneering region for the European energy transition, starting with the south-eastern part of the North Sea. The North Sea offers opportunities for large-scale wind energy and hydrogen production and underground carbon storage. Wisely linking such energy functions, while using existing oil and natural gas infrastructures, can reduce carbon emissions, reduce costs, make effective use of offshore space and accelerate the energy transition.

This requires cooperation and coordination between all actors in the value network. Examples of such cooperation is the usage of gas and oil platforms for maintenance hubs of wind farms, hydrogen production hubs and the shared usage of existing natural gas & oil pipelines for transport of hydrogen to shore or of carbon from industry on land to platforms to be injected in empty oil and gas shells.

All participating actors share a common vision; transforming the North Sea into a catalyst for the European Energy Transition. Executing this vision will not only require change in the way each individual organization does business, but also sharing of costs and risks of usage of common infrastructure and complete new ways of value creation and delivery which will require alignment of business models. This will lead to profound changes in the way these regime actors have been doing business over the past decades. In short; complete transformation of the value network. This might eventually lead to an ecosystem change, when other actors outside of the project group but active North Sea follow the example and adjust their respective value networks as well.

The North Sea Energy project group is in the early phases of the transition. Business modelling as well as sharing costs and risks has been an important aspect in the project group. For many for-profit companies participation in the project group is based on the knowledge that transition to sustainability is necessary to guarantee long-term right to play and to retain a competitive advantage. However, to invest now, it needs to be profitable, making business modelling and financeability a key topic.

FIGUR 2: *TRANSITION DEPICTED AS BUSINESS MODEL INNOVATION, COLLABORATIVE SUSTAINABLE BUSINESS MODELLING AND ECOYSTEM CHANGE*



Transition in terms of business model innovation is then the guided change of a value network and the expansion or scaling of that network, eventually leading to a significant change in the ecosystem. Value networks can change through individual and collaborative business model innovation. Scaling of such value networks, i.e. aiming to replicate or expand the value network's value creation, can influence other value networks and eventually the whole ecosystem, e.g. by means of standards, non-competitive collaborations and provisions, and thus bring about substantial change. In a more network of firms perspective on transition, a transition can be seen as the reconfiguring and scaling of value networks, changing the wider ecosystem. Figure 2 above depicts these 3 cascading scopes of change and how one affects the layer above.

3.2 Mechanisms through which the CSBM process can contribute to purposive sustainability transitions

In section 3.1 we showed that purposive sustainability transitions can be viewed as ecosystem change, induced by value network innovation. The first stages of purposive sustainability transitions focus on value network innovation. Through experiments potential innovations are tested and social networks are built to develop the necessary value networks for implementation of innovations. During acceleration, regime adaptation and stabilization, focus is on ecosystem change. Through expansion and scaling of value networks ecosystems eventually change. This section describes how CSBM contributes to value network and ecosystem innovation. For clarity, we divided the section into three subsections, describing different stages within the multi-phase model (J Rotmans & et al, 2001).

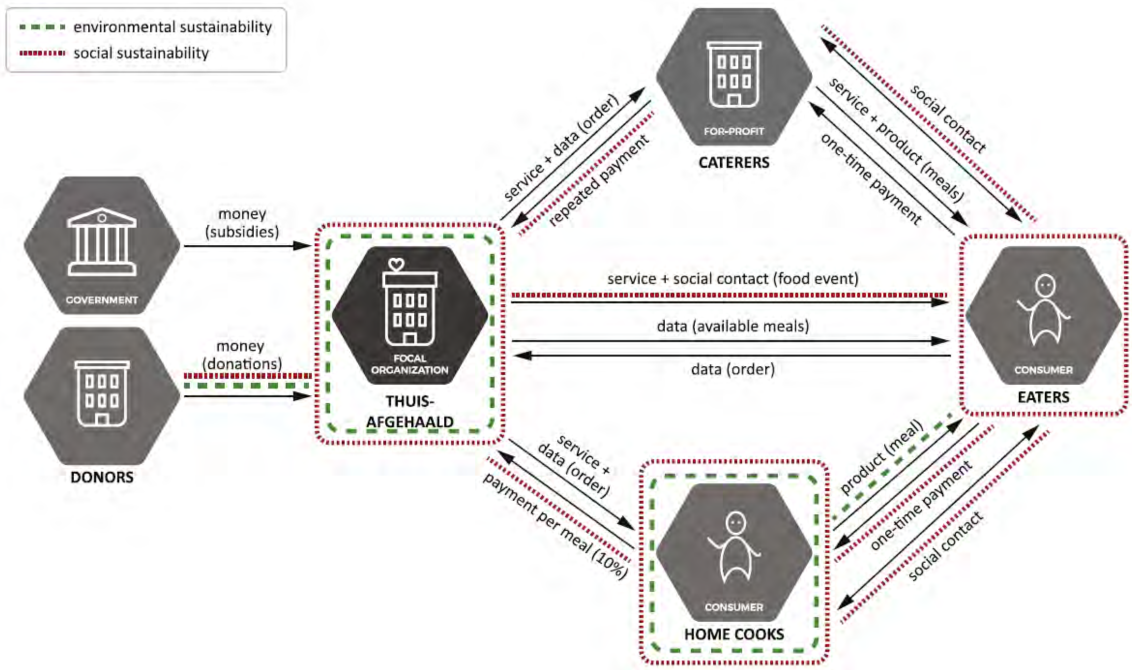
Predevelopment and take-off

In the first two stages of purposive sustainability transitions, predevelopment and take-off, the aim is to learn and experiment with potential solutions, to address societal challenges. The development of a common problem definition, vision and transition agenda takes place (Jan Rotmans & Kemp, 2003). Important aspects are sharing knowledge and building social networks. New innovations and sustainable technologies are identified and promoted towards acceleration. Through learning, monitoring and evaluation the innovation(s) and the respective business model(s) are adapted and start to mature towards scale up.

CSBM can add value in the problem definition and vision development process. Problems can be concretized by describing the current situation in a CSBM inspired value network analysis, as suggested by Brehmer et al. (2018). In such an analysis, actors and the value that is transferred between actors (e.g. product, service, money), including the activities and resources of the actor that are necessary to conduct the value transfers are visualized. Additionally, the way in which actors are linked by value transfers and the legal forms of the organizations as well as the type of values that are being exchanged (social or environmental) are pictured. In this way, the value network analysis proposed by Brehmer et al. (2018) focusses specifically on visualizing the multiple types of value which are being exchanged between actors and the relationship including the underlying BM of each actor. Visualizing the current situation in such a detailed value network analysis not only gives a clear overview of each actor, it also visualizes the business model of each actor, including how these business models relate to each other, an example can be found in 3. This helps to identify stakeholders and their roles, moreover it helps to identify potential weaknesses in the current situation. Transition agendas are, in terms of CSBM, expressions of changes in roles and relations, introduction of new roles and relations and the cancellation of other roles and relations expressed in value creation, capture and delivery. It thus specifies how new value is being created and captured through new roles and relations, this provides valuable information on the actual change that is required in the way organizations do businesses. This can help in translating the transition agenda to more concrete actions.

We contend that the contribution of the CSBM is most explicit in developing and executing experiments. CSBM can help to concretise, evaluate and select potential solutions and contributions to the societal challenge at hand. Potential solutions can be formulated as CSBM scenarios, including the design of potential future value networks that expresses value creation and value capture using the core concepts of the experiment. These scenarios can then be evaluated from a multi actor and multi value perspective to analyse to what extent the proposed scenarios require an acceptable change in the way key stakeholders do business as well as identify ways to improve the scenarios and resulting business models (Gilsing et al., 2020; Gordijn & Akkermans, 2001; van Scheppingen et al., 2012).

Figur 3: *VALUE NETWORK ANALYSIS INCLUDING THE MULTIPLE TYPES OF VALUE CREATED AND THE RELATIONSHIPS BETWEEN ACTORS (Brehmer et al., 2018).*



After the potential value networks are developed, CSBM can help to identify the critical assumptions that should be tested by detailing the perceived causal path from the go-to-market towards mid- and full-scale adoption towards full impact (Bradley, 2016; Fallis, 2013; Ton, 2012). Identification of critical assumptions leads to new experiments to be executed (Eisenmann et al., 2011). Furthermore, new experiments lead to new expected performance data of the scenarios and adds to the detailing of these. Thus the CSBM design and evaluation can help to guide which experiments to conduct and help the identification of critical assumptions from a business model and impact perspective.

Acceleration

Successful niche developments are scaled up and converge towards a dominant design that becomes the new standard among a growing number of actors, until a critical mass has formed that is needed to destabilize the regime. In this stage, new functionalities of the successful niche developments might emerge and best practices between niche actors are shared.

To scale-up and stabilize the niche, convincing more and more actors to join is key (Turnheim & Geels, 2013). 'Joining' means here to adopt new practices, standards, implement new technologies, use different resources, change behaviors, meet new requirements and comply with new regulations, generate better product qualities. This might require new configurations of value chains as well as new suppliers or distributers.

Collaborative business models span the whole value chain connecting multiple actors from suppliers to customers. They have the potential to build strong networks linking the innovation to key actors outside of the focal organisation (Bidmon & Knab, 2018). An advantage of including a collaborative business modelling perspective in this stage of the transitions process, is that it will make the interdependencies between actors explicit (Brehmer et al., 2018). This will lead to a greater understanding of the required new actors to scale-up the innovation, including their key resources and activities. Furthermore, CSBM focusses on identifying possibilities for joint value creation and joint value capture. This makes it concrete to new actors what value can be created and more importantly, how (part of) this value can be captured by the new actor when joining the growing movement around the niche innovation. It provides an articulation of the vision in concrete business terms to potential partners (Bidmon & Knab, 2018; ter Haar & Simons, 2019). In order to support the stabilization, many actors will face a joint challenge or even regulation. CSBMs creating collective value, e.g. joint recycling operations like WeCycle[2], sector-wide data-sharing facilities like JoinData[3], may arise or be sought after.

Regime adaptation and stabilization

Niche innovations might eventually breakthrough into the regime, where new shared rules and structures form around the innovation, eventually stabilizing the regime. The old regime technologies and business models need to be slowly phased out to make room for the new niche innovations.

To break through the regime, the business model surrounding the innovation might be more important than the innovation itself (Chesbrough & Rosenbloom, 2002; Markides, 2006). Bidmon & Knab defend this statement by pointing out that viable business models from which the value created and captured is clear to all stakeholders facilitate and accelerate scale-up leading to break through in the regime (Bidmon & Knab, 2018). We argue that this holds true even more so for collaborative business models. The CBM process places central focus on not only the value created and captured to a single actor, but also to the whole business ecosystem. It shows the value that can be jointly created and how this value can then jointly be delivered and captured (Brehmer et al., 2018). It then translates this joint value creation and capture to individual organisations. Starting with joint value creation shows the actors in the business ecosystem how much more they can achieve by working together. Furthermore, this joint perspective on value creation, delivery and capture between actors supports the convergence of shared rules and structures needed for the innovation to break through the regime (Bidmon & Knab, 2018).

As extensively discussed by Unruh, interdependent processes and value chains as a result of co-evolution of technological, social, organisational and institutional factors, hinder breakthrough of niche innovations into the existing regime (Unruh, 2000, 2002). The CSBM process, focusses explicitly on visualizing, concretizing and exploiting relations and

[2] www.wecylce.nl
[3] Join-data.nl

interdependencies between organisations and the greater eco-system (Brehmer et al., 2018). It might therefore help to breakthrough this co-evolution and make room for new innovations.

4. Discussion and conclusion

Our work was motivated by the observation that transition studies rarely take a network of firms perspective, although purposive sustainable transitions typically require radically new configurations of value networks. This means that multiple organisations need to change the way they do business, in conjunction. To incorporate a network of firms perspective in transitions, we propose the usage of collaborative sustainable business modelling (CSBM) in the transition management process.

To this end, we consider purposive sustainability transition as an ecosystem change, induced by a process of value network innovation. These ecosystem changes are the result of significant value network changes caused by individual and collaborative business modelling, focussing on scaling, common challenges and critical mass for market transformation, similar to how a niche alters the regime. In the first stages of transition, value network innovations are the main focus area, which can be compared to niche innovations among a growing group of actors. In the acceleration and breakthrough stages, these value network innovations are scaled sufficiently to pressurize the whole ecosystem to change.

CSBM stimulates the process of value network innovation and can therefore be key in shaping and accelerating purposive sustainability transitions. The main contribution of CSBM to the first stages of transitions is that by expressing potential solutions as CSBM value network scenarios, the operationalizability can be better assessed, since the value that should be created and captured by each actor in the value network is made explicit. During scale-up, CSBM can contribute by building social networks and convincing more and more actors to join through focusing on the joint value that can be created and captured by each individual actor. We contend that CSBM should indeed be focused on scalability, achieving critical mass to solve common challenges for an ecosystem change from the start. Furthermore, since a successful business model has proven to be more important than the superiority of the innovation itself, taking a CSBM approach from the outset will increase the chances of successful transitions.

Although these contributions sound promising, there is only anecdotal evidence from practice to support the claim that applying CSBM elements will indeed contribute to the success of purposive sustainable transitions. In this paper we provided a conceptual contribution, that still requires empirical support beyond anecdotal evidence. Research is needed on how to extend the available methodological support for CSBM in context of purposive transitions and how to extend the methodological support for purposive transitions to include CSBM. Among other topics, it requires investigation of archetypes that guide the design and evaluation of CSBM. It also includes research into how scaling mechanisms can help to achieve stabilization of the new regime and affect the ecosystem. Another important future research topic is to observe how CSBM perspectives have been applied in transitions and to evaluate what the contribution of applying such perspectives have been.

Furthermore, including CSBM elements in the purposive sustainability transition process is not a replacement for proper transition management. It is also no guarantee for a successful transition, the role of policy and regulations in purposive sustainability transitions should not be underestimated.

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The role of entrepreneurs in stimulating systems change to reduce marine plastic pollution and the business models they use

Julia Planko[1,*] Hanna Dijkstra[2]

[1]University of Applied Sciences Leiden; [2]Vrije Universiteit Amsterdam

*planko.j@hsleiden.nl

In this paper, we explore the role of entrepreneurs in stimulating the transition towards a new system in which marine plastic pollution is mitigated. To reduce plastic pollution of waterways and oceans, all types of system actors are needed. Producers need to increase recycled content, governments need to enact bans and improve waste management, research institutions need to develop alternative materials, NGOs need to raise awareness and consumers must be willing to choose different products. In this systems change towards reduced marine pollution, entrepreneurs also have a role to play as niche innovators that build momentum toward more sustainable socio-technical systems (Dijkstra, van Beukering and Brouwer, 2021). This forces incumbents to adapt (Hockerts and Wüstenhagen, 2010).

The transition literature studies such long-term, multi-dimensional, fundamental changes of production and consumption patterns (Markard, Raven and Truffer, 2012). To achieve systems change, companies, government actors, NGOs, financial institutions, research institutions and user groups need to act – individually as well as in collaborative networks. Entrepreneurial activities can be a key driver of systems change (Hall, Daneke and Lenox, 2010; Vogel and Fischler-Strasak, 2014). Businesses invent technologies and create new products, services and business models that can stimulate sustainable behavior, and they also engage in system building activities (Hall, Daneke and Lenox, 2010; Hockerts and Wüstenhagen, 2010; Farla et al., 2012; Musiolik, 2012; Planko et al., 2016; Cramer, 2020; Diepenmaat, Kemp and Velter, 2020). These system-building activities include: Product and technology development; Collaboration with the government for enabling legislation (which influences creation of demand and of supply); Raising awareness (to create supply and to influence policymakers); User behavior change; and Infrastructure development (Planko et al., 2016).

In the transition to a more sustainable production and consumption system, it is important that entrepreneurs develop collaborative busines models, in order to design value propositions, set collective goals and share the costs of system changing activities. Next to these collaborative business models, individual companies also have their own company-level business model (Planko and Cramer, forthcoming). In this paper, we focus on the systems change entrepreneurs aim for and the company-level business models and strategies they use to achieve this change.

Our research question is: What is the role of entrepreneurs in stimulating systems change to reduce marine plastics pollution and what business models do they use to achieve this? To answer this question, we conducted an explorative multiple case study in the Dutch sustainable plastic sector. We conducted semi-structured interviews and interactive workshops with four organizations which are key actors of change in the Netherlands.

We identified different types of ventures that are striving for systems change: First, ventures with the goal of marine plastics prevention, aiming to stop the source of the problem of plastic entering the environment. These (I) develop alternative materials and products; (II) encourage the reduction of plastic use (e.g. through awareness raising or monitoring apps) or (III) contribute to closing plastic loops (e.g. through better recycling technologies). And second, ventures with the goal of marine plastics cleanup, aiming to clean up the plastic that has already entered the environment. These entrepreneurs (I) develop cleanup technologies and services, or (II) focus on raising awareness (e.g. through social media or voluntary cleanup initiatives).

Preliminary findings of our cases studied are:

Case A: Their goal is to raise awareness for the marine plastics and other ocean health problems and to reduce marine pollution. The value proposition is to sell a re-usable bottle, which they produce and market. However, the selling of this bottle is merely a vehicle to raise revenues in order to finance their system changing activities such as enhancing ocean literacy. They contribute to raising awareness and user behavior change.

Case B: Their goal is to develop and sell technology and services in order to provide a solution and reduce the problem (filtering plastics, including microplastics from rivers). This technology gives governments an opportunity to better manage plastic waste leakage, and thereby contributes to the infrastructure development to enable a more sustainable system. They raise awareness for plastic problem in order to influence policymakers and consumers to put pressure on policymakers and municipalities who are potential customers (legitimacy of new technology; show that there is a need) and herewith contribute to demand creation.

Case C: This non-profit organization has the goal to develop campaigns and products to raise awareness and change legislation. They want to build campaigns that turn individuals into activists, contributing to awareness raising but also encouraging citizens to demand legislation change. Next to campaigns, they enable user behavior change by providing an app that helps consumers find products without microplastics. Their revenue model is based on private funding and crowdsourcing (thereby mobilizing funds for systems change), and they use utilize entrepreneurial strategies for their system changing activities.

Case D: Their goal is to develop an alternative material for plastic, namely biodegradable plastic from renewable material. The company was founded with the mission to reduce plastic pollution. They invest their revenues into further technology development. They collaborate with knowledge institutions to generate new knowledge and they also acquire funding for research (resource mobilization) to optimize their product and innovate new product ranges. They moreover collaborate with partners to co-create products and secure demand.

To conclude, the entrepreneurs we studied do more than only developing and selling a product or service. They also conduct value creation activities that contribute to systems change. These entrepreneurs work on different parts of changing the system, though many engage in multiple system-changing activities. In some business models, selling a product mainly has the aim to generate revenues for system-changing activities. In others, developing and selling a technology, material or product is the primary aim. This product itself generates revenues for its value creation and delivery activities, with which they directly contribute to system change. We can identify two main system-change business model structures: In the first, the product itself contributes to system change, in the second, the product or service is merely the vehicle for revenue generation to fund system changing activities.

The insights gained from this exploratory research will serve to set up a larger study with more interviews and quantitative data collection, to study the different business models deployed in the system transition of the plastic sector. Based on the data gathered we want to develop a framework in which business model elements are connected to system changing activities.

Whereas developing collective business models is crucial for enabling social and economic transition, our findings indicate that additionally the development of company-based business models aiming at system-change plays an important role in enabling this transition.

Keywords

Sustainability transition, systems change, business models, sustainable entrepreneurship

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Track 1.2.

NEW BUSINESS MODELS @ HALMSTAD 2021

Ecosystems in Support of Sustainability

Track 1.2. Ecosystems in Support of Sustainability

Track chairs: Nikolay A. Dentchev, Abel Diaz Gonzalez
Vrije Universiteit Brussel, Belgium

The ecosystem concept has gained a lot of popularity in the last decade (Audretsch, Mason, Miles, & O'Connor, 2018). Ecosystem thinking provides insights on how different stakeholders can be aligned, interact and collaborate to gain competitive advantage, boost innovation and increase business productivity (Adner, 2017; Jacobides, Cennamo, & Gawer, 2018). Ecosystems also support business growth thanks to the variety and complementarity of actors, their interactions and coordinated efforts to mobilize multiple resources (Neumeyer & Corbett, 2017; Roundy, Brockman, & Bradshaw, 2017; Spigel & Harrison, 2018).

The new decade has begun in an unprecedented way due to the strikes of the COVID-19 pandemic. Millions of people have been infected with this virus, and thousands lost their life. A global crisis has emerged, and the social and economic consequences will continue to unfold for the next years. World leaders advocate for more coordinated efforts to rapidly address the pandemic. Several organizations, like the World Economic Forum (COVID Alliance for Social Entrepreneurs, 2020), have started to create supportive structures and programs to support entrepreneurs around the globe with financial and non-financial support to develop their businesses and increase their impact.

Well-functioning ecosystems will be now tested in their capacity to react to this global crisis to support addressing several sustainability challenges (unemployment, hunger, health crisis, exacerbation of poverty, among many others). Ecosystems, therefore, need to prove efficient by mobilizing flexible and complementary resources (funding, infrastructure, knowledge) but also by self-adapting their governance (Acs, Stam, Audretsch, & O'Connor, 2017), policies (Stam, 2015), boundaries (Audretsch, Cunningham, Kuratko, Lehmann, & Menter, 2019), and their own ecosystem culture and resilience capacity (Roundy et al., 2017). Despite the hit, we are already seeing how entrepreneurs, for example, are using their innovations to alleviate the pandemic effects and supporting locals to adapt to the new situation. Some of these entrepreneurs are benefiting from support provided by multiple actors working across different ecosystems.

This session aims at attracting scholars to discuss their current research on how to build ecosystems in support of sustainability. We will focus our discussion on how to build supportive ecosystems for the new business models, including their new challenges in light of the pandemic. We welcome papers from the different methodological background - including literature reviews, theoretical-, conceptual- and empirical papers. These papers can address one or more of the following topics, which is not an exhaustive list:

- What type of support activities have we seen in well-functioning ecosystems during this global crisis?

- What are the key success factors observed in well-functioning ecosystems?
- How do we build more supportive ecosystems for sustainability?
- What are the most prominent actors in Ecosystems to support sustainability during the post-pandemic era?
- How do government and other public institutions influence the ecosystems in support of Sustainability?
- What are the main lessons learnt from the different ecosystems around the globe in response to the current crisis?
- Do we need to rethink on a new ecosystem structure (or framework) including new actors, attributes or ecosystem dynamics that are emerging now?
- How are the ecosystem boundaries redefined during this global pandemic?
- What role do universities assume in the ecosystem to support sustainability in the post-corona time?
- How can ecosystem actors support entrepreneurs to build resilience and increase their impact in this new era?

This track seeks to involve in the discussion papers developed by senior and young academics, students, entrepreneurs and practitioners. Such variety of profiles and backgrounds will be a good mix in the audience to open a dynamic discussion and to provide relevant feedback to the ideas and work of all presenters.

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Creating multiple value through social business collaboration

The dynamic partnership between IKEA and i-did

Jens Andersson[1, *], Leendert de Bell[2, **]

[1] IKEA Social Entrepreneurship BV; [2] Utrecht University

* jens.andersson@inter.ikea.com

** L.A.deBell@uu.nl

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Abstract

There is increasing evidence of inter-organizational or cross-sector collaboration between social enterprises and for-profit companies to address sustainability challenges. Despite the emerging interest in such collaboration, the actual processes behind it often remain a 'black box'. This case study contributes to filling that gap in the literature, by zooming in on the multi-faceted collaboration between IKEA —a global home furnishings retailer— and i-did, a small but ambitious Dutch social enterprise. This case shows that despite significant joint value creation, the collaboration so far has mainly impacted the social enterprise and has not had noticeable wider outcomes on IKEA or beyond the partnership. Nevertheless, continued collaboration can provide a basis for the generation of mutual value and to further explore and innovate around social and circular business models. We conclude by summarising lessons-learned for the benefit of for-profit companies and social enterprises exploring partnerships to address sustainability challenges.

Keywords

Social enterprise, IKEA, cross-sector collaboration, work integration, circular economy

INTRODUCTION

The extent and complexity of present-day sustainability challenges exceeds the abilities of individual organizations and sectors to deal with them adequately (Pedersen et al., 2020; Sakarya et al., 2012; Austin & Seitanidi, 2012a). There is increasing evidence of inter-organizational and cross-sector collaboration, involving private, public, and civil society actors, to address sustainability challenges. These new forms of collaboration involve formal or informal relations by which two or more actors work jointly to solve a social problem, sharing resources, assets, and risks, and to create value for mutual benefit and for society, which could not have been achieved by individual organizations separately (Technopolis, 2018).

A promising type of cross-sector collaboration concerns the growing number of alliances and strategic partnerships between social enterprises and for-profit companies (Sakarya et al., 2012; Di Domenico et al., 2009). In recent decades, for-profit companies have showed a notably higher level of ambition about the way in which they produce and deliver products and services, with ever more explicit attention being paid to their responsibilities for the people, the environment and society. Although progress is being made in several areas, many for-profit companies still struggle with its implications for the core business. Meanwhile, social enterprises have been pioneers and front runners in tackling structural societal problems through innovative business models that appear to be outside the immediate focus and goals of government or industry (van Dijk et al., 2020). Social enterprises differ from for-profit companies because they are primarily driven by a social purpose, where profit is not an end in itself, but a means to create social impact regarding a specific societal problem. While the societal ambitions of most social enterprises go (far) beyond their own organization, they typically struggle to scale their operations effectively because of a lack the resources, experience, or knowledge.

There is an emerging literature on cross-sector collaboration, but the actual processes behind it often remain a 'black box'. Much of the literature on cross-sector collaboration focuses on identifying organizational motivations and key success factors for collaboration, but not necessarily on the process of joint value creation itself (Le Pennec & Raufflet, 2018). Consequently, our understanding of how value is created in cross-sector collaborations, the implications for the development of new business models, and the tensions involved is still limited (Pedersen et al., 2020). The objective of this case study therefore is to better understand the process of joint value creation within the specific type of cross-sector collaboration between for-profit companies and social enterprises. More specifically, this case study will zoom in on the partnership between IKEA —a global home furnishings retailer— and i-did, a small and ambitious Dutch social enterprise that produces design products from recycled felt and exclusively employs people who, for whatever reason, have been unemployed for a long time. Since 2016, both companies are collaborating in several areas with the purpose of jointly increasing their social and environmental impact.

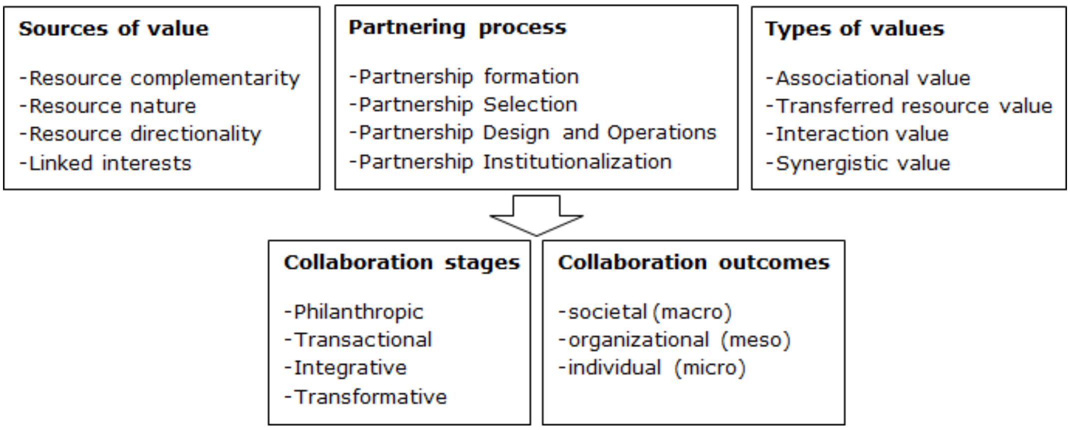
Consequently, our main research question is: What are the opportunities and challenges of cross-sector collaboration between two companies with vastly different sizes, organizational forms, governance structures and business models to create joint social, environmental and economic value? The collaborative value creation (CVC) framework, developed by Austin and Seitanidi (2012a, b), will serve as a framework to analyse the process of value creation within this cross-sector collaboration. Originally designed to assess cross-sector collaboration between corporates and the non-profit sector, this framework seems most appropriate to assess the collaborative value creation process between a multinational corporation such as IKEA and a small social enterprise such as i-did. Data was gathered via desk research and interviews with the main stakeholders from both companies. The findings provide valuable learnings for both companies in question, as well as for other companies that explore the value creation potential of cross-sector collaborative partnerships.

THE COLLABORATIVE VALUE CREATION FRAMEWORK

Cross-sector collaboration, such as the partnership between for-profit companies and social enterprises under study here, are increasingly viewed by academics and practitioners as a powerful instrument to address the increasing size and complexity of socioeconomic problems worldwide, which exceed the abilities of individual organizations to deal with them adequately. Although value creation is the main justification for these cross-sector collaborations, there is still limited understanding of the potential of different types of collaborative relationships. These collaborations seek to reconcile wealth creation with social purpose, bringing together two contrasting organizational forms that cannot be viewed through the same conceptual lens as same-sector collaborations (Di Domenico et al., 2009).

The collaborative value creation (CVC) framework by Austin and Seitanidi (2012a; 2012b) provides a comprehensive conceptual framework that enables a deeper understanding of the multidimensional and multilevel value creation in cross-sector collaboration. As such, this conceptual framework seems particularly appropriate to assess the type of partnership between corporates and social enterprises like IKEA and i-did. Figure 1 illustrates the key components of this conceptual framework that will be applied in this case study. The sources of value, the partnering processes and the types of values of the collaboration between IKEA and i-did will be analysed and discussed first, which will then serve as input to assess the extent of the collaboration stages and the collaboration outcomes.

Figure 1: *Collaborative Value Creation Framework*



Based on Austin & Seitanidi (2012a, 2012b).

Sources of value

The overall hypothesis of the CVC framework is that greater value is created as collaboration moves across the value creation spectrum from sole creation toward co-creation. This puts the spotlight on the underpinning pre-conditions for closer collaboration, or the sources of value in the CVC nomenclature. The assumption is that stronger presence of these sources of value favour closer collaboration and hence greater value creation.

The CVC framework builds on the resource dependency literature, according to which a fundamental basis for collaboration is *resource complementarity*, obtaining access to necessary resources different than those one possesses (Austin & Seitanidi, 2012a). The potential value of resource complementarity, however, depends on the degree of *organizational compatibility*. Major differences between two partners may indeed be sources of value creation but can also become bottlenecks to collaboration. A second potential source of value that needs analysis is the *nature of the resources* each partner contributes to the collaboration. *Organization-specific resources*, such as knowledge, capabilities, infrastructure, and relationships can mobilize and leverage more value than more *generic resources*, such as money or reputation. Subsequently, the potential for value creation depends strongly on how these resources are deployed. Are these resources coming unilaterally from one of the partners or is there a *bilateral* and *reciprocal* exchange of distinctive and complementary resources that are combined to produce new activities that neither organization could have created alone? Lastly, it is essential to clearly understand the extent to which the different partners see their *interests* as *linked*, which involves understanding how they view value (e.g., altruism vs. self-interest) and how possible divergent views on value exchange and creation can be reconciled in a way that both partners perceive as fair.

Partnering process

In order to capture the full potential of a partnership, the process of *partnership formation* —with a particular emphasis on the potential of achieving an organizational fit and the realization of resource complementarity— is an essential precondition for establishing a collaboration. The *partnership selection* process ideally builds on the assessment of the potential for achieving organizational fit during the partnership formation stage, and largely determines the potential for value creation. In the CVC framework, the *implementation* of the partnership relates to the way in which the actual value creation process takes place, whether planned or emanating (Austin & Seitanidi, 2012b). *Partnership design and operations* thereby focuses on procedural processes to increase conformity, such as setting objectives and structural specifications, formulating rules and regulations, establishing leadership or management, and deciding on organizational structures. Once these structures and processes are accepted by both partner organizations, Austin and Seitanidi (2012b) classify this process as *partnership institutionalization*.

Types of value

According to the CVC framework, combining the sources of value discussed above produce different types of value. Austin and Seitanidi (2012a) distinguish *associational value* as the benefits (e.g., in credibility) from having a collaborative relationship with another organization that enjoys a respectable or positive reputation. The benefits from receiving certain resources from the partner is referred to as *transferred resource value*. Some resources are more durable once transferred (e.g., skills and capability improvement vs. money or product donation). In addition, to ensure the sustainability of the collaboration, this value transfer needs to be repeated of renewed regularly. The co-creation process that takes place in the actual collaboration often generates *interaction value*, which is more intangible, such as reputation, trust, relational capital, learning, knowledge, joint problem solving, communication, coordination, transparency, accountability, and conflict resolution. Ultimately, the underlying assumption for engaging in any partnership or collaboration is the potential to create *synergistic value*, where the combination of resources allows both partners to accomplish more together than they could have achieved separately.

Collaboration stages

What stands out from the previous paragraphs is that value creation is a dynamic process, which may change as the relationship between partners evolves. The CVC framework captures the changing nature of the collaborative value creation in the collaboration continuum, which identifies four stages (Austin & Seitanidi, 2012a). The *philanthropic stage* refers to largely unilateral transfer of resources, most commonly financial support from a corporate donor to an NGO or social enterprise. In the *transactional stage*, reciprocal exchange of more valuable resources takes place which contributes to separate objectives of both partners. In the *integrative stage*, both partners aim for organizational integration and co-creation of activities, which may involve sharing missions, strategies and personnel. In the most advanced stage of convergence, the *transformative stage*, the ultimate objective is to co-create transformative system change at the societal level.

Collaboration outcomes

Finally, the CVC framework also assesses the outcome of the collaboration, in terms of who benefits from the collaboration. These types of partnerships often tend to create value at multiple levels, both within and outside the collaboration. Within the partnership, value maybe be created at the *meso* or organizational level and at the *micro* level, for employees of those organizations. Outside the partnership, value creation as a result of the collaboration may benefit individual recipients (micro level), other organizations (meso level) or contribute to systemic changes that improve societal welfare (*macro* level) (Austin & Seitanidi, 2012b).

METHOD AND DATA COLLECTION

To be able to assess and reflect on the collaboration between IKEA and i-did, this study takes a qualitative case study approach. This approach allows a rich, thick description of a particular phenomenon under study with the objective to increase our understanding of this phenomenon (Merriam, 1998). Data was collected from multiple sources to capture the case under study in its complexity and entirety (Yin, 2002). A combination of relevant online resources, company documentation and data from previous research in which i-did has participated (De Bell et al., 2019) was complemented with 8 semi-structured interviews with key informants who have been directly engaged at one or more moments in time in the collaboration between IKEA and i-did (see Appendix 1).

The fact that one of the researchers is working within IKEA allowed easy access and facilitated the participation of respondents. Consequently, the interviews with IKEA respondents took place in a more informal setting, all online because of COVID restrictions. These interviews have not been recorded, but notes were made. The interview with the owners of i-did was conducted on location by both researchers and has been recorded and subsequently transcribed. All interviews were conducted between the months of May and September 2020. Most interviews lasted one hour on average, and were conducted in Swedish and English. The respondents were asked to reconstruct and interpret the collaboration process between IKEA and i-did from the perspective of their respective organizational entity (IKEA Franchise, IKEA Range and Supply, IKEA Netherlands, IKEA Social Entrepreneurship and i-did).

The data analysis consisted of examining, interpreting, and categorizing the qualitative data (Yin, 2002). The CVC framework served to shape the criteria for interpreting the data. To help improve the accuracy, credibility, validity, and transferability of the study, the researchers included member checks on several occasions (Merriam, 1998). Information and interpretations obtained from all respondents were crosschecked in a joint online session with all IKEA respondents and via written feedback on the final draft with all respondents to obtain as objective as possible account and interpretation of critical events. Finally, both the internal and external perspectives of both researchers also allowed for investigator triangulation (Yin, 2002).

THE COLLABORATING ORGANIZATIONS

IKEA

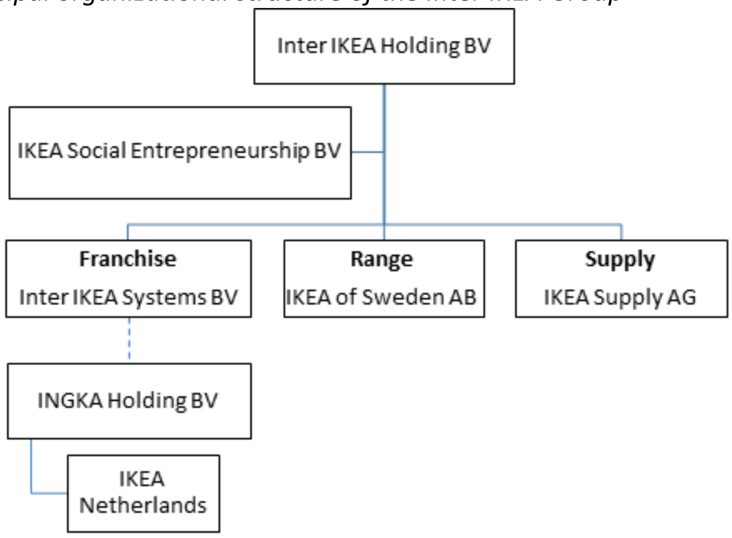
IKEA is a multinational group of Swedish-origin that designs and sells ready-to-assemble furniture, kitchen appliances, home accessories, food and related goods and services. IKEA has more than 500 sales locations worldwide and 217.000 employees and reached total retail sales of EUR 40 billion in fiscal year 2020 (Sep 2019 - Aug 2020).[7]

Being a large multinational corporation, IKEA is far from a monolith. On its main corporate website, IKEA describes itself as "one brand, many companies".[8] IKEA operates as a franchise system, consisting of IKEA Group and franchisees. Inter IKEA Holding B.V. is the holding company of the Inter IKEA Group, which consists of three core businesses (figure 2). Core Business Franchise includes Inter IKEA Systems B.V., which is the worldwide franchisor and owner of the IKEA concept. Core Business Franchise develops the IKEA concept and oversees its implementation in local markets. Core Business Range is responsible for developing and designing the overall IKEA product range within home furnishing and food. Core Business Supply sources and distributes IKEA products to IKEA franchisees. All the IKEA stores operate under franchise agreements. IKEA Netherlands is owned by the largest IKEA franchisee INGKA Holding BV, and operates 12 stores on the Dutch market, except the IKEA Delft store, which is directly owned by Inter IKEA.

A key actor in the i-did partnership has also been IKEA Social Entrepreneurship BV, which is a social purpose corporation established by Inter IKEA to improve the livelihoods and wellbeing of vulnerable and marginalized people by supporting social entrepreneurs and social businesses both directly and indirectly related to the IKEA value chain. This is thus an entity within IKEA that actively promotes partnerships with social enterprises not only based on business relationships, but also by establishing accelerator programs aiming to scale up social enterprises and providing financial and non-financial support.

[7] https://about.ikea.com/en/about-us/year-in-review Consulted on February 9, 2021
[8] https://about.ikea.com/en/about-us accessed on 19 March 2021

Figure 2: Principal organizational structure of the Inter IKEA Group



i-did

i-did is a Dutch social enterprise that started out in 2009 as a sustainable 'slow fashion label', while offering employment opportunities to people with a distance to the labour market, for instance people with a migrant or refugee background. After the consumer market for sustainable fashion proved to be too competitive and challenging, i-did changed direction towards the business-to-business segment end 2012. An in-house procedure to recycle discarded textiles was developed together with felt supplier Frankenhuis B.V., where old uniforms, for example from hospitals, KLM Royal Dutch Airlines and the Ministry of Defence, are processed into design felt. This felt serves as raw materials for new design products or acoustic interior products. The use of this felt also provides great water savings when compared to the production of new textiles.

The production process offers 6-12 months' work experience to people who have been unemployed for a longer period of time. In addition to work experience, training in (employee) skills and empowerment coaching, i-did also offers guidance to follow-up employment. In the past years, i-did has succeeded to secure several large corporate clients, including IKEA. Any profits are reinvested in the enterprise to expand the social and environmental impact.

Roughly ninety percent of its revenue is generated from the business market (both standard collections and specific designs), the remaining ten percent of its revenue is generated from direct sales to customers via their web shop. Additionally, i-did receives some wage cost subsidies from local governments to provide for the coaching activities. i-did Utrecht currently has about 20-25 participants in its 6-month work experience program. i-did The Hague has a different business model, where around 40 people are presently employed for 12 months, supported by a program initiated by the local municipality.

THE COLLABORATION JOURNEY

The collaboration between IKEA and i-did was long in the making and was ultimately triggered by the actions of a few engaged individuals. The first contact between IKEA and i-did was at a match-making event in October 2013, which eventually did not lead to further collaboration. In the years that followed i-did evolved from redesign of excess or overstock of garments from fashion labels to developing its felt making technique. It was parallel with the launch of the first felt product at the end of 2015 that a new connection was made with IKEA. "*IKEA was still out of the picture, until the moment the IKEA Netherlands' sustainability manager … bumped into us at a CSR Netherlands meeting. Mouths fell open, the energy of that meeting long ago was right back and immediately there was the attraction of the incredibly cool felt laundry basket that we had developed with Seepje (a Dutch social enterprise that produces detergents) made from old KLM flight attendants clothing*" (Dekkers, 2020).

The first phase in the collaboration consisted of i-did producing a Christmas gift for IKEA employees and two temporary collections of products for IKEA: *ÅTERSTÄLLA 1* and *ÅTERSTÄLLA 2*. At IKEA, time limited collections are commercialized over a period of a couple of months and are expected to sell out within a given timeframe, as opposed to the so-called running range, which is more long-term and permanent. Products in IKEA are usually developed globally, under supervision of IKEA Range & Supply, but for the *ÅTERSTÄLLA* collections it was possible to produce locally, using left-over textiles following a special design template that had been developed to enable partnerships with local social entrepreneurs. In order to produce the collection, the two organizations worked on sourcing the left-over textiles, developing the products and producing sales and communication material for the IKEA stores.

The *ÅTERSTÄLLA* collections (launched 2016 and 2017) involved upcycling —making new products such as pillow cases from unsold and depreciated IKEA textiles— for all 13 Dutch IKEA stores. i-did was excited about the big client. What was envisioned went far beyond philanthropy: "*It was commercial, but it was also idealistic. It's both. The click with [IKEA Netherlands' sustainability manager] was really about looking in each other's eyes and thinking, we're going to change the world together*" (Interview i-did, 2020).

Commercially, however, the *ÅTERSTÄLLA* collections were not very successful. A few explanations are mentioned by the interviewees. The colour and design of the products were negatively affected by the fact that they were based on textiles that had been discarded in the first place. "*A lesson is that a textile that does not sell, will not sell even if it is repurposed*" (Interview i-did, 2020). Another reason was that IKEA stores do not have enough incentives to actively present and sell sustainable products: "*We had fantastic pictures, website and good store communication, but the stores did not implement these. The products do not sell themselves; clearer communication is needed. As long as we do not measure sustainability, the stores do not communicate it*" (Interview IKEA Social Entrepreneurship, 2020).

Despite the disappointing sales, IKEA and i-did wanted to continue the collaboration after the first two collections, but recognised that there was a need to find products with higher commercial potential. The idea of turning IKEA textile waste into felt came up to close the textile loop within IKEA. However, since this involved the development of new products, beyond the scope of the local design templates used for the first two collections, this required involvement by the global product development organisation IKEA Range & Supply from Sweden. While the main relationship with i-did was maintained by IKEA Netherlands, IKEA Range & Supply supported product development, design, and testing, but no extensive capacity building was provided by IKEA, which is usually the case in global social business partnerships.

The shift in product focus meant that the business collaboration deepened, but it also meant that the product development process became more complex and took much longer to realize. This delay had a considerable impact on i-did as an organization. "*When we started developing a felt collection with IKEA Netherlands in 2017, we put a lot of time in developing it together and we also opened a new production facility in The Hague because there was a big order coming. If we do big orders … we can spread it over the year, it's like an underflow of projects, which is nice because it provides a certain basis for us to employ people. On top of this, we can do projects with higher margins, which is a perfect combination. But then Sweden [IKEA Range & Supply] said: 'Wait a minute, that's product development. This is our part. Please hold your horses and let us get involved'. But then, here we are, two and a half years later...*" (Interview i-did, 2020).

Consequently, i-did not only missed out on revenue from IKEA during 2018, the company had also heavily invested in a new location, systems and people. "W*e had a lot of issues in 2018. The figures of i-did The Hague were very bad, and the trust of the foundations that had invested in us to enable our expansion plans sank to a low*" (Interview i-did, 2020)*.* Although IKEA Netherlands understood i-did's predicament and was trying to think along and come up with alternative solutions, IKEA Range & Supply stuck to their procedures.

In addition, there were colour problems with the felt that was produced by a third-party supplier, which eventually reduced the IKEA order considerably. These problems were caused by the felt sub-supplier and put the spotlight on the need to have clear responsibilities for sub-suppliers. IKEA believed that i-did should have dealt with the problem in a clearer way, since it was i-did's sub-supplier, while i-did expected IKEA to intervene. Ultimately this was an expensive lesson for i-did of how to handle sub-suppliers and the workings of the business-to-consumer sector. "*As soon as you are in retail, you must deal with end consumers, who look at price, safety, colours, etc... When a variety of colours came out the process of making felt, IKEA only picked one colour because they wanted to make sure they had the exact same colour for all end products, which reduced the order considerably* (Interview i-did, 2020).

The collection that started to be developed in 2017 was eventually launched with the name *TILLVERKA* in the summer of 2020 after some additional delay because of the COVID pandemic. *TILLVERKA* was the first IKEA collection worldwide that consisted of recycled felt from its own leftover textile, and includes foldable boxes, cushion covers and a bag. The process of developing the collection highlighted the power differences between a large multinational and a small social enterprise. "*A very big one who takes a very small one serious is fantastic, but also sometimes a difficult process. Decisions taken high up in the process have a very big impact down on the floor. This will be the case for most companies they work with, but sometimes we doubt if they realize what the costs are for a social enterprise with people who aren't trained to be that flexible*" (Interview i-did, 2020).

At the same time, it highlights the need for the smaller player to act professionally in their business relationships. IKEA also facilitated several non-commercial activities to support i-did. In anticipation of the *TILLVERKA* collection, i-did produced a shopping bag in felt that was given as a Christmas gift to 6.500 IKEA co-workers in 2019. IKEA Netherlands also helped i-did to use some of the leftover felt that was not suitable for the TILLVERKA collection. "*Early 2020, IKEA Netherlands suggested to come up with a product for nursery homes, which was a nice and welcome project in Corona time*" (Interview i-did, 2020). Despite the missed revenue from IKEA, i-did bounced back in 2019 and grew markedly. *"If the revenue doesn't come, you must find it somewhere else"* (Interview i-did, 2020).

The relationship between the two companies also developed in other ways. The recently established entity IKEA Social Entrepreneurship BV —set up with the explicit task to support and fund social entrepreneurs and enterprises also outside the IKEA business— entered the collaboration at the beginning of 2018. i-did presented a business case for investment in a mini-plant that would allow them to produce their own felt from discarded textile. As part of the evaluation of such an investment, IKEA Social Entrepreneurship BV provided a grant for a pre-study and brought in IKEA specialists in concept development to support i-did to conceptualize its offer and prepare for scaling. "*They were appointed to us to help us with the franchise model. The energetic meetings have taught us a lot and have given us the right direction. It really helped us to think different as a company*" (Interview i-did, 2020). The multi-year loan agreement for the mini-plant was signed in the summer of 2020 with IKEA Social Entrepreneurship BV. This investment was supported with loans from two foundations and a grant from a third foundation.

The collaboration between IKEA and i-did has thus evolved from one focused on time-limited product collections to a more multi-faceted relationship, involving not only business, but also financial support, capacity development as well as more traditional philanthropy. This has not been a planned process but built on opportunities and challenges arising over time within the collaboration, also dependent on the intrinsic evolution within he two participating organizations.

VALUE CREATION PROCESS

Now we turn to using the CVC framework to go deeper in our understanding of the opportunities and challenges of value creation within a collaboration between companies with vastly different business models and to extract learnings for companies that explore the value creation potential of cross-sector collaborative partnerships. The main findings of this section are summarized in Table 1.

Sources of value

The collaboration between IKEA and i-did appears to fulfil the predictions of the CVC model for successful co-creation of value. There is high *resource complementarity* in terms of the great differences in size, competence and resources of the two companies. The *resource nature* is highly distinct, with on the one hand IKEA with its brand, customer base, expertise and financial resources and on the other i-did with its local roots and credibility and proven business model with positive social and environmental impact. In terms of *resource directionality* the underpinning idea of the collaboration was to use these distinct competences in a highly integrated manner to produce new types of circular products to be sold by IKEA.

There were also strong *linked interests* between the companies; based in an overall vision of fostering positive social and environmental impact, IKEA sought to deal with its textile waste. "*We have a circularity agenda that we take seriously. There are still products that are going to waste. That is not ok*" (Interview IKEA Netherlands, 2020). It was also an opportunity to promote the IKEA brand locally. "*Community work tends to be not so impactful. We take this on national level and link it to core business. i-did does that*" (Interview IKEA Netherlands, 2020). i-did wanted to gain recognition and expand its operations. "*Once you do business with a company like IKEA, it opens doors. It's like a certificate that you are reliable and are able to deliver quality*" (Interview i-did, 2020). Underpinning the partnership was also the personal engagement and intrapreneurship of staff within both IKEA and i-did.

Partnering processes

However, the actual collaboration journey described above shows that moving from high potential to actual value creation was challenging and involved significant degrees of trial and error. Could the reasons for this be found in how the partnering process played out?

The *partnership selection* seems to have been based on relatively informal grounds, involving a shared vision and energy of individual staff members, rather than a comprehensive assessment of the organisational fit. However, the *partnership formation* did involve an assessment of i-did and formulation of a business case from the side of IKEA. Instead, it is in the *partnership design and operations* that the challenges started. While the actual development and production the two *ÅTERSTÄLLA* collections in 2016-

17 went smoothly, it is clear that the commercial results were unsatisfactory. Consequently a more complex set up with the TILLVERKA collection was attempted based on felt, but the reception by IKEA stores and customers was still not very strong when the TILLVERKA collection was ultimately launched in 2020 in the midst of the COVID pandemic. Additionally, the delays in developing TILLVERKA were costly to i-did.

There are three factors that influenced this outcome. First, a decisive external stakeholder in the retail sector weighed in on the partnership: the IKEA customer. Without customers' acceptance and purchasing decision a product, however socially valuable, is not commercially viable and the social and environmental value is questioned. External validation is also part and parcel of the CVC model: "*Institutional viability and expanding value co-creation also requires ongoing inputs from outside stakeholders*" (Austin & Seitanidi, 2012b: 942).

In the IKEA—i-did case, it proved difficult to develop products that customers found appealing enough to buy. How to best commercialize products with social and environmental profiles to customers is an on-going discussion within IKEA and beyond. Research has shown that customers may expect brands and corporations to behave ethically, but that this does not necessarily translate into individual purchasing decisions as they are often based on other criteria (Kronthal-Sacco et al., 2020).

Second, the partnership with i-did was not integrated into the IKEA business model, but based on ad-hoc solutions. IKEA's home furnishing products are with few exceptions sourced from globally competitive suppliers with which IKEA develops close relationships within its global purchasing organisation. There are no established ways of working for local IKEA markets to purchase local products directly from local producers, which also tend to become more expensive than regular IKEA products.

Third, the collaboration with IKEA put high demands on i-did to manage its own production process and sub-suppliers and communicate with IKEA when things do not go as planned. There is also the issue of managing the IKEA orders; as a small producing company i-did wants a certain volume to cut unit costs and spread production over the year to optimize capacity use. For IKEA collections orders tend instead to be variable over the year and based on specific deadlines.

Despite these challenges, three innovative collections were produced and tested, the value of which is discussed in the next section. In parallel, non-commercial solutions and support was added to the collaboration. So while the business relationship has remained project based, the broader collaboration between IKEA and i-did has secured a measure of *partnership institutionalization*.

Types of value

Despite the challenges significant value has been created through the collaboration. *Associational value* has been created in the sense that both companies have gained external credibility, in the case of i-did leading to new business opportunities with other corporate customers, while in the case of IKEA in all likelihood strengthened brand capital on the Dutch market, albeit data has not been accessed to support that assertion.

There has also been substantial *transferred resource value*, particularly from IKEA to i-did, a transfer that became more diversified as the collaboration evolved. i-did has been introduced to IKEA designs and materials and been required to adjust its operations to comply with IKEA's requirements. This has fostered professionalization of i-did as an organization and increased its productivity, but it also led to a loss of autonomy and creative freedom, and there is always a risk of products not meeting the IKEA standards.

The transfer from i-did to IKEA is likely to mainly involve intangibles, in terms of inspiration and energy. The collaboration has provided an opportunity for innovation within IKEA on two related fronts —local production and circularity— within an organization that can be perceived as bureaucratic and slow-moving. As an IKEA representative summarized this: "*They are hungry, we are not*" (Interview IKEA Franchise, 2020).

The interaction value has been high in the form of relational capital, learning, joint problem solving and conflict resolution. "There's always a lot of time for us. We were surprised always when we had meetings with IKEA, they really make time. With other clients it's like, yeah, I've got half an hour and we must come up with something, otherwise I must do something else. One feels that there is commitment and that is a nice basis" (Interview i-did, 2020).

However, the interviews also show that the interaction value has at least partly been offset by the delays and frustrations involved in preparing the third collection. These events also highlighted the power differences between the two companies: "*So, we are all dealing with something new, learning, so it's all well for us, but sometimes we asked ourselves: do they know we are that small?*" (Interview i-did, 2020).

Lastly, the initial ambition to create *synergistic value* has been attained by the delivery of a range of innovative socially and environmentally impactful products created through the collaboration, although the viability of this value can be questioned in the absence of commercial success.

Table 1: Collaborative value creation IKEA and i-did

Sources of value			
Resource complementarity	**Resource nature**	**Resource directionality**	**Linked interests**
High. Great differences in size, competences and resources	Distinctive competencies. IKEA with brand, customer base, expertise and financial resources. i-did with local credibility and business model with positive social and environmental impact	Conjoint. Use of distinct competencies to produce new products for IKEA customers	Strong. Individual interests of the two companies linked. Based in overall vision of social and environmental impact, IKEA seeks to deal with textile waste, while i-did to expand its operations
Partnering processes			
Partnership formation: Organizational fit	**Partnership selection: Co-creation of value**	**Partnership design and operations**	**Partnership institutionalization**
The initial formation process was informal based on connection between individuals and common values	To be accepted as IKEA business partners go through rigorous audits and a business case needs to be approved by management	Collections produced, but challenges in terms of commercial value, IKEA integration and capacity of i-did	Business collaboration project based, but institutionalization through long-term loan and capacity building provided by other parts of IKEA
Types of value			
Associational value	**Transferred resource value**	**Interaction value**	**Synergistic value**
High. Gives credibility to both organizations	Diversifying resource transfer particularly from IKEA to i-did	High value of intangibles including trust, relational capital, learning, joint problem solving and conflict resolution. Partly offset by frustrations surrounding third collection	Innovative socially and environmentally impactful products produced through the collaboration

COLLABORATION STAGES AND OUTCOMES

The CVC framework predicates that higher degrees of co-creation within a collaboration foster deeper, more transformative collaboration and greater outcomes. We have seen in this paper that significant value has been created during the IKEA—i-did collaboration, but also that the collaboration has evolved over time and that there have been challenges and costs to account for. This section rounds of the analysis by discussing the stages and outcomes of the collaboration.

The sources of value, partnering processes and types of value created all point to high degrees of co-creation within the collaboration. Overall, the strong common shared values and the intensive interaction with many common activities, involving test and trials over a period of several years, should classify this as an *integrative collaboration*. However, the business collaboration has remained project based and hence largely *transactional*; i-did has not been integrated as a regular supplier to IKEA and its products have not become part of IKEA's so-called 'running range' but sold as time-limited 'collections'. No common viable business model for continued engagement at local level has been found and the collaboration has not been replicated in other IKEA markets.

In short, the business side of the partnership has not become institutionalized, but instead built on individual engagement that has circumvented the IKEA system rather than transforming it. Instead, at the time of writing the partnership has begun to pivot towards a more *philanthropic collaboration* with IKEA providing preferential loans and capacity building. The upside is that this preserves the close relationship between the two enterprises, potentially awaiting a solution to the impediments to a more sustainable business relationship. The downside is that this reduces the potential for co-creation and collaborative value creation in the short-run.

This shows that the level of co-creation has not been consistent over time, which affects the potential outcomes of the collaboration. Having not been close to a *transformational stage* the outcome at *macro level* is likely to be very limited, and if it exists difficult to measure. There has been no great expansion of the social and environmental impact due to the partnership and it has not fuelled the spread of social innovations, technologies or regulations in society, although there are still hopes for the conceptualisation work to enable replication of the i-did model in the years to come.

It also means that the effects on *meso level* on the two organizations arguably have been below what could be expected given the high degree of complementary sources of value. Nevertheless, i-did has clearly benefited as an organization from the collaboration through increased credibility and visibility, financial and non-financial support, organizational development and opportunities for innovation and expansion. But this has come at a cost, with delays and reduction in orders from IKEA leading to sales not meeting expectations and a decrease in trust from other funders, in addition to hard-earned lessons to manage sub-suppliers.

The impact on IKEA has been relatively limited given its size and as mentioned the partnership is yet to lead to changes to IKEA's business model to accommodate this kind of local product partnerships. The outcome of the collaboration on IKEA is, if anything, more indirect, e.g. by triggering an internal discussion on local business models, contributing to finding solutions to old co-worker clothing and also by being used as a showcase for IKEA's engagement with social entrepreneurs.

At a *micro level* the high interaction value is likely to have been broadly been beneficial for the people involved in the collaboration by enriching their jobs of the people involved, but again there have been significant frustrations.

CONCLUSIONS AND LEARNINGS

This case study has sought to open up the 'black box' of cross-sector collaboration, within the special case of a small local social enterprise partnering with a large multinational for profit company. It has showed that the collaboration journey has involved significant trial and error and expanded beyond the direct business relationship to the benefit of i-did. Significant value has been created through the business collaboration, but the challenges of convincing customers and adapt the IKEA business model to this type of partnership remain. This greatly reduces the potential for co-creation and collaborative value creation in the short-run.

Nevertheless, continued collaboration is secured through non-business means and provides a basis for continued generation of mutual value and also to explore and innovate around social and circular business models. Through such collaboration IKEA can develop a testing ground for innovation in the sustainability domain and related communication opportunities, while i-did gains credibility, knowledge and market access from working with a large multinational corporation.

The IKEA–i-did collaboration brings several lessons-learned to for-profit companies and social enterprises exploring partnerships to address sustainability challenges.

For-profit companies. For-profit companies need to be clear about why they are partnering with social enterprises. What are the social impact and business goals involved? If there are business objectives involved, it is important to formulate a collaboration roadmap that may involve test and trial, but eventually arrives at a realistic business case. Without commercial viability, there is greatly reduced likelihood for sustaining and scaling social impact within the collaboration.

For-profit companies also need to be aware that partnering with a social enterprise is likely to involve deviation from their core business models, ways of working and incentives. Exceptions or a window for innovation needs to be ensured, to avoid a reliance on personal engagement and workarounds. Financial and capacity building support and a long-term perspective are likely to be necessary. Such measures also need to be combined with mechanisms for carrying over and integrating successful socially innovative approaches in the core business model and the rest of the value-chain with a view to become a more sustainable business as a whole.

Social enterprises. Social enterprises should consider partnerships with multinational for-profit companies with circumspection and as part of a wider commercial or scaling strategy. Such partnerships are potentially very rewarding, but purely commercial collaborations may require significant investment in professionalising the organisation, ensuring quality, building up production capacity and lowering prices. The social enterprise should consider where in the value-chain of the for-profit company it can bring most value and also consider lower-risk commercial or non-commercial collaboration as a complement to or instead of commercial partnerships. As the much more vulnerable party it should demand special treatment, support and time to adapt from the much stronger party.

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Appendix: Interviews

i-did, Owners (M. Geijsen and M. Dekkers), Utrecht, September 1, 2020.

IKEA Social Entrepreneurship, Partner Account Leader, online, September 10, 2020.

IKEA Social Entrepreneurship, Business Controller, online, May 14, 2020.

IKEA Franchise, Concept Description Manager, online, May 14, 2020.

IKEA Range and Supply, Partner Development Leader, online, May 12 and July 16, 2020.

IKEA Netherlands, Business Development & Transformation Manager, online, July 13 and July 21, 2020.

The Influence of Policy Mixes on Business Model Innovation for Sustainability

Mina Rezaeian[1,*], Jonatan Pinkse[1], John Rigby[1]

[1] Manchester Institute of Innovation Research, Alliance Manchester Business School, University of Manchester, Manchester, M15 6PB, UK

*mina.rezaeian@manchester.ac.uk

Abstract

The academic debate on sustainability transitions increasingly points to the role of policy mixes in inducing technological innovations to influence the speed and direction of a change in socio-technical systems. However, the role and impacts of policy mixes on the way firms innovate their business models to better accommodate the uptake of sustainable technologies in mainstream markets is relatively unexplored. This paper develops a conceptual framework that delineates the interactions between policy mixes and a set of firm-specific conditions – perception, dynamic capability, and innovation barriers. We explain how different policy mix features stimulate firms to make business model innovation choices that either put those firms on exploitative or explorative pathways in their sustainable transition journeys. Our framework contributes by articulating the underlying relations and tensions between policy mixes and business model innovation and leads to a better understanding of the role of firms in sustainability transitions.

Keywords

policy mix, business model innovation, sustainability transitions.

1. INTRODUCTION

From forest-razing wildfires to ecological depletion, environmental challenges are making their presence felt in many different forms. The regularity with which such challenges occur calls for urgent policy interventions to affect systemic changes and move towards a more sustainable future (Bergek et al., 2014, Kemp and Pontoglio, 2011, Lindberg et al., 2018). These policy interventions are broadly known as environmental or transition policies and encompass efforts to guide or facilitate transitions by influencing the speed and direction of a change in socio-technical systems (Alkemade et al., 2011). However, no single approach or policy instrument is capable and versatile enough to deal with major transitions, particularly those that involve multiple actors and institutions (Geels, 2011, Lindberg et al., 2018, Markard et al., 2012, Turnheim et al., 2015). Understanding how political and policy agendas are set and which actors are involved requires a more dynamic perspective compared to traditional policy studies (Flanagan et al., 2011). Many policy instruments need to act simultaneously or sequentially as part of a policy mix to catalyze change (Kivimaa and Kern, 2016, Rogge and Reichardt, 2016, Edmondson et al., 2018).

Promoting sustainable technologies through different policy instruments is a common practice for policymakers to support sustainability transitions. Many studies have investigated the links between environmental policy and innovation (Popp, 2006, Nordhaus, 2002, Newell, 2010, Gans, 2012) and integrate policy-mix literature into sustainability research, in particular the impact on technological innovation (Edmondson et al., 2018, Kern and Howlett, 2009, Kivimaa and Kern, 2016). However, policy mixes do not have a tangible impact on the uptake of sustainable technologies unless firms adopt and commercialize these as new products and services (Wellington et al., 2007, Adams et al., 2016). As Fagerberg (2018) argues, technological innovations must be complemented by non-technological innovations to drive structural changes and sustainability transitions.

Business model innovation is an important form of non-technological innovation that helps firms to diffuse, exploit, and tap into the inherent value of sustainable technologies (Boons and Lüdeke-Freund, 2013, Markard et al., 2012). However, many different barriers such as path dependency and organisational inertia, lack of information or awareness of environmental impacts, and a lack of capability to respond to sustainability transitions (Kennedy and Bocken, 2020, Chesbrough, 2010b) often make it challenging for businesses to choose and implement appropriate business model innovations. Consequently, most firms remain cautious in taking significant actions required for sustainability transitions (Pinkse and Kolk, 2010). Against the above background, and in the context of sustainability transitions, the issue that arises is the role governments could or should play to support (or even push) businesses to overcome such barriers.

It is in our view not well understood how policy mixes help firms address innovation barriers and how they affect the degree and speed of business model innovation. Our main objective in this paper is to explore this question by conceptually analyzing how and under what conditions policy mixes lead firms to innovate their business models to better accommodate the uptake of sustainable technologies in mainstream markets. For this purpose, we first characterize policy interventions as a policy mix and trace their impact on business model innovation. Next, we develop a conceptual framework that explains how policy mixes modulate firms' business model innovation choices. Our framework zooms in on a set of firm-specific conditions – perception, dynamic capability, and innovation barrier – as key transmitters of policy mix impacts on these choices. Finally, we explain how different policy mix features stimulate firms to make business model innovation choices that either put them on exploitative or on to explorative pathways in their sustainable transition journeys. Our framework helps to articulate the underlying relations and tensions between policy mixes and business model innovation and leads to a better understanding of the role of firms in sustainability transitions.

2. TRANSITION POLICIES AND POLICY MIXES

Existing studies have explored the role of environmental policies on innovation (Fischer et al., 2003, Nill and Tiessen, 2005, Popp, 2003, Rogge et al., 2011). They have assigned different categories for policy instruments from technology-specific vs general instruments (Bergek et al., 2014) to economic vs regulation and information (Rogge and Reichardt, 2016), and command-and-control vs market-based and voluntary policies (Bohnsack et al., 2015, Kemp and Pontoglio, 2011). Despite the different categorizations, policy instruments have two mutually re-enforcing roles in bringing about transitions: supporting novel niche innovations and destabilizing existing socio-technical regimes (Kivimaa and Kern, 2016).

Many scholars compared the impact of different instruments on the rate and direction of technological innovation to indicate the most prominent instrument to accelerate technological innovation. While some studies highlight the superiority of market-based policies and price mechanisms (Jaffe et al., 2002, Jaffe et al., 2005), others suggest that regulatory and command-and-control policies are more effective in driving the development of sustainable technologies (Greene, 1990). However, recent literature claims that policy instruments’ design features (e.g., stringency and predictability) are more important than their nature in encouraging, mediating, and directing innovative compliance (Johnstone et al., 2010b, Rogge et al., 2011, Kemp and Pontoglio, 2011, Bergek et al., 2014).

Furthermore, most studies examine the impact of environmental policy as separate instruments – not as a policy mix. Yet, it is almost impossible to analyze the impact of a specific policy instrument because it is interlinked with and influenced by other sets of policies, especially in the case of complex sustainability transitions. Such transitions require deep structural changes and ask for a combination of policy instruments, acting simultaneously or sequentially over time (Kivimaa and Kern, 2016, Trencher and van der Heijden, 2019, Rogge and Reichardt, 2016, Edmondson et al., 2018). Flanagan et al. (2011) highlight the importance of studying policy mixes by indicating that the emergence of policy mixes can be considered as a window of opportunity to deal with a messy and complex, multi-level, multi-actor reality. Policy mixes are complex arrangements of multiple policy instruments in different domains which interact over a certain objective and develop and evolve incrementally over time (Rogge and Reichardt, 2016, Kern and Howlett, 2009).

A closer look at the literature shows that the focus of policy mix studies is on analyzing the impact of environmental policy on technological innovation. However, it has been argued that it is necessary to move to frameworks that consider the implications of environmental policy mixes on enduring changes in business models to better align them with a sustainable economy (Burger and Luke, 2017). Although technological innovations are important for firms, without accompanying business models they might not suffice to guarantee firms' success (Zott et al., 2011). Therefore, technological and business model innovations are complementary, and their boundaries are unclear and potentially overlapping.

When sustainable technologies are immature and cannot yet compete with current technologies, policy mixes will need to focus on improving the economic viability of sustainable technologies by helping create new markets for them. But when business models become more pronounced, it becomes a managerial rather than a technological challenge for firms to find the right business model (i.e., value proposition, customer requirements, stakeholder value, etc.) to be competitive while complying with environmental policies. In this paper, we build on Rogge and Reichardt (2016) framework to analyze the link between the policy mix and business model innovation. As we are interested in analyzing the impacts of 'existing' policy mixes on business model innovations, we only consider policy mixes characteristics and elements. The policy process – i.e., policymaking and policy implementation – is beyond the scope of this paper.

3. BUSINESS MODEL INNOVATIONS

Business models are the ways firms deliver value to their customers, entice customers to pay for value, and convert payments to profit (Amit and Zott, 2001, Teece, 2010). Business models can be characterized by value proposition, value creation and delivery, and value capture (Foss and Saebi, 2017, Teece, 2006, Teece, 2010, Schneider and Spieth, 2014, Saebi et al., 2017). A dynamic view of business models looks at innovations related to business models and argues that such innovations offer new logics and ways to create and capture value (Casadesus-Masanell and Zhu, 2013). Despite numerous definitions of business model innovation, unfortunately, there is no consistency in the literature about the degree and type of changes or innovations in a business model to be considered business model innovation. Schneider and Spieth (2014) assert that to execute business model innovation, at least one of the three business model dimensions – i.e., value offering, value architecture, and revenue model – should be innovated.

Business model innovation also differs with respect to the unit of analysis – based on the emphasis on the changes in the architecture, the components, or the ramifications for other parts of the business model (Foss and Saebi, 2017). It can take place through incremental changes and developments in individual business model elements or radical changes in the business model's architecture. Incremental changes happen by gradually changing or innovating one or some of the business model elements. By comparison, radical innovations are revolutionary changes and breakthroughs in the entire business model or its architecture which can create new markets and disrupt existing businesses (Teece, 2010). Subsequent discussions on business model innovation refer to the exploration-exploitation dichotomy. Osiyevskyy and Dewald (2015, p.58) argue that there are two generic strategies related to business models: "explorative adoption of a disruptive business model, and exploitative strengthening of the existing business model".

Bolton and Hannon (2016) argue that business model innovation is strongly associated with and influenced by political and regulatory structures in a socio-technical regime. Regulatory incentives such as tax cuts and feed-in tariffs play a significant role in motivating or pushing firms to change their business model and accelerating the transitions (Huijben et al., 2016). Although the importance of analyzing the relationships between government policies and innovative business models has been emphasized (Wells, 2013), so far, policy mixes have rarely been discussed as having an influence on business model innovation. A review of the literature regarding the interactions of government policy and firms' business models reveals that studies do not use a broad, policy mix perspective on environmental policy (San Román et al., 2011, Karneyeva and Wüstenhagen, 2017, Yang et al., 2020). Also, they rarely discuss 'how' policies lead to changes in firms' business models. It is not yet clear under what circumstances policy mixes bring about innovative changes in firms' business models.

4. CONCEPTUAL FRAMEWORK

In this section, we develop a conceptual framework to articulate and analyze the conditions under which government policy mixes are most likely to lead to business model innovation. Figure 1 displays the relationship between the different building blocks of policy mixes and firms' approach to business model innovation to accelerate transitions. Beginning with the building blocks of environmental policy mixes and their specific features, we introduce a set of firm-specific conditions, which influence how firms could manage their business models in response to policy changes. Based on the impacts of policy mixes on these conditions, we show the different reconfigurations (innovations) that could occur in firms' business models. Our framework shows that the interplay between policy mixes and business model innovation manifests as a complex choice between two separate pathways – exploration and exploitation – each leading to specific firm responses.

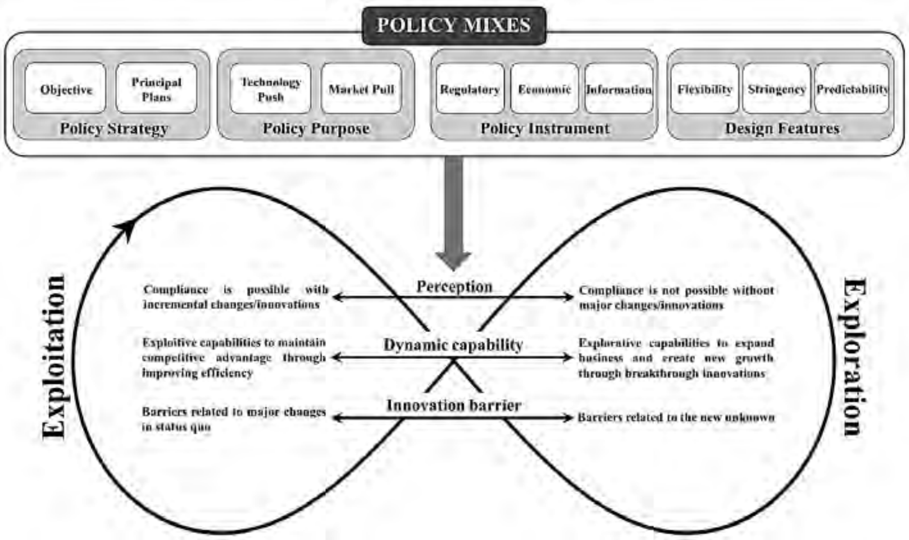

Figure 1. The interplay between policy mix and firms' approach to business model innovation

4.1. FIRM-SPECIFIC CONDITIONS

As Figure 1 shows, we discuss three firm-specific conditions that modulate the relation between policy mixes and business model innovation. According to Charitou and Markides (2003), a firm's response to disruptive innovations – and the policies related to them – depends on two factors: motivation and ability. In this paper, we define three specific factors: perception, dynamic capability, and innovation barriers. While perception captures motivation, we see a firm's dynamic capabilities and innovation barriers as the ability to respond. In the following, we briefly discuss how these factors might influence firms' approaches to business model innovation and determine their motivation and capability to change.

Perception. The first factor is firms' perception of policies and the regulatory landscape in general. Jackson and Dutton (1988) highlight that corporate decision-makers interpret and evaluate events, developments, and trends in their industry based on perceived characteristics of issues as threats or opportunities. Although studies have highlighted the superiority of the perception of threat to opportunity in triggering business model innovation (e.g. Saebi et al., 2017), Jackson and Dutton (1988) argue that environmental issues and their associated policies can be linked to both threat and opportunity features such as high priority, urgent, and stressful. Accordingly, we consider in what way different features of policy mixes shape firms' perception of the policy landscape as being a threat or an opportunity and how this perception motivates making business model changes in response.

Dynamic capability. Teece (2018, p.1) defines dynamic capability as "firms' ability to integrate, build and reconfigure internal competencies to address, or in some cases to bring about, changes in the business environment." Teece (2018) further argues that the speed, degree, and associated cost of aligning the firm's resources – including its business model(s) – with customer needs depending on the strength of a firm's dynamic capabilities. We argue that dynamic capabilities are not only necessary to meet customer needs but also essential for firms to adjust, adapt, or innovate their business models to comply with environmental policies. By increasing the ability to transform and implement external knowledge, a firm can increase its dynamic capabilities to respond to external change (Daghfous, 2004). In our framework, we consider to what extent policy mixes can influence firms' dynamic capabilities that allow them to change their business model.

Innovation barrier. Several studies have identified barriers for firms to respond to sustainability transitions such as path dependency and organizational inertia, lack of information or awareness of environmental impacts, misaligned incentives, and a lack of capability (Chesbrough, 2010a, Kennedy and Bocken, 2020, Stubbs and Cocklin, 2008). Chesbrough (2010a) categorizes barriers to business model innovation into two groups. The first relates to existing assets and business models and arise when a firm must reconfigure assets and operational processes. The second refers to the lack of cognition of recognizing and understanding barriers. Regulations and policies are also mentioned as one of the barriers to innovation in various industries. Kennedy and Bocken (2020) specify the challenges to business model innovation in the context of sustainability as: ambiguity, dealing with the absence of 'green' supply of materials, unsupportive regulatory conditions, managing conflict with the existing incumbent business model, lack of guiding managerial tools, and added administrative burden to verify green claims. In our framework, we reflect on the influence of such innovation barriers for the impact of policy mixes on business model innovation.

Together, these three factors determine the conditions that help or hinder what effect policy mixes might have on business model innovation. They help articulate why and how firms respond to policies and regulations differ in terms of making changes to their business models.

4.2. POLICY MIXES AND THEIR IMPACT ON FIRM-SPECIFIC CONTEXTS

In this section, we elaborate and operationalize the policy mix by following Rogge and Reichardt's (2016) building blocks: policy strategy, policy purpose, instrument types, and design features. As we seek to analyze the impact of 'existing' policy mixes on business model innovation, in our framework we do not consider how elements of the policy mix come about and why they change, i.e., the policy process. The interactions between the policy mix building blocks and firm-specific conditions suggest that each building block, comprising of different components, will affect firms' approach to innovating their business models (exploration vs exploitation pathways), depending on how they perceive government policies; whether they have the necessary dynamic capabilities; and if they face specific innovation barriers.

Policy strategy

Studies have highlighted the role of policy strategy – the long-term strategic orientation of policies – on sustainability transitions and technological change (Quitzow, 2015, Rogge and Reichardt, 2016, Weber and Rohracher, 2012). Policy strategy is a combination of policy objectives and the measures (principal plans) designed to achieve them (Rogge and Reichardt, 2016). Policy objectives refer to the long-term targets of policy mixes with quantified ambition levels to address environmental problems and can be broken down into smaller goals (Borrás and Edquist, 2013, Rogge and Reichardt, 2016). Principal plans refer to strategic action plans and roadmaps governments set to achieve such objectives and support long-term visions of policy mixes (Rogge and Reichardt, 2016).

The 'quality' aspect of policy strategy (in terms of clarity, coherence, and scope of application) plays a fundamental role in business model innovation. Compared to technological innovation, business model innovation presents a greater challenge to firms as it may require them to change all or several important elements of their business model such as value propositions, customer segments, supply chain partners, and key tasks and resources. Furthermore, the presence of innovation barriers such as managerial resistance (Chesbrough, 2010a) and ambiguity related to policy incentives (Pinkse and Groot, 2015, Kennedy and Bocken, 2020) could make business model innovation time-consuming, expensive, and risky processes.

A long-term orientation of policy strategies with a clear and coherent scope, guidance and timeframe is likely to affect firms' approach to business model innovation. First, it crystallizes firms' perception of the inevitability and enduring nature of the policy, convincing them that change is unavoidable and that there is little space to manoeuvre past policies without innovating their business model. Second, the future orientation of policy strategies gives firms a chance to build up dynamic capabilities to respond to external change. They provide firms time to implement changes and form a picture of their future business structures (i.e., value proposition, customer segments, key resources, key partners, etc.) within their long-term vision. Third, clear, long-term policy strategies can reduce or address some of the innovation barriers by reducing ambiguity, fear, and risk of the unknown.

> ***Proposition 1:*** *Short-term and ambiguous policy strategies are more likely to lead to exploitative innovation or small changes in firms' business models.*

Policy purpose

Policy intervention is widely considered a fundamental trigger for sustainable technologies. Such technologies' nascent nature requires substantial R&D to be compatible with existing regimes, and their return on investment is accompanied by a high level of uncertainty and risk (Rennings, 2000, Jaffe et al., 2002). Policies induce the development of sustainable technologies by considering both the supply and the demand side of the regime through technology push and market pull (Peters et al., 2012).

Technology-push policy tends to address the supply side failure of knowledge or information-related innovation barriers and seeks to support radically new technologies or the further development of existing technologies to ensure their compatibility with the needs of the regime. For a technology push policy to be successful, policymakers need to think about its effects on firms' existing business models. The need for fundamental changes in a business model depends on a technology's potential conflict with existing business models. The higher the degree of conflict, the more resistance from established players in the market (Charitou and Markides, 2003). Policymakers might have to consider to what extent the firms receiving R&D support have the dynamic capabilities that would allow them to change their business model to accommodate novel technologies.

For policy mixes to induce business model innovation, it seems that policies creating a market pull are more likely to have an impact because they create customer demand (Schmookler, 1966, Rennings, 2000). Such policies reduce the uncertainty associated with investments in sustainable technologies because they address the risk of failing to get customers. From a business model perspective, the challenge for market pull policies will be to create demand for sustainable technologies in mainstream markets, not just niche markets. For incumbents to change their business models for mainstream markets, though, it will not only be sufficient to provide support for sustainable technologies but to also ban or remove support for unsustainable technologies, thereby destabilizing the regime (Kivimaa and Kern, 2016).

Policy mixes that support technology push or market pull do not necessarily lead to business model innovation as the assumption cannot be made that existing business models can accommodate the sustainable technologies that the policy envisages. Firms that lack the dynamic capabilities to reconfigure their business model might use policy support for R&D to develop sustainable technologies but fail to commercialize them when they create conflict within their organizations. For a market pull policy to have such an impact, they should incentivize firms to change their business models used in the mainstream market instead of testing new business models in niche markets. Policymakers risk supporting the creation of business models that are fully dependent on government support but are not financially viable without such support.

> ***Proposition 2:*** *Technology push and market pull policies are less likely to lead to business model innovations if they do not consider firms' mainstream market and its barriers to change.*

Policy instruments

A successful policy mix contemplates the general picture of the innovation context, identifies the problems firms have to face to deploy sustainable technologies and tries to mitigate them from different angles with a mixture of instruments (Del Río et al., 2010, Kemp, 2011). Popularly referred to as sticks, carrots, and sermons, policy instruments are categorized into three groups: regulatory (command-and-control), economic (market-based), and information (soft instruments).

Regulatory instruments are legal and enforceable tools that influence social and market interactions and the behaviour of individuals and firms through binding regulations (Borrás and Edquist, 2013, Quitzow, 2015, Morgan and Yeung, 2007). Such coercive instruments determine how certain target groups should act within pre-defined boundaries (Krott, 2005) and are usually supported by threats of sanctions and penalties (e.g. economic sanctions, or withdrawal of rights for a while) in cases of non-compliance (Borrás and Edquist, 2013). The coercive nature of regulatory instruments is an effective push against firms' resistance to change arising from perception or innovation barriers such as managerial obstruction and organizational inertia.

Economic instruments are financial and market-based instruments providing fiscal (dis)incentives to influence social and economic activities by incorporating environmental considerations into business and public policy decisions (Borrás and Edquist, 2013). Economic instruments can encourage firms to change their business models. They alleviate managers' fear and resistance to change by influencing their perception of the policy as an opportunity to increase profit or a threat to lose the market. They, too, mitigate market-based innovation barriers by providing financial support for firms to change their business model. Such instruments influence firms' dynamic capabilities by facilitating demonstrations and procurement as well as creating favourable market conditions for firms to adjust or innovate their business model at a lower risk and cost.

A key problem in adopting and commercializing sustainable technologies is the lack of knowledge and research in this area. Information instruments are suitable to tackle this issue. Information instruments are voluntary and non-coercive policies that aim to reduce the 'information costs' of firms (Jaffe and Stavins, 1994). They can help address several barriers in the innovation process such as lack of information or awareness of the environmental impact, lack of knowledge to respond to sustainability transitions, and lack of guiding managerial tools. Information instruments play the interpretive role of policy mixes by providing information and changing patterns of cognition, understanding and meaning, and thereby creating or changing visions and expectations of firms (Edmondson et al., 2018).

A mixture of different instruments is needed to influence firms' perception and dynamic capabilities and address innovation barriers. While regulatory instruments are more likely to enforce firms to change their business models, mostly by affecting perceptions or resistance-driven innovation barriers, economic and information instruments tend to empower firms by improving their dynamic capabilities and addressing market and information-based innovation barriers. As a result, they not only enforce but also enable firms to change their business model to efficiently adopt and commercialize sustainable technologies.

> ***Proposition 3:*** *While regulatory instruments are more likely to enforce firms to change their business models, mostly by affecting perceptions and/or resistance-driven innovation barriers, economic and information*

instruments tend to empower firms by improving their dynamic capability and addressing market and information-based innovation barriers.

Design features

Studies have also highlighted the importance of policy mix design features in encouraging, mediating, and directing innovative compliance responses and their impact on policy instrument's effectiveness and efficiency (Del Rio, 2009, Rogge et al., 2011, Kemp and Pontoglio, 2011, Bergek et al., 2014). In this section, we analyze the impact of three design features on the firms' approach to business model innovation: stringency, flexibility, and predictability.

Stringency defines "the ambition level of an instrument" (Rogge and Reichardt, 2016, p.1624) and shows the level of required effort and expenditure for market actors to comply (Johnstone et al., 2010a). The stringency of policies affects firms' perception regarding the inevitability of a change. While strict environmental policies are fundamental for inducing compliance (Kemp, 2000, Rogge and Reichardt, 2016), they should be flexible enough to let firms comply with stringent targets without hindering well-proven paths and stifling radical innovations (Del Rio, 2009, Kemp, 2011). Since radical innovations usually require large investments – in terms of time, money, resources, and skills – flexible policies can give firms a chance to select their response based on their capabilities and mitigate organizational inertia (see the German example of incumbents' response to EEG policy in section 4.2.1). Predictability shows "how certain and foreseeable the policy signal is" (Bergek et al., 2014, p.113) and addresses investor uncertainty (Quitzow, 2015). As discussed, uncertainty is one of the major barriers hindering radical and systemic sustainable technologies (Del Río et al., 2010). Predictable policy mixes reduce uncertainty and give firms the needed security to prepare their future business structure, mobilize resources, and improve dynamic capabilities.

A balanced degree of stringency, flexibility, and predictability of the policy mix will influence firms' perception regarding the inevitability of the change and the prospect to remain part of the socio-technical regime. It gives firms time and flexibility to improve their dynamic capabilities and select their preferred means of compliance. It also addresses innovation barriers related to uncertainty and ambiguity.

> ***Proposition 4:*** *A higher degree of flexibility along with stringency increase the chance of explorative/radical business model innovations.*
> ***Proposition 5:*** *A high degree of predictability decreases the uncertainty related to long-lived capital-intensive investments or the costs related to fundamental changes in BMs and therefore increase the chance of explorative/radical business model innovations.*

4.3. BUSINESS MODEL INNOVATION PATHWAYS

Our framework shows that firms' responses to policy interventions manifest via two pathways: exploitative and explorative. In this section, we explain the specific conditions that would lead firms to follow these pathways.

Exploitative and explorative pathways

An exploitative pathway refers to incremental improvements over time or changes in some of the elements of business models (Osiyevskyy and Dewald, 2015, Knab, 2018) to improve efficiency, competitiveness, and operations while avoiding contingencies and risk, minimizing costs, and maximizing return on investment (ROI) (Osiyevskyy and Dewald, 2015, Humble et al., 2017). The perception of firms is that they can comply with the policies to a satisfactory level and survive in the current socio-technical regime through incremental adjustments by only changing some business model elements. Such firms tend to rely on exploitative capabilities that help strengthen the current business model and maintain competitive advantage (Liu et al., 2019). As these firms' major objective is to protect their existing business model, any major changes in the socio-technical regime that make their environment unstable, unpredictable, and ambiguous could be regarded as an innovation barrier.

In comparison, an explorative pathway refers to redesigning existing business models through breakthrough radical changes in value propositions, value creation and delivery or the overall architecture of a business model (Markides, 1998, Markides, 2006). Here, the perception of firms is that they will not survive in the socio-technical regime without major modifications to their existing business model. Hence, they need to leverage explorative capabilities to adapt to changes and breakthrough innovations, expand their business, and create new growth (Liu et al., 2019). As these firms pursue radical changes in their business model, anything related to the new unknown business can be considered an innovation barrier, from path dependency and organizational inertia to the risk of losing competitive advantages.

Policy mixes and exploitative and explorative pathways

As discussed in the previous sections, the policy mix influences firms' perception, dynamic capabilities, and innovation barriers and can induce business model innovation. We argue that the combination of these elements in a policy mix should be tailored (according to business types and nature of technologies) to support specific business model innovation pathways. If current business models can accommodate new sustainable technologies and meet policy requirements, policy mixes' building blocks should be designed to support firms to follow an exploitative pathway by supporting incremental changes of some business model elements to increase efficiency, reduce costs, and attract more customers. On the other hand, if existing business models do not allow accommodating new sustainable technologies and there is a need for a different way of doing business to meet policy goals (because current models are acting as a barrier to transitions), policy mixes should support explorative pathways by destabilising prevailing regimes and promoting breakthrough innovations.

While all policy mix building blocks are needed to promote both exploitative and explorative pathways, they differ in their focus, levels of support and objectives. Although a long-term orientation of policy strategies is needed for both pathways, long-term certainty with minor changes in the regulatory system is more likely to support exploitation activities, while policy strategies for a massive transition and major change requirements are more likely to bring about exploration. The focus, goal, and design features of policy instruments should also be targeted to address specific innovation requirements. They must be directed in a way to help firms improve their operations, efficiency, and competitive advantage to support an exploitative pathway. Conversely, to accelerate an explorative pathway, policy instruments would have to focus more on destabilising prevailing socio-technical regimes. These instruments provide the 'window of opportunity' by facilitating favourable market conditions, delivering necessary knowledge-related support, and addressing innovation barriers. Policy mix design features also act in a different manner in promoting exploitative or explorative pathways. For example, levels of stringency influence how firms choose pathways. A high stringency level usually means a great level of ambition that asks for major changes and efforts to comply with policies and is more likely to bring about explorative changes to business models.

Although it has been argued that firms should manage both exploitative or explorative pathways simultaneously (Osterwalder et al., 2020), we posit that it will depend on an industry's underlying conditions how governments could best stimulate specific pathways to bring about a sustainability transition. The appropriateness of supporting exploitative or explorative business model innovation depends on whether firms in an industry perceive a policy mix as an opportunity or threat, to what extent they have the dynamic capabilities to change their existing business model, and which specific innovation barriers they face. In industries where there is much resistance to sustainability transitions, as firms mainly deploy unsustainable technologies, policy mixes should first focus on supporting an explorative pathway for business model innovation. Sustainable technologies often stay in the niche due to insufficient evidence for their commercial potential, raising doubt about their chance of survival in mainstream markets. By creating incentives to explore the viability of new business models for sustainable technologies, the government can support the launch of new ventures by start-ups or incumbents that create variety in the market (Hockerts and Wüstenhagen, 2010). Only once there is sufficient accumulation of their commercial potential as part of mainstream markets, the government can support scaling up such business models and support firms in doing so through exploitation activities to improve efficiency and maximise potential (Schaltegger et al., 2016). In industries where sustainable technologies have already reached maturity and there is less conflict with existing business models, the policy mix should instead be tailored to exploitation more swiftly. Here it is no longer an issue of insufficient market evidence but rather a need for a strong signal to scale up sustainable technologies and accelerate the sustainability transition. Notably, supporting explorative business model innovation in such industries might be counterproductive to a transition as it keeps creating variety, while what is needed is convergence to a new dominant business model for the industry. As the underlying conditions in an industry that support or hinder the uptake of sustainable technologies tend to change over time, policy mixes will have to change accordingly, leading to alternating exploitative and explorative pathways in the transitioning to sustainability.

5. CONCLUSION

In this paper, we present a conceptual framework that shows how combinations of different policy instruments with certain features and objectives (that is, policy mixes) need to come together and affect non-technological innovations for the purpose of transitioning towards a more sustainable future. We focus specifically on business model innovation and propose that policy mixes modulate firms' business model innovation choices through a set of firm-specific conditions. These conditions help articulate the circumstances under which policy mixes stimulate firms to choose between two business model innovation pathways – exploitative or explorative – on their sustainable transition journeys.

This paper contributes to the emerging literature streams on policy mixes, sustainability transitions and business model innovation. While an emerging body of literature analyses sustainability transitions and business models, it focuses on a macro level (Bidmon and Knab, 2018, Bolton and Hannon, 2016). Our framework helps conceptualise and investigate the micro-foundations under which conditions transitions happen and the role of business model innovation in this process. We, too, contribute to the policy mix literature (Edmondson et al., 2018, Flanagan et al., 2011, Rogge and Reichardt, 2016) by focusing on business model innovation as a necessity in sustainability transitions. We argue that analysing the impacts of environmental policy mixes is complicated and needs to go beyond the impact on technological innovation alone. Through closer scrutiny of firm-specific conditions, we highlight how policy mixes affect firms' approaches and rationales for innovating their business model or failing to do so. The paper also contributes to management and innovation literature (Chesbrough, 2010a, Teece et al., 1997) by highlighting the exploitative and explorative approaches towards business models as a response to environmental policy mixes. While exploitation and exploration are usually considered in the context of technological innovation, we show how this dichotomy also helps to get a better understanding of business model innovation and sustainability transitions.

Although current policy mixes tend to be created in a 'layering process', whereby new policies are simply added to existing ones in an unsystematic, random way (Sewerin, 2020), our framework suggests that policymakers should consider consciously designing future policies and gradually modify existing policy mixes or remodel and replace them to accelerate transitions. This paper underscores specific considerations for firms' successful transitions on a micro level and systematise transition challenges while operationalising potential solutions. Further research is needed to provide empirical evidence for the proposed relations between different qualifications of policy mix building blocks and firms' approach to business model innovation by focusing on various industries with different technology maturity levels. Also, empirical studies can go beyond exploration and exploitation and therefore, analyse the impacts of policy mixes on the main elements of business models. Several questions remain. We hope that the insights generated from this paper will serve as valuable contributions to both policymakers and managers alike to mobilise necessary resources to accelerate sustainability transitions more efficiently.

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Social Capital and Social Entrepreneurship

Romel Andrade[1,*], Nikolay Dentchev[2]

[1] Universidad Catolica Boliviana; [2] Vrije Universiteit Brussel

* romelbrun@gmail.com

Abstract

Social Entrepreneurship (SE) has attracted the attention of both academics and practitioners. It was realized at the same time that there is a growing research interest in the role that social capital plays in social entrepreneurship However, little quantitative empirical evidence has been provided on the role that social capital play in SE across countries. On that account, this study aims to fill this gap in the literature by exploring the relationship between social capital and SE across countries from a quantitative perspective. For that purpose, we rely on the theoretical lens of social capital. We follow a quantitative approach by building OLS regression models based on previous studies. The regression results suggest that our dependent variable is driven by social capital, the constraint on the executive, philanthropic support, GDP per capita, legal origin, national saving, and urbanization. The positive effect and significance level of our predictor variable states that countries that have a high level of social capital show a higher level of SE than countries with a low level of social capital. The contribution of the present research to the literature was twofold. First, it provides insights into the antecedents of SE. Second, based on past studies, we test social capital theory and assess whether this theory applies to social entrepreneurship from a quantitative prespective.

Keywords

Social Capital, Social Entrepreneurship

Social Capital and Social Entrepreneuship

Romel Andrade[1,*], Nikolay Dentchev[2]

[1] Universidad Catolica Boliviana; [2] Vrije Universiteit Brussel

* romelbrun@gmail.com

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Social Entrepreneurship (SE) has attracted the attention of both academics and practitioners. It was realized at the same time that there is a growing research interest in the role that social capital plays in social entrepreneurship However, little quantitative empirical evidence has been provided on the role that social capital play in SE across countries. On that account, this study aims to fill this gap in the literature by exploring the relationship between social capital and SE across countries from a quantitative perspective. For that purpose, we rely on the theoretical lens of social capital. We follow a quantitative approach by building OLS regression models based on previous studies. The regression results suggest that our dependent variable is driven by social capital, the constraint on the executive, philanthropic support, GDP per capita, legal origin, national saving, and urbanization. The positive effect and significance level of our predictor variable states that countries that have a high level of social capital show a higher level of SE than countries with a low level of social capital. The contribution of the present research to the literature was twofold. First, it provides insights into the antecedents of SE. Second, based on past studies, we test social capital theory and assess whether this theory applies to social entrepreneurship from a quantitative prespective.

Keywords

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Defining the Business Ecosystem of Peer-to-Peer Electricity Trading

Mehdi Montakhabi[1], Shenja van der Graaf[2], Pieter Ballon[1], Nils Walravens[1], Wim Vanhaverbeke[3]

[1]imec-SMIT, Vrije Universiteit Brussel, Pleinlaan 9, Brussels, 1050, Belgium; [2]University of Twente, Po Box 217 7500 AE Enschede The Netherlands; [3]Department of Digital Economy, Entrepreneurship and Innovation, Surrey Business School, University of Surrey, Alexander Fleming Rd, Guildford GU2 7XH, UK

mehdi.montakhabi@vub.be

Abstract

Purpose: The purpose of this paper is to introduce the value proposition and structure of the business ecosystem of peer-to-peer electricity trading through a future oriented approach.

Design/Methodology/Approach: This study follows a qualitative approach. It conducts conceptual analyses by utilizing previously validated tools in similar contexts. First, different views on business ecosystems are introduced and an argument is made to justify an ecosystem perspective for peer-to-peer electricity trading. Second, the value proposition of the peer-to-peer electricity trading ecosystem is identified by utilising a meta-model which consists of four elements: end customer value, business value (shareholder value), collaborative value (business value to the supply chain) and societal value (value creation in the supply chain and control of negative externalities). Third, based on the structural view of business ecosystems, the study identifies actors, positions, links, and activities in the traditional electricity trading. And last, (structural) changes of the ecosystem for peer-to-peer electricity trading are discussed.

Findings: This paper elaborates the business ecosystem of peer-to-peer electricity trading and highlights the structural changes it imposes to the status quo.

Practical and social implications: The ecosystem construct adds insights into actors' ecosystem strategy regarding their business models for peer-to-peer electricity trading as well as into the governance of this type of trading. It provides a comprehensive view for policy makers. It enhances the research designs in detailed aspects of the peer-to-peer electricity trading by providing a wide lense.

Originality/Value: The identified business ecosystem of peer-to-peer electricity trading provides a comprehensive, multi-stakeholder perspective to incorporate complexities and include externalities.

Keywords

Business ecosystem, peer-to-peer electricity, value network, business model, value chain

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I. INTRODUCTION

The electricity generation and consumption paradigm was (and still is mostly) based on central electricity production from non-renewable (e.g. fossil-fuel, nuclear, gas, etc.) and renewable (wind, hydroelectric, etc.) resources in power plants. Electricity, in a one-directional flow, passes through the transmission grid, transformed from high to low-voltage, and is delivered to consumers through distribution grids. Primarily, governments were the single-player for generation to delivery of electricity. Liberalization of the electricity market has brought competition to some parts of the value chain, namely to generation and supply. This paradigm, however, is changing in relation to the proliferation of distributed renewable electricity resources (e.g. solar panels, etc.) and batteries owned by prosumers as well as the possibility of easier communication by (and between) smart devices (e.g. smart meters, etc.). Prosumers are defined as consumers who are equipped with renewable energy resources and batteries (Montakhabi, Van der Graaf et al., 2020). Peer-to-peer electricity trading is an opportunity to trade prosumers' surplus electricity with other consumers and prosumers (Montakhabi, Madhusudan, et al., 2020). Figure 1 shows the evolution of electricity production and trading. Peer-to-peer electricity trading is changing the electricity generation and consumption paradigms which reflects on the value creation (Morstyn et al., 2018) and capturing by actors in electricity markets.

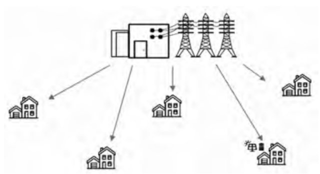
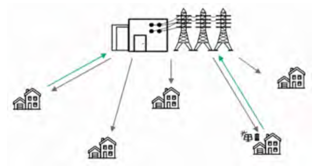
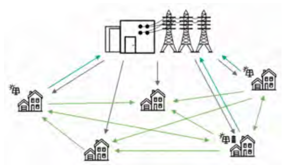
Yesterday	Today	Tomorrow
		
• Centralized production • One directional flow of electricity	• Increasing number of smaller, distributed electricity generators	• Peer-to-peer electricity trading

Figure 1. Evolution of electricity production and trading (Tiefenbach, 2019, n. p.).

Even though peer-to-peer electricity trading potentially forms a considerable share of transactions in future electricity markets, there is still no comprehensive vision emerging. Furthermore, consequences of peer-to-peer electricity trading have not been sufficiently and thoroughly elaborated. The complication of peer-to-peer electricity trading increases the interdependency among actors. It challenges the current structure of actors, activities, links, and positions. These all make the requirement for taking a wider lens to incorporate several stakeholders and consider externalities (e.g. emissions). Without considering the socio-economic and sustainability aspects of the peer-to-peer electricity trading from a multi-stakeholder perspective, it is difficult to develop these systems meaningfully (Leviäkangas and Öörni, 2020). The 'business ecosystem' concept is a promising means to address and remedy this.

The concept of 'business ecosystem' is one of the powerful means to comprehensively elaborate new models of value creation and capture. The interdependence of stakeholders has been exemplified by increase and ease of communication in the Internet era (Le Gall, et. al, 2015). This concept is able to illuminate complicated interactions and interdependencies which is the case for multilateral settings like peer-to-peer electricity trading. The concept has received much scholarly attention over the past three decades, and moved quickly from a theoretical concept to deployment. Furthermore, it is applicable not only for the world of high-tech but also for low-tech industries (Adner, 2017).

Given this context, this paper seeks to answer this question: "*How can the ecosystem framework be deployed in affording peer-to-peer electricity?*". In order to examine this, the following sub-questions are tackled sequentially: Does an ecosystem approach make sense for peer-to-peer electricity trading and why? What is the value proposition of the peer-to-peer electricity trading business ecosystem? What is the structure of the business ecosystem of peer-to-peer electricity trading?

In analyzing the electricity market by use of the business ecosystem concept, this paper contributes to peer-to-peer electricity trading and business ecosystem literature. On the one hand, the findings assist existing and emerging actors in the electricity market to adjust their business models for peer-to-peer electricity trading. On the other hand, it supports policymakers to develop a holistic perspective (Gomes, et. al, 2019) of all the stakeholders in the current and future electricity trading so to devise policies that can unlock the benefits of peer-to-peer electricity trading while considering the risks this may impose on the whole ecosystem. The ecosystem view assists policymakers to realize ways to enhance public benefit of electricity as a public good by facilitating value creation throughout the ecosystem (Leviäkangas and Öörni, 2020).

The paper is structured as follows: First, the rationale for elaborating an ecosystem view is discussed. Then, the concept of business ecosystems and two main views, ecosystem-as-affiliation and ecosystem-as-structure, are introduced. This is followed by a discussion on why an ecosystem view makes sense for peer-to-peer electricity trading as well as the elements of business ecosystem-as-structure are identified. Second, the methodology of this study is introduced. Third, the findings are presented in two parts: The first part introduces the value proposition of peer-to-peer electricity trading by using a meta-model which is built on the hierarchical relationship between business models, value chains, and ecosystems. The second part discusses the changes in the business ecosystem resulting from peer-to-peer electricity trading. Fourth, key insights are presented. Finally, discussion, conclusions, and opportunities for further research conclude the paper.

A. Why Business Ecosystem Amongst Other Views?

Value generation and capturing have increasingly become more complex. Hence, appropriate tools have been developed to address this. An evolution of tools that lead to emergence of business ecosystems can be traced in the literature. The ‘business model’ was initially understood as a firm-centric concept, related studies aimed to evaluate profitability and were focused on the financial value (e.g. Porter, 1985). The value chain concept could complement the business model thinking by providing a broader insight on the process of value generation and the importance of positions in the process of competitiveness. Businesses could occupy a competitive position, to increase profitability through cost reduction and by using the value chain concept. As the value generation and capturing became more complex, it was not enough to only focus on a single actor’s profitability; A single actor’s profitability became more and more tied to the profitability of other related parties which weren’t necessarily direct competitors. It required a collaborative view rather than solely competitive view (Arend 2013). This gives birth to the value network concept as a network of actors in which profitability of single actors is required but not sufficient for value generation. While value network is an extremely useful tool to trace value generation, the need for a wider view that could incorporate value capturing and include a wider range of stakeholders was clear. The business ecosystem is a tool to address this need. It can provide a comprehensive view and is able to highlight externalities (Leviäkangas and Öörni, 2020). As the utility of tools broadened, their theoretical basis did as well.

Electricity market incorporates various stakeholders with complex relations and contrasting agendas. It generates enormous resistance for structural changes toward the peer-to-peer electricity trading. There have been several calls to investigate the peer-to-peer electricity trading model through a multi stakeholder view (Global Observatory, 2019). Montakhabi, Zobiri, et al. (2020) studied the transition from the traditional electricity market to the peer-to-peer market by utilizing the value network concept. Nevertheless, to get insights of the value capturing and governance of peer-to-peer electricity trading, an application of the ecosystem view is necessary.

B. Two Views on Business Ecosystems in Literature

The term "business ecosystem" was initially introduced by Moore (1966). It originated from a biological metaphor, challenged the traditional strategy literature, and extended strategic analysis which was limited to competitive analysis within boundaries of industries.

Theoretically, the business ecosystem concept incorporates the agency and stakeholder theories as two main competing theories (Leviäkangas and Öörni, 2020). On the one hand, the agency theory (Blyth et al., 1986), which is supported by theories of investment (Jorgenson, 1963), assumes that the existence of an organization is only justified if it increases the wealth of its shareholders. On the other hand, in a broader view, stakeholder theory considers firms responsible to their stakeholders and the whole society (Freeman et al., 2004). Furthermore, the business ecosystem concept embraces complexity theory (Peltoniemi and Vuori, 2004) and systems theory (Marín, 1997). The business ecosystem is used as a concept to study complex systems. It is based on the requirement of an understanding of the whole rather than merely discovering the parts. An ecosystem is always more than the sum of its components. There is a synergic surplus of value as the result of collaboration between ecosystem-members that goes further than a simple aggregation of elements (Xu, Kemppainen, and Pikkarainen, 2020). Competition and cooperation simultaneously exist in a business ecosystem. Noteworthy relevant concepts that came from the complexity theory to the business ecosystems theory are self-organization (Mitleton-Kelly 2003), emergence (Mitleton-Kelly 2004), coevolution (Pagie and Mitchell, 2002), and adaptation (Merry, 1999). Business ecosystems are said to grow through self-organization, emergence, and coevolution. These assist them to attain adaptability.

Two mainstreams are detectable in the business ecosystem literature. The first stream defines ecosystems as networks of affiliated organizations (e.g., Iansiti and Levien, 2004; Autio and Thomas 2014; Rong and Shi, 2014; Jacobides, Cennamo, and Gawer, 2015). This approach, ecosystem-as-affiliation, takes an actor-centric view; Belonging to a network, or affiliation to a platform builds communities of actors that form a business ecosystem.

The second stream, ecosystems-as-structure, defines a business ecosystem around a core value proposition (e.g., Adner, 2013; Adner and Feiler, 2019; Adner and Kapoor 2010). In this view, actors' interaction serves the fulfillment of the core value proposition of the ecosystem taking an activity-centric view. The value proposition, as the cornerstone of the business ecosystem, requires a set of activities to be accomplished. Furthermore, it is the value proposition that defines the boundaries of the ecosystem. Table 1 shows definitions of the business ecosystem in the literature. It is worth considering that despite the methodological differences between the two views, they are mutually consistent.

Author	Definition	Ecosystem as affiliation vs. structure
Moore (1996)	"An economic community supported by a foundation of interacting organizations and individuals – the organisms of the business world. This economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organism also includes suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles, and tend to align themselves with the direction set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments, and to find mutually supportive roles."	Affiliation
Power and Jerjian (2001)	"A system of websites occupying the world wide web, together with those aspects of the real world with which they interact. It is a physical community considered together with the nonliving factors of its environment as a unit."	Affiliation
Iansiti and Levien (2004)	"Loose networks of suppliers, distributors, outsourcing firms, makers of related products or services, technology providers, and a host of other organizations [that] affect, and are affected by, the creation and delivery of a company's own offerings."	Affiliation
Iansiti and Levien (2004)	"A large number of loosely interconnected participants who depend on each other for their mutual effectiveness and survival."	Affiliation
Peltoniemi and Vuori (2004)	"A dynamic structure which consists of an interconnected population of organizations. These organizations can be small firms, large corporations, universities, research	Structure

	centers, public sector organizations, and other parties which influence the system."	
Den Hartigh and Van Asseldonk (2004)	"Network of suppliers and customers around a core technology, who depend on each other for their success and survival."	Affiliation
Quaadgras (2005)	"A set of complex products and services made by multiple firms in which no firm is dominant."	Affiliation
Adner (2006)	"the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution"	Structure
Teece (2007)	"the community of organizations, institutions, and individuals that impact the enterprise and the enterprise's customers and supplies"	Affiliation
Zahra and Nambisan (2012)	"A group of companies that interacts and shares a set of dependencies as it produces the goods, technologies, and services customers need"	Affiliation
Kapoor and Lee (2013)	"Interdependent activities carried out by [firm's] customers, complementors, and suppliers"	Structure
Autio and Thomas (2014)	"A network of interconnected organizations, connected to a focal firm or a platform, that incorporates both production and use side participants and creates and appropriates new value through innovation"	Affiliation
Adner (2017)	"the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize"	Structure

Table 1. Definitions of business ecosystem in literature

The two approaches construct a business ecosystem from two completely opposite directions. Each approach has its own merits. Depending on the case and the capabilities of each approach, the approach is selected. It is worth considering that the starting point in the ecosystem-as-structure is identifying a focal actor and then by following the ties to this actor, identifying other affiliated actors, and finally determining the value proposition that the ecosystem is capable of generating. In this view, positions result from links; Hub-and-spoke, brokers, and platforms are some of the familiar characterizations in this view. In the ecosystem-as-structure approach, the value proposition for the ecosystem is identified, and by following the supporting activities, actors are identified. The former approach is interested in the actors with a direct tie to the focal actor, but the latter may end in actors with no direct tie to the focal firm or even the ecosystem may have no focal actor. The requirement of alignment dictates links and positions in a business ecosystem (Jacobides, et al., 2018).

Even though in a mature stage, ecosystems are mostly known by their focal actors and it is easier to discuss them as affiliation, in the inception stage it is easier to study ecosystems by their focal value proposition through identifying their structure. Considering that the ecosystem of peer-to-peer electricity trading is (to a large extent) a non-existing one yet; it makes sense to imagine the inception of a peer-to-peer electricity trading ecosystem around a focal value proposition rather than a focal actor. Hence, this study analyzes the peer-to-peer electricity trading based on the ecosystem-as-structure view. It follows Adner's (2017) view which identifies an underlying value proposition that determines the structure of interdependent activities. So, for the purpose of this study, a business ecosystem is defined as:

“The alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize” (Adner, 2017, p. 42)

C. Does Ecosystem View Make Sense for Peer-to-Peer Electricity Trading? Why?

Referring to the selected definition for a business ecosystem in this study, for the ecosystem construct to be of relevance four requirements are necessary (Adner, 2017). In the absence of these requirements, there would be no specific value to appealing an ecosystem view. To identify whether an ecosystem perspective adds to the understanding of peer-to-peer electricity trading these four requirements are reviewed and reflected upon for the peer-to-peer electricity trading case:

1. **Alignment structure**: This is the degree of mutual agreement between members of a business ecosystem regarding their positions and activity flows. It is not necessary that all members of a business ecosystem have and follow the same goals. But for an ecosystem’s success, all members must be pleased with the positions they occupy in the ecosystem. Hence, the alignment includes both compatible motivations and a constant understanding of the configuration of activities amongst actors. This requirement relates to the debates of the political economy theory (Ballon, 2009).

When there is no alignment required between actors, either because the value creation by the focal actor does not require partners, or because the alignment already exists and no shift is necessary, the ecosystem view will not add any value. In the case of the electricity market before liberalization, the focal firm, which was mostly government-owned, did not need partners to generate value. The government was the sole market player and was handling everything from electricity generation, transmission, distribution, etc. in a hierarchical order. Liberalization of the electricity market opened the way for competition but still the critical roles are played by Transmission System Operators (TSOs) and Distribution System Operators (DSOs) which are usually state-owned entities. However, in the liberalized electricity market, partners’ alignment was necessary, which has been reached during past decades. However, the challenges of peer-to-peer electricity trading necessitates a shift in partners' alignment. Peer-to-peer trading challenges and seemingly changes roles and activities in the future electricity markets. It likely opens up opportunities for the emergence of new roles (Montakhabi, Zobiri, et al., 2020) and requires a new alignment structure.

2. **Multilateralism:** This refers to the existence of multiple partners with relationships that are not just an aggregation of bilateral interactions. In other words, multilateral ties which can be split into simple (in-)direct bilateral ties do not require an ecosystem approach. Transaction cost economics (Williamson, 1975) and relational contracts (Dyer and Singh 1998) are two out of many theories to discuss bilateral relationships.

In an ecosystem, a critical interaction across relationships is necessary. As an example, in the peer-to-peer electricity trading case, one of the main multilateral relationships is between prosumers, consumers, and retailers. A successful contract between a prosumer and a consumer is affected by the contract between the consumer and retailer. Analyzing the relationship of consumers and prosumers in isolation from retailers would lead to false conclusions. This is just one of many imaginable multilateral relationships in peer-to-peer electricity trading. In scenarios that require the emergence of new actors, the probability of multilateral relationships is higher.

3. **Set of partners:** This highlights the necessity of the existence of partners in an ecosystem. Partners are defined as actors whose participation is necessary for the value proposition of the ecosystem to materialize. Partners may or may not directly link to a focal actor or deliver the final product or service to consumers but as members of the ecosystem, they all have a joint value generation effort as an underlying goal. It is usual and to some extent expected that several actors pursue different plans and have different perceptions of the composition of partners in a business ecosystem.

Peer-to-peer electricity trading, by nature, requires the participation of different partners. It is partly because of the construction of the electricity market after liberalization. Some activities are legally monopolized for specific (mostly public) actors (e.g. distribution system operators do the metering, transmission system operators take care of the balancing of the electricity grid, etc.). So, peer-to-peer electricity inherently entails the existence of a set of partners to materialize.

4. **For a focal value proposition to materialize**: This puts the materialization of the value proposition in a business ecosystem at the center of attention. It helps to identify effective activities that support the value proposition. It consequently extends the analysis to recognize a set of partners in an ecosystem. In an ecosystem what the final target of the collective effort receives is more important than what an individual actor offers. Emphasis on the materialization of the value proposition requires a minimum coordination among actors. This minimum coordination level defines how much divergence of interests and perspectives are tolerable in an ecosystem as long as the value proposition is being materialized.

The value proposition of peer-to-peer electricity trading is discussed in detail in the Findings section. In short, as suggested by its name, peer-to-peer electricity trading promises that it would allow prosumers with excess electricity produced by their renewable energy resources (e.g. solar panels, etc.) to trade with other prosumers and consumers. Central generation in power plants, transferring the electricity through the transmission system, then transforming it to low voltage electricity before delivery to the distribution network is the traditional paradigm of electricity generation and delivery. The novelty is to trade the electricity from distributed electricity resources and deliver it through the distribution grid.

From a technical perspective, peer-to-peer trading aims to keep the distributed generated electricity from renewable resources at a local level. As a result, transmission losses are minimized, making local communities more robust against failures of the electricity grid. From an economic perspective, it enhances the efficiency of the utilization of dispersed resources. From a socio-environmental view, it is said to increase social resiliency and enhance sustainability (Murkin, et al., 2016).

D. Elements of Business Ecosystem-as-Structure

Activities, actors, positions, and links are the constructing elements of a business ecosystem as a structure. Aligned configuration of the four elements is necessary for the focal value proposition of an ecosystem to exist.

- ***Activities*** are the required tasks that should be fulfilled to materialize the value proposition.
- ***Actors*** are responsible to do the activities. In an ecosystem, an actor might be responsible for several activities and an activity might be undertaken by several actors.
- ***Positions*** define the configuration of different actors in the activity flows.
- ***Links*** show the flow of deliverables between actors. Money, physical products, data, and influence are a few types of deliverables that can flow through links in an ecosystem.

II. METHODOLOGY

This study follows a qualitative approach. It conducts a conceptual analysis by utilizing previously validated tools in similar contexts. The study is built on Adner's (2017) work which defines a business ecosystem as a structure. A business ecosystem is identified by its value proposition and illustrated by four constructing elements which are actors, activities, positions, and links (see section D for further information). The study uses Leviäkangas and Öörni (2020)'s meta-model to identify the value proposition of the peer-to-peer electricity trading (see section A in Findings for further information). The data is systematically collected through a literature review which takes into account state-of-the-art publications including books, journal articles, and conference papers about peer-to-peer electricity trading. The gathered data from the literature review process is enriched, triangulated, and validated by interviews conducted in the context of the SNIPPET[9] project. Research strategy includes comparison and assessment of data from different mentioned sources, and finally formation and reasoning of the research team's interpretation.

Twenty-three semi-structured interviews were conducted in the context of the SNIPPET project. Interviews were planned to cover several aspects of the current and future structure of the electricity market, actors in the market, their responsibilities, resources, objectives, etc. Interviews were conducted face to face and via Skype. Each interview took forty-five minutes on average. The interviewees are academics and practitioners in the electricity market. They were selected from several stakeholder groups to provide a comprehensive view of the electricity market. Semi-structured interviews were guided by the questions about the value proposition and the structure of the current electricity trading as well as peer-to-peer trading. Interviews were recorded and transcribed afterwards. If the interviews were not recorded, due to the interviewees' preferences or technical problems, notes were taken. Data is coded based on the elements of the selected frameworks. Reported findings are the interpretations of the research team of the coded data. To support the findings, direct quotes are inserted in the findings section. The interviews were conducted between October 2019 and March 2020. The results are validated by two expert members of Global Observatory on Peer-to-Peer (P2P), Community Self-Consumption (CSC), and Transactive Energy (TE) Models, who are researchers on peer-to-peer electricity trading.

III. FINDINGS

A. Value Proposition of Peer-to-Peer Electricity Trading Business Ecosystem

This section identifies the value proposition of the peer-to-peer electricity trading ecosystem. To do so, the study uses a meta-model proposed by Leviäkangas and Öörni (2020). The meta-model is built on the relationship between business models, value chains, and business ecosystems as a hierarchical structure. The model was initially developed in response to the need for new governance in the mobility sector. This need is mainly imposed by four disruptive forces which are technology disruption, changes in governance structure, challenges concerning environmental impacts, and transport poverty. The same forces, as discussed below, are present and impact the electricity market as well. This justifies the utilization of the model for the peer-to-peer electricity trading ecosystem.

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9 https://www.esat.kuleuven.be/cosic/project/snippet/

Technology disruption: It is revolutionizing the ways businesses are run and actors communicate with each other and with their customers. Technology disruptions not only change business models, but also value chains and networks. In the electricity sector, bilateral communication by use of internet-based services has made the communication between prosumers and consumers possible. Smart devices (e.g. meters, home energy management systems, etc.) let tracing electricity consumption and production in short intervals possible. Furthermore, batteries and solar panels are becoming widely available in higher capacities and lower prices. These are a few examples of technological disruptive forces in the electricity market that pave the road to peer-to-peer electricity trading.

> “I think, as we said, climate change and through incentives from authorities, we need to see changes in terms of energy assets in the market. Technology is needed to manage these assets."

Governance structures. The provision of electricity from distributed renewable energy sources at consumers’ premises, the possibility of energy self-consumption, and the emergence of energy communities are changing the traditional logic of trading in the electricity market. While in the past all the investments were made by the public sector (in most cases governments), by the emergence of peer-to-peer electricity trading, private investors seek opportunities for financial returns not only in household buildings but also in office buildings and business complexes. Regarding the interrelation of the two above-mentioned forces, on the one hand, technology disruption often enables new ways of governance. On the other hand, governance structure can open new prospects to use technology disruptions by innovative investors.

> “[…] current markets where you trade electricity, they are just for really big players. It's not a democratic setup […].”

E*nvironmental impacts:* Electricity generation power plants, especially those generating electricity from fossil fuel, gas, and nuclear energy, generate severe environmental adversities. Furthermore, they considerably contribute to climate change. They emit harmful pollutants; According to the United States Environmental Protection Agency, power plants that use non-renewable energy sources are the main emitters of mercury (50 percent), acid gases (over 75 percent), and many toxic metals (20-60 percent) in the United States. Emissions of power plants cause adverse impacts on the climate, flora, fauna, and humans. Advanced filtration systems have improved purifying the emissions and controlling the adversities but power plants still cause a considerable share of emissions worldwide.

> “Oh, it's extremely simple, it is climate change. We need to get rid of a lot of fossil based plants and we need to bring in a lot more renewable energy resources. We need to go through electrification of transport and heating. Transport and heating is 80% of all the energy used today and those need to be electrified. That's going to put an enormous strain on the power grid and

electricity production. So climate change is driving this was a very simple answer."

***Energy poverty**:* The European Commission defines energy poverty as “a situation in which a person has difficulty obtaining the necessary energy in their home to meet their basic needs because of inadequate resources or living conditions.” (Energy poverty, 2021).

> “[…] if you want to go to a very modern country or a very modern system, people should not be thinking about electricity use, it should be a basic […].”

Issues regarding energy poverty (González-Eguino, 2015; Middlemiss et. al, 2019) and inclusiveness of energy systems regarding accessibility to electricity are more and more emerging.

In a similar vein to the mobility sector, all the above-mentioned challenges impact the energy sector as well and call for new initiatives. New technologies to enhance accessibility, decrease negative externalities, and new approaches to electricity production and trading are more than welcome. Due to environmental and social demand and technological push, the electricity ecosystem is open to accept initiatives like peer-to-peer electricity trading which have the potential to address the above-mentioned challenges.

The meta-model for defining the value proposition of the business ecosystem consists of four elements: 1) end customer value, 2) business value, 3) collaborative value, and 4) societal value; The first element represents the value proposition to consumers, the second element is about the value proposition to shareholders in the firm level, the third element is about the business value to the supply chain, and the fourth one is about value creation in the supply chain and controlling the negative externalities.

Table 2 shows how peer-to-peer electricity trading generates value at different levels of the meta-model. The value proposition of peer-to-peer electricity trading is partially discussed in previous studies, but using a unifying framework, like what is used in this study (Leviäkangas and Öörni, 2020) is missing in the literature.

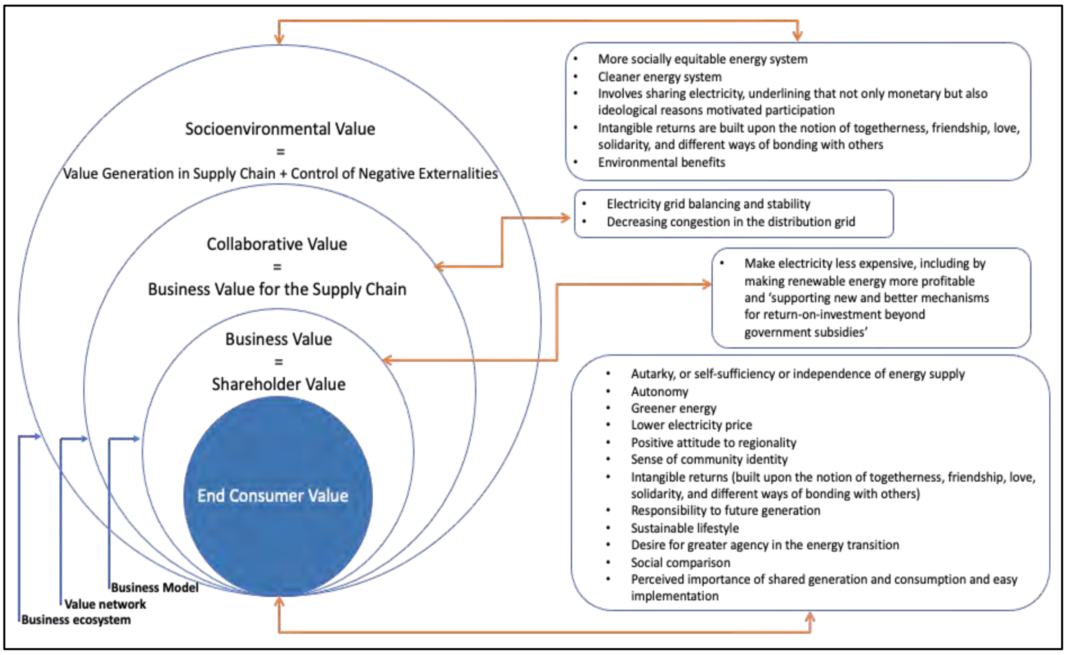
End customer value	**Business value**	**Collaborative value**	**Socio Environmental value**
● Autarky, self-sufficiency or independence of energy supply (Ecker, Spada and Hahnel, 2018; Fell, Schneiders and Shipworth, 2019; Hahnel *et al. 2019*; Spasova, Kawamoto and Takefuji, 2019; Ableitner *et al.*, 2020; Smale and Kloppenburg, 2020; Wörner *et al.*, 2020) ● Autonomy	● Make electricity less expensive, including by making renewable energy more profitable	● Electricity grid balancing and stability (Smale and Kloppenburg, 2020) ● Transmission losses are minimized so making local	● More socially equitable energy system (Scuri et al., 2019; Wilkinson et al., 2020) ● Cleaner energy system (Wilkinson et al., 2020)

(Ecker, Spada and Hahnel, 2018; Ableitner et al., 2019; Mengelkamp et al., 2019; Hackbarth and Löbbe, 2020; Löbbe et al., 2020; Smale and Kloppenburg, 2020; Wilkins, Chitchyan and Levine, 2020; Wörner et al., 2020) ● Greener energy (Kubli, Loock and Wüstenhagen, 2018; Ableitner et al., 2020; Smale and Kloppenburg, 2020) ● Lower electricity costs (Kubli, Loock and Wüstenhagen, 2018; Hahnel et al., 2019; Mengelkamp et al., 2019; Löbbe et al., 2020; Plewnia and Guenther, 2020) ● Positive attitude to regionality (Mengelkamp et al. 2019; Ableitner et al., 2020; Hackbarth and Löbbe, 2020; Löbbe et al., 2020; Wörner et al., 2020) ● Sense of community identity (Mengelkamp, Staudt, et al., 2018) ● Intangible returns (built upon the notion of togetherness, friendship, love, solidarity, and different ways of bonding with others) (Singh et al., 2017; Singh et al., 2018) ● Responsibility to future generation (Smale and Kloppenburg, 2020) ● Sustainable lifestyle (Wilkins, Chitchyan and Levine, 2020) ● Desire for greater agency in the energy transition (Scuri et al., 2019; Ableitner et al., 2020; Wilkinson et al., 2020; Wilkins, Chitchyan and Levine, 2020) ● Social comparison	and 'supporting new and better mechanisms for return-on-investment beyond government subsidies' (Kirchhoff and Strunz, 2019; Mengelkamp et al., 2019; Ableitner et al., 2020; Löbbe et al., 2020; Wilkins, Chitchyan and Levine, 2020)	energy communities more robust against failures of the electricity grid (Murkin, Chitchyan, and Byrne, 2016)	● Involves sharing electricity, underlining that not only monetary but also ideological reasons motivated participation (Hackbarth and Löbbe, 2020; Löbbe et al., 2020) ● Intangible returns are built upon the notion of togetherness, friendship, love, solidarity, and different ways of bonding with others *(Singh et al., 2018)* ● Environmental benefits *(Mengelkamp, Staudt, et al., 2018; Ableitner et al., 2020; Hackbarth and Löbbe, 2020)*

(Scuri et al., 2019; Ableitner et al. 2020; Smale and Kloppenburg, 2020) • Perceived importance of shared generation and consumption and easy implementation (Hackbarth and Löbbe, 2020)			

Table 2. Value created by peer-to-peer electricity trading at different levels of the meta-model

Figure 2 unifies the information from Table 2 and highlights the limits of previously discussed tools. Each circle represents the conceptual border of a tool. The model has end consumers' value in the core of value recognition. It shows how going from the basis towards the ecosystem view expands the recognition of the value proposition. Consumer value is a combination of financial and non-financial benefits which satisfies consumers' needs. The next layer is the business value which is the value that actors generate for their shareholders. It represents itself in profit or capital gain and materializes through revenue increase and/or cost reduction. Actors pursue business value maximization for their shareholders through profitable business models as an intrinsic tool. Another way to increase the business value is through collaboration by appropriate positioning in the value network. To generate collaborative value, actors open their business models in different ways. Shared research and development plans, alliances, and licensing technologies are a few examples of open business models. Despite the costs that open business models impose as the result of more coordination, actors follow them when the expected benefits overweigh the costs. Generating collaborative value requires an exogenous approach rather than the intrinsic approach to generate business value in the previous layer. Last but not least is the socio-environmental value layer. It widens the value domain further than the values for shareholders to stakeholders (Vladimirova, 2019). Social and environmental values are discussed in this layer.



Note: Each circle represents the limits of different tools (see the left bottom of the picture)

Figure 2. Meta-model composing of business models, value networks, and business ecosystems for identifying the value proposition of peer-to-peer electricity trading

Peer-to-peer electricity trading has the potential to generate value in different ways which makes it a good case for applying the meta-model. First, since peer-to-peer electricity is produced from renewable energy resources and requires consumers' involvement, it generates environmental benefits and has the potential to generate societal benefits as well. Second, successful implementation of peer-to-peer electricity trading requires collaboration among different stakeholders. Complexities of peer-to-peer electricity trading requires collaboration between several actors in the value network. Third, large scale peer-to-peer electricity trading is still expected. Identifying the value proposition of the peer-to-peer electricity trading in different layers, by using the meta-model, provides a clear and comprehensive understanding of the business ecosystem around peer-to-peer electricity trading.

B. Business Ecosystem of Peer-to-Peer Electricity Trading

In this section, first, the business ecosystem of traditional electricity trading is reviewed and then the peer-to-peer electricity trading is discussed. For centuries, the basic elements (activities, actors, positions, and links) of the electricity ecosystem have been unchanged: Electricity has been centrally generated in power plants; the high-voltage electricity transmits through the transmission grid. Then the high-voltage electricity is transformed to low-voltage before being distributed through the distribution grid. Finally, Retailers sell the electricity to end consumers. Technological advancements and liberalization of the electricity market demonstrate their effect on the intra-actor competition level. In Figure 3(a) traditional electricity ecosystem is shown by its characterizing elements. It illustrates actors' relative positions in the ecosystem and links between critical activities.

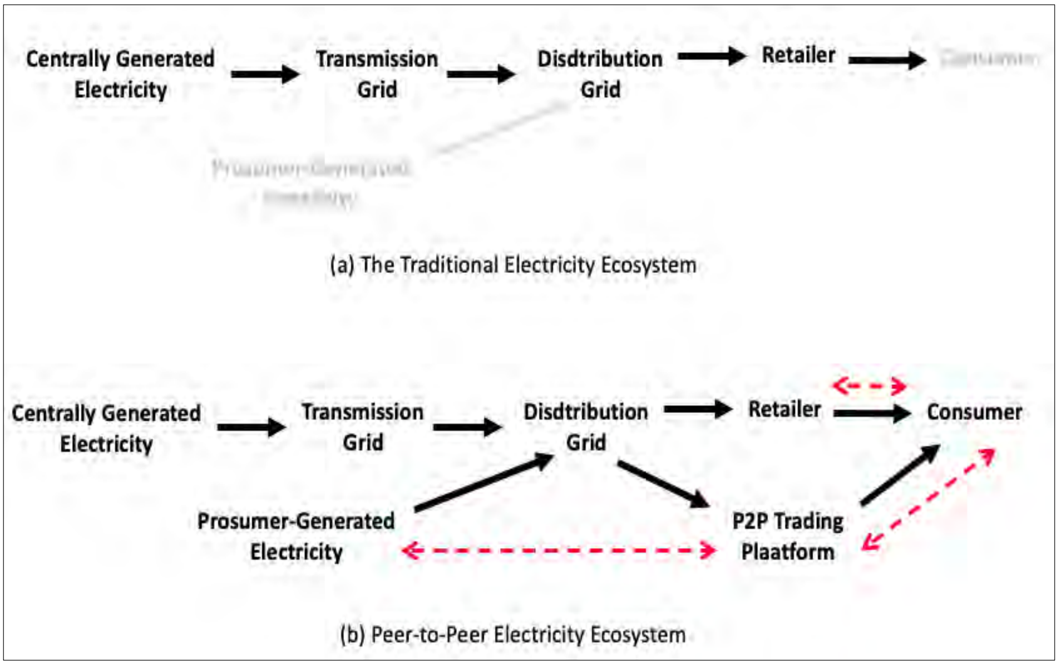


Figure 3. Blueprints for the traditional and peer-to-peer electricity ecosystems

Despite the involvement of several actors in the traditional electricity trading value proposition, it is possible to analyze the relationships between actors bilaterally, in isolation, and without impacting other relationships. Some of the identified (bilateral) relationships are more active (black in Figure 3a, e.g., retailers promote their service packages to influence consumer's consumption behavior at different hours of a day) and some are more passive (grey in Figure 3a, e.g., prosumers do not have any other option except delivering their excess electricity to the distribution grid without bargaining power regarding the price). Because traditional electricity trading lacks multilateralism, which was the second requirement for ecosystem view as discussed in section B of the Introduction, there is no merit in using the business ecosystem logic to understand its dynamics.

> "[…] current markets where you trade electricity, they are just for really big players. It's not a democratic setup […]."

Figure 3b shows the peer-to-peer electricity trading situation. On the contrary to traditional electricity trading, the value proposition of peer-to-peer electricity trading, as discussed in section A of Findings, entails reconfiguring activities and multilateral relationships. Hence, it necessitates the deployment of ecosystem logic to understand its dynamics. In the peer-to-peer electricity trading, electricity is purchased from fellow peers rather than retailers which were the sole electricity sellers in the past. Furthermore, despite the centralized generated electricity at power plants, which passes through the transmission grid before reaching to the distribution grid, the peer-to-peer traded electricity is directly delivered to the distribution grid. The value proposition of the peer-to-peer electricity trading requires some key activities' positions to shift; *the electricity production is distributed, not central; the distributed produced electricity is mostly generated from renewable resources; it is being delivered directly to the distribution grid not passing through the transmission grid; and it is being traded between peers through the peer-to-peer trading platform, not sold through retailers.* Furthermore, peer-to-peer electricity trading imposes new requirements. It requires new links between activities and actors in other positions in the business ecosystem as well, such as it requires a secure and privacy-friendly platform for communication and trading to be developed.

> "[…] We need to go back to where basically mathematics is keeping the balance of the grid […]."
>
> "[…] It is more going to be algorithm based optimization […]."

It may seem straightforward from a technical point of view, as all the technologies are in place, but it is complicated from data protection and privacy perspectives.

The requirement of a trading platform highlights another requirement for peer-to-peer electricity trading: Peers should participate in the trading through the platform. Consequently, consumers who were latent members in the traditional electricity trading setting, shift to potential active participants who can decide about the level of their participation (Montakhabi et al., 2021).

We define the activeness or passiveness of an actor by the fact whether an actor firstly has options to decide and secondly can decide between different options. For example, when prosumers can only inject their excess electricity into the distribution grid and cannot negotiate on the price, they are considered to be passive. But when they can select and negotiate to whom and at what price to sell, they become active participants in the ecosystem.

By putting prosumers and consumers in the role of active participants in the business ecosystem, peer-to-peer electricity trading gives rise to new links in the ecosystem. The first is observable between prosumers' and consumers' participation in the peer-to-peer electricity trading which entails the adoption of the peer-to-peer trading platform. The second is the consumers' incentive and retailers' offers; T*he more consumers participate in the peer-to-peer electricity trading, the less they are willing to purchase from retailers*. It has already given rise to the offerings of retailers. To decrease consumers' incentive to participate in peer-to-peer trading of electricity, retailers are offering green electricity, of course at a higher price, to environmentally concerned consumers. If there is not enough incentive from the consumer's side to actively participate in the peer-to-peer trading platform, there would not be enough motivation for prosumers to participate in the peer-to-peer trading of electricity.

> "[…] I think the risk is the status quo that there's too many strong big companies with established business models that will try to prevent this from happening. […]."

Table 3. presents main differences between the traditional and the peer-to-peer electricity trading business ecosystems.

	Current ecosystem	**Peer-to-peer ecosystem**
Electricity production	Centralized	Distributed
Source of electricity generation	Mostly non-renewable resources	Mostly renewable resources
Way of delivery	Passing through the transmission grid	Directly to the distribution grid
How trade happens	- Retailers sell to consumers - Prosumers sell to the distribution grid	Between peers
Selling through	Retailers' platform	Peer-to-peer trading platform
Type of user-involvement	Passive	Active

Table 3. Main differences between the traditional and the peer-to-peer ecosystem

IV. TAKEAWAYS FROM THEORY AND FINDINGS

In the following, some important takeaways from the theoretical review and findings on the peer-to-peer electricity trading are presented.

1) The business ecosystem is an extremely useful concept for comprehensively studying both value generation and capturing. It takes a multi-stakeholder perspective and incorporates all influencers.

2) The business ecosystem is not only a useful concept in the world of high technology but also for other areas that specific structure of interdependence enforces multilateral settings.

3) Peer-to-peer electricity trading gives rise to new links in the ecosystem. Hence, it structurally changes the electricity trading ecosystem.

4) Ecosystem-as-affiliation and ecosystem-as-structure are two main views of business ecosystems in literature. The former defines an ecosystem as a network of organizations around a focal actor. The latter focuses on the focal value proposition and its required activities.

5) The peer-to-peer electricity trading ecosystem is still in its infancy. So, identifying the focal value proposition is easier than a focal actor. Hence, ecosystem-as-structure is a better tool to study peer-to-peer electricity trading at this stage.

V. Discussion, conclusions, and opportunities for further research

Comparing Figures 3a and 3b as the representations of the traditional and peer-to-peer electricity trading, illuminates structural differences between the underlying value propositions. When a change in relationships in, at least, one of the four elements of an existing (ecosystem) structure (activities, actors, positions, and links) occurs, the ecosystem approach will be an insightful tool. Peer-to-peer electricity trading not only introduces new activities and new actors in the electricity trading structure, but also influences links and positions in a way that requires new interactions. The changes peer-to-peer electricity trading impose on the elements of the electricity trading structure highlight the necessity of an ecosystem characterization. Although the prosumer position does not shift, the requirement of new links in peer-to-peer trading noticeably influences the prosumer's impact on value generation. Furthermore, the introduction of a peer-to-peer trading platform entails new activities, most likely new actors, new links, and new positions.

In situations where the value proposition of the ecosystem enforces alteration of the structure, alignment comes into consideration more than ever. How should actors which may not be directly linked to each other - or even to the focal actor which imposes the change - get encouraged to change? Implementing an ecosystem strategy requires a perfect understanding of ecosystem boundaries and dependencies between actors. In a peer-to-peer electricity trading case, it is not easy to make any assumptions about who will run the platform. Since it entails dealing with personal data, legal barriers, security, and privacy as well as data protection concerns extend the question from "Who has the business motivation and capabilities?" to "Whom is legitimate and trustworthy (D'Hauwers, et al.,2020) enough from prosumers and consumers' perspectives to undertake this role?". Although technological solutions (e.g. blockchain, etc.) pave the road to decrease the requirement of trust, questions remain that make any robust assumptions about the candidates impossible.

Peer-to-peer electricity trading entails a structural departure from the long history of electricity trading (e.g., wholesale, retail, day-ahead). Despite traditional electricity trading which conforms to existing strategy constructs, describing and evaluating peer-to-peer electricity trading requires a business ecosystem view.

The ecosystem perspective, which has been presented in this paper, provides a holistic view of peer-to-peer electricity trading. It helps to develop and consequently govern the system as a whole rather than concentrating on single elements in isolation (Leviäkangas and Öörni, 2020). Understanding the surrounding ecosystem helps actors in peer-to-peer electricity trading to adjust their positions in the value network and to enhance their profitability through their business models, while having a bigger share in capturing value. The ecosystem perspective helps actors in decreasing their risks through the right collaborations. These are possible as the result of understanding broader demands which spread outside the immediate sphere of a single actor's activities. Moreover, the ecosystem perspective makes it easier to identify the broader external effects of an actor. Last but not least, it can assist actors to undertake social responsibilities.

In the next step, this study seeks to answer questions at the ecosystem and actor levels. Main questions at the ecosystem-level are about the potential for scalability, type (adaptive or centralized) of the appropriate ecosystem (Furr and Shipilov, 2018), structural interdependencies and complementarities in the ecosystem (Jacobides et al., 2018; Kapoor, 2018), barriers and constraining mechanism (Almpanopoulou, et al., 2019), the best sequence to build and leverage the value proposition (Adner, 2012), and terms of access and exclusivity (Jacobides, 2019). Important questions at the actor-level are about the role (Jacobides, 2019), timing for move, and position of each actor in the ecosystem.

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Ways of operating in business ecosystems to drive circular transitions

Derek Diener[1]*, Sara Fallahi[1], Ann-Charlotte Mellquist[1], Emanuela Vanacore[1]

[1]RISE Research Institutes of Sweden AB

*derek.diener@ri.se

Abstract

The circular economy megatrend demands that manufacturing firms change their business model, implying that great changes must happen in business ecosystems. This short paper is based on observations from research in three ecosystems and identifies avenues firms can take in business ecosystems when orchestrating implementation of circular economy goals.

Keywords

circular economy, business models, business ecosystem, supply chain

INTRODUCTION

One of the main mottos of the circular economy for manufacturing firms is *change your business model.* From a pragmatic and innovation perspective, the business model provides at the very least a snapshot of how a business works; it explains the very logic for how firm creates and captures value (Teece, 2010). This logic is not only embedded in the formal rules including incentives, contracts, and key performance indicators, but also ways of thinking and norms of the system. The supply chain and actors in it, including tacit competences and knowledge, is built based on the same logic (Adner 2012). Hence, changing a business model is easier said than done (Chesbrough 2010).

Heuristics like the business model canvas provide some help to make explicit the critical building blocks of a business (Osterwalder and Pigneur, 2010). Such a view or inventory is invariably a valuable activity for creating awareness for a firm undertaking a transformative change, such as that related to adapting to circular economy principles. However, it remains a firm-level unit of analysis (Foss and Saebi, 2017) and arguably, more focused on the customers than the dynamics related to the many other actors and relationships that contribute to the value creation and capture. Needless to say, (timely) change to stock-based (circular) business logic from a flow-based (linear) one requires great effort within at least the originating firm and beyond into the supply chain. It demands concerted change to processes and ways of thinking internally to the firm as well as within external actors who may reinforce the current logic. Moreover, firms need to manage the distribution (or redistribution) of new activities required for resource optimization within their established value chains and many times new partnership and orchestrations are needed. With these challenges in mind, the business model as a firm-level construct is arguably not adequate to serve as the primary unit of analysis.

In this paper, we use the construct of *business ecosystem* as complementary to the business model to put emphasis on roles and alignment of the actors involved. The construct suggests a constellation of actors that together create a value proposition that no single firm can achieve in isolation (Lingens et al., 2021; Adner, 2017; Jacobides et al., 2018). As such, descriptions of business (or innovation) ecosystems place increased focus on the system around the firm and its dependency on actors around it with a few principles emphasized including: the shared outcome organized around a focal firm (Autio & Thomas 2014), the symbiotic relationship between a set of actors (Basole & Rouse 2008), or the value flows of products and services, data, payments and intangibles (den Ouden 2010). In times of little change, actors and the system can operate undisturbed without reflecting on their alignment. However, when a change is instigated, the alignment of actors in the ecosystem is disrupted. It is argued that in these situations, the ecosystem logic shows its value (Adner, 2017). In particular, the construct has been noted as a valuable logic for mapping and orchestrating systemic change and circular transitions (Bertassini et al 2020).

In order to provide lessons about the potential ways the construct could be used to understand and orchestrate circular transitions, we pose the question: *How do actors operate in their business ecosystems to implement circular transitions?* We also reflect on experienced benefits of utilizing the ecosystem logic in circular transitions.

METHODOLOGICAL APPROACH

This short paper is based primarily on studying circular transitions from vehicle manufacturer and supplier perspectives in three subsystems related to the broader vehicle business ecosystem: polymer components, manufacturing equipment and lithium-ion batteries. Each study was conducted as action research with the intent to stimulate circular transitions in the organizations and systems of interest (de Guerre 2002). Individually, each study involved at least semi-structured 20 interviews, discussions and working meetings with representatives from two vehicle manufacturers, six firms in the material supply chain, three firms in the production equipment supply chain, four firms in the recycling supply chain, four service focused firms (including insurance and ledger services), and three branch organizations. While representatives from suppliers were of primarily business development and design functions, representatives from vehicle manufacturing firms, were from corporate strategy, design, vehicle attributes, and purchasing functions.

While each study departed from its own research questions, they all had one activity in common, creating understanding of the business ecosystems. Questions focused from the vehicle manufacturer perspective on how circular transition strategy was translated into ways of working and goals for design and purchasing functions, and on the supplier side, how they aim to fulfill their own goals related to circular transitions both upstream and downstream and how (and if) they experience new demands from vehicle manufacturers. In addition, a specific effort was made to map business ecosystems, defining roles of actors, identifying material, money and information flows. We also focused on understanding how the actors worked in the ecosystem in their ongoing circular transition work. Specifically, we relate observations to two ecosystem perspectives: the actor-focused ecosystem as affiliation in which a community of actors is centered around a focal actor or platform and the activity-focused ecosystem as structure, in which activities are derived and actors are focused on a common value proposition (Adner 2017). We later compiled findings from the three studies and conducted a combined analysis considering both what we learned and reflected on how the ecosystem construct helped us and other actors learn.

KEY INSIGHTS

Two types of insights are presented here: (1) ways in which actors operate in business ecosystems to drive circular transitions, and (2) benefits of using the construct. First, we describe how firms and their representatives operate in the ecosystem to implement circular transition, from arguably more conventional supply chain relationships wherein an ecosystem by affiliation seems most apparent, to those in which an ecosystem by structure wherein shared value propositions drive activities is more apparent. As Adner (2017) notes, any given situation may exhibit aspects of both types.

Focal actor utilizes conventional bilateral supply chain relationships: An action may be initiated when a vehicle manufacturer (designer and/or purchaser) sends request for proposal or solution (with requirements/specifications related to circular economy goals) to primarily incumbent Tier 1 suppliers. Alternatively, the supplier may send a suggestion, possibly a description of a new circular offer or solution, to the vehicle manufacturer. Whether alignment remains depends – for all intents and purposes – on how demanding or radical the new demands are and whether the supplier and its suppliers are able to fulfill them. Regardless, demands from the focal actor imply new rules for the ecosystem to follow. These rules will spread. We observed that suppliers who develop circular offers naturally then offer these same solutions to other customers. Thus, one customer's initiation of circular demand can lead to other customer being offered the same, illustrating how suppliers operate in between ecosystems and can end up being drivers in circular transition.

Focal actor initiates new relationships and roles: As an example, purchasing agents of a vehicle manufacturer may attempt to cultivate future supply chain relationships or partnerships as well as requisitions with not only Tier 1 suppliers but less commonly, Tier 2 suppliers. For example, in order to reach a certain recycled content goal, a formal purchasing action may involve going upstream (and downstream) to secure secondary raw materials. In these cases, the focal actor operates outside of the conventional linked supply chain and starts to coordinate larger parts of the ecosystem in a way not previously done. Benefits to this approach of facilitating circular transition relate to the immense gap between the current state and the presiding circular economy vision. As the owner of the value proposition and new vision and as a larger organization, the vehicle manufacturer may be best positioned and resourced to help other actors in the ecosystem develop new competences.

Activities generated from a group aligned around a shared goal that can become a shared value proposition: As an example, company representatives may work in less formal collaborations to contribute to common circular transition goals. In one case, representatives from vehicle manufacturers, insurance and recycling companies, and trade organizations worked together towards recycling more post-consumer polymer material from vehicles. The group had no focal actor but was aligned in that it essentially shared an ambition to (1) devise a way to create valuable polymer fractions and (2) create a value proposition that would create demand for post-consumer plastics. However, the group had no manufacturer that was interested in the polymer fractions. As such, a company that manufactured products from recycled polymer that usually would not be prompted in cases of normal requisitions was brought in to fill the missing competence and infrastructure. As a result of the collaboration, a new product and value chain was created. In such settings, we observe that firm representatives meeting in these settings may have more in common with each other than they have with their colleagues (of the firm). The success of this example aside, the promise related to these types of outcomes should be viewed with caution. Examples like this one in which alignment is around sustainability goals can deteriorate as actors near more formal agreements (Altmann & Linder, 2019).

Activities generated around an developing or emerging platform or value proposition: In one ongoing innovation project, a small ledger company focused on the value proposition of collecting, storing and potentially, monetizing data related to lithium-ion batteries, attempts to align new actors in the value chain in order to achieve a shared goal of battery second use and better recycling. Here, the data is the potentially new product, but other actors have to be aligned in order to join the ecosystem. Other actors (like vehicle manufacturers) could 'join' this ecosystem, or they can choose to try to create their own ecosystem. Naturally, divergence in both perspectives and interests have been apparent suggesting challenges to achieving this outcome. As another example outside of the studies of focus for this paper this type, a focal actor creates conditions for multi-lateral development of solutions by suppliers. One example of this is seen with Local

Motors, that was founded on principles of co-creation and open collaboration (Local Motors 2021).

These examples represent just a few of the types of change that occur in the business ecosystem. Together, they represent an array of avenues on the span of ecosystem-as-affiliation and ecosystem-as-structure views. Arguably, a firm or change-agent can observe, map and utilize each of these types to drive circular transition in their business ecosystem.

Utilizing business ecosystem as construct in circular transitions: We have experienced that illustrating the business ecosystem helps reveal rigidities and allows for the learning amongst individuals; it specifically supports the unfreezing of existing norms to allow individual learning and system change (Schoen 2010). First, we suggest an approach considering firms as the unit of competence and analysis needs to be complemented with the business ecosystem view which puts emphasis on structures and roles of the different stakeholders. Specifically, entities (and roles) that may remain unseen or marginalized in a business model view become visible when drawing the business ecosystem. Based on our research, entities providing financing and data ledger capabilities are commonly in this category.

Second and perhaps more novel, in order to increase granularity and to avoid the *firm-is-a-box* construct, we took a close-up, breaking down firms into different entities based on their roles and capabilities. This close-up view is based on two main observations: (1) when one takes the view that actors in a business ecosystem create value together, focusing only on boundaries around firms becomes arbitrary (especially when larger corporations are involved); (2) when it comes to facilitating change needed for circular transitions, flows and relationships between individual functions/units in multiple firms become more important.

When considering rules, it can be said that individual functions/units within firms (such as Purchasing, Manufacturing or Aftermarket) have different languages, ways-of-working and priorities (their *rules*). We have observed that units within different firms may have more in common with units in other firms than those in their own firm, at least when it comes to matters of circular transitions. For example, if one looks at strategies of and relationship between manufacturing firm and supplier, one may only see that their goals related to circular transition are aligned. While ambitious circular economy goals may be expressed at the strategic level, those goals may not be communicated by the purchasing unit to the supplier. Moreover, we have seen that big breakthroughs can happen with the right collaborations and these opportunities may not appear when only looking at firm-level boxes and activities.

CONCLUSIONS

The studies revealed a few ways of implementing circular transitions which include operating in existing roles and via existing bilateral links and creating new relationships and activities and potentially multi-lateral links. In order to achieve timely change towards circular economy, it is arguable that a combination is necessary. On the one hand, a focal actor can utilize the power of existing affiliations to initiate change by sending new requirements and rules into the ecosystem to drive change. Perhaps more disruptively, a focal actor can relinquish some of its power and participate to co-create new value chains outside of official supply chain relationships. Here, non-incumbent entrepreneurs with disruptive solutions fit for circular transitions may have a better chance to participate.

Finally, based on experiences in the three studies, the business ecosystem construct is deemed to be invaluable complement to business model innovation for use in circular transitions. Using the construct allows understanding the current state and current activities as well as for identifying needed activities and actor types to achieve circular economy goals.

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Navigating among institutional logics in a health innovation ecosystem – shaping sustainable business models

Hélène Laurell[1*], Jeaneth Johansson[1, 2], Patrik Hidefjäll[1], James Barlow[1, 3]

[1]Halmstad University; [2]Luleå University of Technology; [3]Imperial College Business School

*marie_helene.laurell@hh.se

Commercializing MedTech is challenging, often requiring 10-20 years for ideas to reach market and embed into mainstream practice (Morris et al., 2011). Challenges arise from misalignment of actors and resource constraints that cause substantial and unsustainable losses in value, both for companies and healthcare systems. Moreover, we now face a societal crisis through the Covid-19 pandemic. Tackling the misalignment between actors and speeding the adoption of MedTech innovations is therefore essential.

This study contributes theoretically to literature on structures of aligning institutional logics in complex health innovation ecosystems (Adner, 2017; Jacobides et al., 2018), involving multiple actors' heterogenous needs and requirements in commercialization of innovations. We apply a business model lens and focus on the synchronization and co-creation of shared logics, which lead us to the following two research questions: (1) How do we understand alignment of logics between actors in a health innovation ecosystem in commercialization and adoption of MedTech innovations through a business model lens? (2) What role does the on-going pandemic Covid-19 play as an external trigger for accelerating the adoption of MedTech innovations?

We use a theoretical framework (Figure 1) which outlines interdependency between actors at macro and micro levels (Roundy et al, 2017) in the health innovation ecosystem. The system is shaped by institutional spheres that require different types of compliance of actors to achieve legitimacy (Scott, 2001). The framework highlights four spheres, i.e. 1) academic, 2) market and 3) governance, and 4) societal (Larish et al, 2016), which covers politics, public and media that provide conditions and context of the health innovation ecosystem.

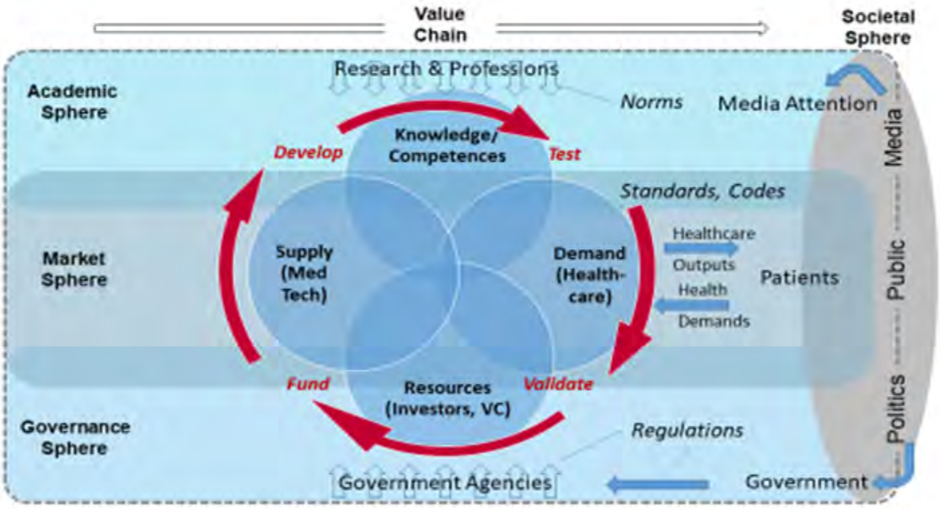

Figure 1 Health Innovation Ecosystem

The spheres are characterized by different mechanisms of control and influence, e.g. the academic sphere is characterized by mechanisms for validation of new knowledge. The interfaces between spheres may be a locus for knowledge and resource conflict between actors, exemplified by patent courts, regulatory and reimbursement agencies as between the market sphere and the governance sphere, but also a locus of alignment between logics as exemplified by professions that constitutes a logic of its own that spans the academic and market spheres.

Hence, actors in a health innovation ecosystem hold different 'institutional logics', i.e. belief systems that both shape their cognition and guide their actions (Greenwood et al. 2011), which may also be in change when for instance being exposed to external pressures such as the Covid-19 pandemic. In the commercialization of innovations, MedTech start-ups interact with key actors in their perceived ecosystems and together they form the market (see Stam, 2015; Spigel and Harrisson, 2018). Through this, MedTech start-ups aim to develop sustainable business models by acquiring relevant competences and resources to commercialize their innovations. Business model development also requires alignment between commercialization and adoption of innovations, i.e., alignment between the supply side and the demand side (Adner, 2017).

We applied a grounded theory approach, using qualitative design to investigate the alignment of institutional logics and the role of the Covid-19 pandemic in the MedTech start-ups' process of commercializing innovations (Eisenhard, 1989; Strauss and Corbin, 1997). The study is based on a longitudinal multiple case study design enabling us to identify and outline recurring patterns of institutional logics, and uncover the hidden, dynamic and complex commercialization processes (Eisenhard and Graebner, 2007; Gehman et al 2018). We purposively selected three in-depth cases to explore the phenomenon (Yin, 2017; Patton, 1990). In total 6 interviews and 13 workshops were held with the MedTech start-ups. Interviews and workshops lasted approximately 120 minutes each. Data collected were recorded, and transcribed.

Our preliminary findings based on our data, proposes a framework for understanding the alignment of logics between actors in a complex and uncertain health innovation ecosystem, specifically focusing on business model development and commercialization of innovations from a start-up perspective. As such, we answer to the pressing need to increase the understanding of underlying institutional pluralism and mechanisms operating in complex settings such as the health innovation ecosystem; knowledge widely stressed as to remain in its infancy (see Ocasio et al. 2017).

First, we contribute to the ecosystem literature by providing a more dynamic model that captures interrelations between innovative MedTech start-ups and healthcare organizations, interrelations between micro and macro levels and multiple complementing and conflicting institutional logics. As such we contribute to the urgent call for a language that enables analyses of what is going on at the multiple levels from micro foundation level to a macro level (Burton-Jones et al., 2020). Our framework based on institutional logics enables visualization of micro level practices, opening the black box of the health innovation ecosystem, better understanding of the institutional mechanisms and underlying forces hindering and propelling institutional change at a macro level. As such, we contribute through a framework that may reduce the cognitive boundaries, speeding up the processes of change and developing norms and regulation and decrease the cognitive barriers of change, on micro and macro levels.

Second, we find that the rules of the games are partially lacking and/or unclear for MedTech start-ups, especially referring to the sub-segment of digital health innovations. Regulation is changing, and new regulations are stipulated. Norms e.g. for how to interpret regulations and to understand and adopt the new MedTech solutions into work processes are not yet in place. This spills over to cognitive dissonance, fear of action and inherited resistance of change in the system, also causing inertia in the system.

Third, we find that current changes in digital technologies and the offering of some new products and services of value in the healthcare system take place much faster than the institutional processes aimed at implementing these new solutions. In line with this, we contribute by increasing the transparency, making micro processes of alignments and misalignments in the commercialization and adoption of MedTech innovations more tangible, enabling understanding of the underlying structures with conflicting institutional logics hindering institutional change in the health innovation ecosystem.

Fourth, we find misalignments between different key actors' expectations on time as a critical hinder in the commercialization and adoption of MedTech innovations. Traditionally, healthcare actors are not exposed to urgency of time in adoption of MedTech innovations. Such processes expect to take time implying norms acting as gatekeepers for “too fast” adoption. Meanwhile MedTech firms severely experience the urgency of time. They are dependent on fast development of a viable business model, implying fast commercialization processes to assure for revenues and sustaining its business. Noteworthy, Covid-19 has been a trigger for accelerating the adoption of the start-up's digital health solutions. The pandemic also accelerated the alignment process where time become a matter of urgency in healthcare and for example resulted in development of new procurement practices. The implementation of the European Union's Medical Device Regulation was also postponed one year due to Covid-19 which was a relief of a regulatory burden for especially MedTech start-ups.

Keywords

MedTech innovation, commercialization, adoption, ecosystem, institutional logics

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Track 1.4.

Business Models for the Circular Economy

Track 1.4. Business models for a circular economy

Track chairs: Niels Faber[1], Jan Jonker[2], Abhishek Agarwa[3]
[1]University of Groningen, Netherlands; [2]Radboud Universiteit Nijmegen, France; [3]Robert Gordon University, United Kingdom

The Circular Economy (CE) is one of the promising perspectives that might offer innovative and radical solutions at system level to tackle wicked and pressing problems associated with our current, linear economy. Problems related to for instance climate change, resource shortages, and social exclusion. Business models based on linear thinking are based on a pattern of extraction of resources, production and use of goods creating side and end of life effects seen as negative externalities such as waste, pollution or social exclusion. This linear economic concept has shown itself to be inadequate to address increasingly complex societal challenges. Radical changes are needed. Therefore, there is a need to conceptualise notions such as value preservation, restoration, and revitalization of raw materials, and natural and biological systems, into a new generation of business models.

These are based on organising closed and extended loops, driven by principles such as design for circularity, decomposability, minimum and extended use of resources and strategies to optimize the use of functionality. We explicitly add to this exclusive material-oriented view the need to incorporate social inclusiveness. Shaping a circular economy is not just an adjustment of the current economic fabric by using less and better commodities but entails a large-scale overhaul of the economy and society at large. The transition to a circular economy requires rethinking of supply chains into value cycles, forming the building blocks of a system transition.

In this track, which is the sixth in a row after NBM@Toulouse (2016), NBM@Graz (2017), NBM@Sofia (2018), NBM@Berlin (2019), and NBM@Nijmegen (2020), once more we would like to explore the consequences of the circular economy thinking on business models for the future. In particular we focus on three interrelated subjects. The first subject concerns organising for circularity within and between organisations. Possibly this may be developed towards a coherent typology of forms of circular organising. Second, we focus on developing strategies for the enhancement of access to and use of functionality of products, components, and (raw) materials. The aim is to move beyond Product as A Service (PAAS) and related concepts. Third and last topic is embedding social inclusiveness into business model design. This encompasses amongst others the engagement of stakeholders, understanding their perception of circularity, and how this influences existing thinking on the role of business in society. Stakeholder engagement explicitly encompasses the changing mindset of stakeholders that unfolds with the realization of a circular, close-loop economy. Consequentially, the three subjects may lead to the clarification of implications for societal, economic and institutional configurations. In addition to these three subjects, we welcome contributions that develop a vision on what may be expected in the foreseeable future regarding the research and practices of a circular economy.

Language Matters: Aiming for Consolidation or Sticking to Complexity in Circular Business Models Literature?

Roberta De Angelis

Cardiff Business School, Department of Marketing and Strategy, Cardiff (UK)

deangelisr@cardiff.ac.uk

Since the 1970s humanity has been in ecological overshoot. This means that we consume natural resources by a measure that exceeds what Earth can regenerate each year: we use the equivalent of 1.6 planet Earths to attain the resources we need and absorb our waste (Global Footprint Network, 2020). How can we stop this unsustainable path and build prosperity whilst catering for growing needs and respecting ecological boundaries?

Broad consensus seems to have emerged as never before around what can be a plausible answer to this question: the circular economy (CE hereafter). Since 2012, CE thinking, whose underlying principles are anchored in the functioning principles of nature, has been advocated in policy, business and academic forums to address current ecological issues, including wasteful production and consumption systems. The CE is viewed as a "promising idea and ideal that has much to bring towards addressing challenges of the Anthropocene" (Friant *et al.*, 2020), and as a "key principle for reaching sustainable development goals (…). It is complementary to other strategies, but also necessary on its own" (Brandão *et al.*, 2020). However, despite the burgeoning interest it is attracting and its huge potential to decouple economic growth from consumption of finite resources, progress towards CE implementation in industry is slow paced (Panwar and Niesten, 2020; Parida *et al.,* 2019).

On one hand, this outcome is not surprising if we consider the systemic nature of the innovations that are required for a CE to emerge and the existing barriers to its implementation. Circular business models (CBMs hereafter) and design strategies as well as reverse logistics networks and enabling system conditions are the key building blocks of the transition towards the CE (EMF *et al.,* 2015). These span beyond the reach of any single organisation, even the most resourceful, skilled and powerful. This complexity in the innovation landscape is coupled with the existence of multiple hurdles that are encountered in implementation. Most notably, regulatory, technological, cultural, market and organisational barriers (Kirchherr *et al.,* 2018; Tura *et al.,* 2019). Hopkinson *et al.* (2018) make a pertinent point when arguing that "the shift to a CE is not straightforward, and the current transitional phases may collide against many entrenched features of the highly successful and much older linear economy model" (p. 91).

On the other hand, whilst it is undeniable that a complex sustainability transition such as a CE-oriented one can only be accomplished in the long term and it is inevitably confronted with many practical challenges, it is somewhat disappointing that despite the existence of a fairly voluminous scholarly literature on the subject, practitioners are either uncertain or struggling about how to implement CE strategies and models (Galvão *et al.,* 2020; Urbinati *et al.,* 2019). Consequently, it becomes pertinent to investigate whether scholars' efforts are supportive enough to equip management practitioners with the guidance they need in the process of BM (BM hereafter) innovation for circularity.

Current literature highlights the proliferation of constructs relating to CBMs (e.g., definitions, categories, strategies, archetypes, canvasses, frameworks, taxonomies, typologies and mapping tools) and points to the potential pitfall of such multiplication of perspectives: complexity of language and, thereby, confusion in terms of what a CBM is and what it takes to implement it. Täuscher and Abdelkafi (2017) rightly emphasise that managers are absorbed by the task of identifying suitable paths to innovate their BMs and so some support is necessary to guide their thoughts. In this respect, managers lack appropriate tools when developing new BMs (*ibid.*). Seemingly, the CBMs research is plagued by the same problem. As it stands, the literature on CBMs may run the risk of *missing the wood for the trees:* by placing too much emphasis on the functional forms that CBMs might take, the relevance of bringing clarity around a meaningful and manageable understanding of the CBM concept can be overlooked.

The growing semantic dissonance in the CBMs field is not advantageous to the implementation of CE principles. In fact, Kirchherr *et al.* (2017) have warned that "a concept with various understandings may ultimately collapse or remain in a deadlock due to permanent conceptual contention" (p. 221). This is echoed by Pieroni *et al.* (2019), who argue that "the existence of different propositions of archetypes for CE-oriented BMs without a consensus might hinder the knowledge consolidation in the field. Establishing common discourse/language to facilitate the dissemination and adoption of circular objectives collaboratively at an inter-organizational or societal level is fundamental" (p. 210).

The multiple yet divergent perspectives populating the CBMs literature are enriching a young field of research, which is still nascent. Nonetheless, the purpose of this research is to highlight that it is now high time for scholars to consolidate the literature by building the much-needed conceptual clarity around the CBM concept. Then a pertinent question is: how can conceptual clarity be built? To answer to this question, it is appropriate to anchor the study in the parent BM literature. This is consistent with recent research in the CBMs literature calling for a closer integration between the two fields to cross develop each other (Santa Maria *et al.,* 2020).

The necessity to enhance conceptual clarity unites the CBMs and the BMs literature. Accordingly, the consolidation of existing and divergent BMs perspectives is encouraged to enable better comprehension of the BM concept, ease theory building and testing as well as implementation (Foss and Saebi, 2018; Ritter and Lettl, 2018; Täuscher and Abdelkdafi, 2017). Ritter and Lettl (2018) propose that different BMs perspectives are complementary and should be combined to consolidate the field and offer a complete understanding of the BM concept. Arguably, the same logic could be applied to the CBMs constructs to build a clearer and more complete understanding of CBMs. Hence, this article asks: *how can divergent CBMs perspectives be merged into a more coherent and simplified BM framework for a CE?* By answering to this question, this research will contribute to consolidate CBMs literature, which currently suffers from lack of conceptual clarity (Feherer and Wieland 2020; Geissdoerfer *et al.,* 2020) and fragmentation (Chen *et al.,* 2020).

Keywords

business model, circular economy, construct clarity

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Developing a guide for Circular Business Model Design

Merryn Haines-Gadd[1],* Mark Lancelott [2], Fiona Charnley[1]

[1]University of Exeter; [2]PA Consulting

*m.s.haines-gadd@exeter.ac.uk

In the last 5 years, an increasing number of academics, policy makers, NGO's and businesses are publically embracing the notion of a Circular Economy. Hailed as an approach able to deliver Trillions of euros in uncaptured value, it is argued that a Circular Economy can help to mitigate risk of resource scarcity and deliver sustainable economic growth whilst preserving and enhancing natural capital (Ellen MacArthur Foundation, 2013).

Academics and practitioners alike have proposed many different methods and models of implementing circular principles within business. Firstly through new business model archetypes, such as Circular supplies or Resource Recovery (Moreno et al., 2016; Lacy & Rutqvist, 2015). Secondly, through business design frameworks and toolkits, such as '*ReSOLVE*' (Ellen MacArthur Foundation, 2015), *'The Circular Economy Business Model Toolkit'* (forumforthefuture, n.d.) or '*The Framework for Sustainable Circular Business Model Innovation' (*Antikainen & Valkokari, 2016). Thirdly, through the adaption of existing business tool such as, *'Sustainable Business Model Canvas'* (Bocken, Schuit & Kraaijenhagen 2018) or *'Circular Business Model Mapping Tool' (*Nußholz, 2018) and lastly through the development of new tools such as '*Sustainable Value Analysis Tool'* (Yang et al., 2017).

Yet, despite it being widely discussed and explored, there has yet to be consensus regarding what features and characteristic contribute towards making a business model circular or a clear understanding of what separates this from the linear approach (Planing, 2015; NubHolz, 2018). Moreover, none of these approaches provide practical, step-by-step guidance or set of resources for organisations to adopt circular principles and practices into business, from a value, organisational or financial perspective. Thus, to address these issues, PA Consulting in collaboration with University of Exeter Business School set out to develop an easy to use guide for designing Circular Business Models as part of an Ellen MacArthur foundation (EMF) CE100 Co.Project.

To carry out this project a design thinking approach was employed. This was selected because the Circular Economy concept is still emerging (Korhonen et al., 2018), and business models are often complex and dynamic, with success being contextual on the industry, sector and business. Thus, an approach that allows for, collaboration, experimentation, iteration and the gathering of insight from practitioners designing and conceiving of circular business models is appropriate to address the complexity and uncertainty of this topic (Guldmann et al., 2019).

The guide was developed iteratively, through testing and experimentation leveraging the expertise from all key collaborators. PA Consulting provided expert practitioner knowledge on sustainability led business innovation, proposing and developing tools as well as providing first-hand experience of best practice. While, the University of Exeter investigated the theoretical foundations behind circular business modelling and circular value, developing a 'Taxonomy of Value for a Circular Economy' (Haines-Gadd & Charnley, 2019) as part of the value led approach the project undertook. This knowledge of practice and theory was then synthesised to create a first iteration of the guide.

This version and its subsequent iterations, were then presented and tested through a series in-person and online workshops and expert interviews with Ellen MacArthur Foundation CE100 members over the course of 18 months. The guide went through four key iterations with each version being viewed and tested by our industrial and academic collaborators. This included both large and small organisations such as C-ECO, INGKA, Philips, Siemens, Net Positive Solutions and EMF, all who operate in varying sectors. All the feedback from participants were collated, analysed and then used to shape and refine the content.

As a result 'The Circular Business Model Design Guide' was created. Taking a value-led approach to business modelling, the aim of the guide is to provide practical resources to organisations so they can create, deliver and capture value within circular systems. It consists of 4 main sections:

- **Where to play:** identifying circular business opportunities through value mapping
- **How to win:** identifying key partners and creating mutually beneficial circular value propositions
- **How to operate:** recognising the circular capabilities needed to implement circular initiatives
- **How to profit:** selecting the right pricing strategy to enable sustainable profit

The titles and focus for the sections were inspired by Fafley and Martin's (2013) *'Playing to Win Strategy Choice Cascade'* and were selected, expanded and applied within this circular context to ensure that strategic business thinking was embedded at the core of the guide. Each section consists of template tools and supporting concepts that provide guidance on how to contemplate circularity within business modelling. Useful as both an educational resource and practical industry tool, it can help to identify new green field circular business opportunities and define the business and operating model required. The guide was designed to be non-sector specific and used by organisations of any size. The sectional nature of this guide is also intended to provide structure while also allowing for agility and flexibility in execution, therefore it can either be used sequentially from 1-4 or with focus to explore particular areas of interest.

This final iteration was publically launched at online EMF workshop on the 3rd December 2020 to 60+ participants and is available online www.paconsulting.com/bdg. During the event, the guide was presented in full and workshop sessions conducted on each section to present the tools but also collect feedback from circular economy focused audience. Currently, the guide has 819 downloads, and in future studies we intend to contacted those who have downloaded the guide to distribute a questionnaire and request further interviews to continue to develop the content and thinking.

Initial insights have been gathered from those testing the final version during the launch workshop session. Participants offered suggestions for development as well how they thought the guide by benefit organisations. These are follows:

Benefits:

- It is practical, useful checklist for addressing different aspects of circular economy in a systematic way
- Is a useful framework for facilitating often complex discussions
- Helps companies think through how best to deliver value to customers across the whole value chain for circular opportunities

Areas of development:

- Consider how the tools and process of the guide might cross pollinate with other circular focused tools and frameworks, such as circular procurement framework or circular design guide
- Additional case studies demonstrating the tools in practice for specific sectors would helpful for understanding how they apply to different contexts and markets
- How might these tools link to the business model canvas

In conclusion, this paper will present an overview of each section of the guide, the process of testing and experimentation that was undertaken and conclude with final insights and reflections on what value it can provide organisations as well the key points of development highlighted from post launch feedback.

Keywords

Circular Value; Tools and methods; Business Model Innovation; Circular Business Modelling

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Green Business Model Design, Reconfiguration and Development

Peter Lindgren[1,*] , Niklas Stoyan Hornbæk Knoth

* Peter Lindgren, Aarhus University, peterli@btech.au.dk

Niklas Stoyan Hornbæk Knoth, CGC - Aarhus University, knothniklas@hotmail.com

Abstract

Ever since the branching of the scholarly literature on business models of the late 1990´s and early 2000s, businesses have been experimenting with **business model design** – creating, capturing, delivering, receiving and consuming **TO BE Business Models** – focusing on TO BE Business modelling, entrepeneurship, intrapreneurship and interpreneurship and **business model reconfiguration** – focusing on changing or reconfiguration of **AS IS Business Models**.

Lately businesses have been motivated on innovating Green business models. Reconfiguring existing business models is complex but reconfiguration of business models to become efficient Green Business Models is even more complex as it includes balancing monetary and non-monetary value formulas. It calls for advanced business model innovation approach that challenge classical business model frameworks and understanding. Monetary value and profit are no longer main focus in business model innovation and business development – aiming at just changing BM dimensions and components – or adding more business model dimensions to the business model – to generate profit.

Green Business Model innovation– if business want to remain competitive and efficient - requires a different business model innovation approach – which we propose to be called **the multi green business model innovation approach.**

Strategic challenges in green business model innovation is addressed together with a strategic platform for green business model innovation. It relates to green business model innovation literature and investigates practice in 109 SME businesses to achieving greater understanding of how green business model innovation is strategically carried out and how profit and other values can strategically go in symbiosis in green business model innovation.

Keywords

Green Business Model, Green Business Model Innovation, Strategic Green Multi Business Model Innovation, Green Business Model parameters,

Introduction

Quantitative Green Business Model Parameters (GBMP)

as use of energy, Energy efficiency, use of black and green energy, use of materials and resources, life Cycle analysis (LCA), recycling of materials, waste, waste reduction, waste construction, pollution, carbon emission and

Qualitative Green Business Model parameters as

Categorising Green Business Model Innovation (GBMI) on the levels of Green business Model (BM) innovation, GBMI collaboration types, sustainable business models[2][18], circular business models [3][, UN 17 Goals [1]

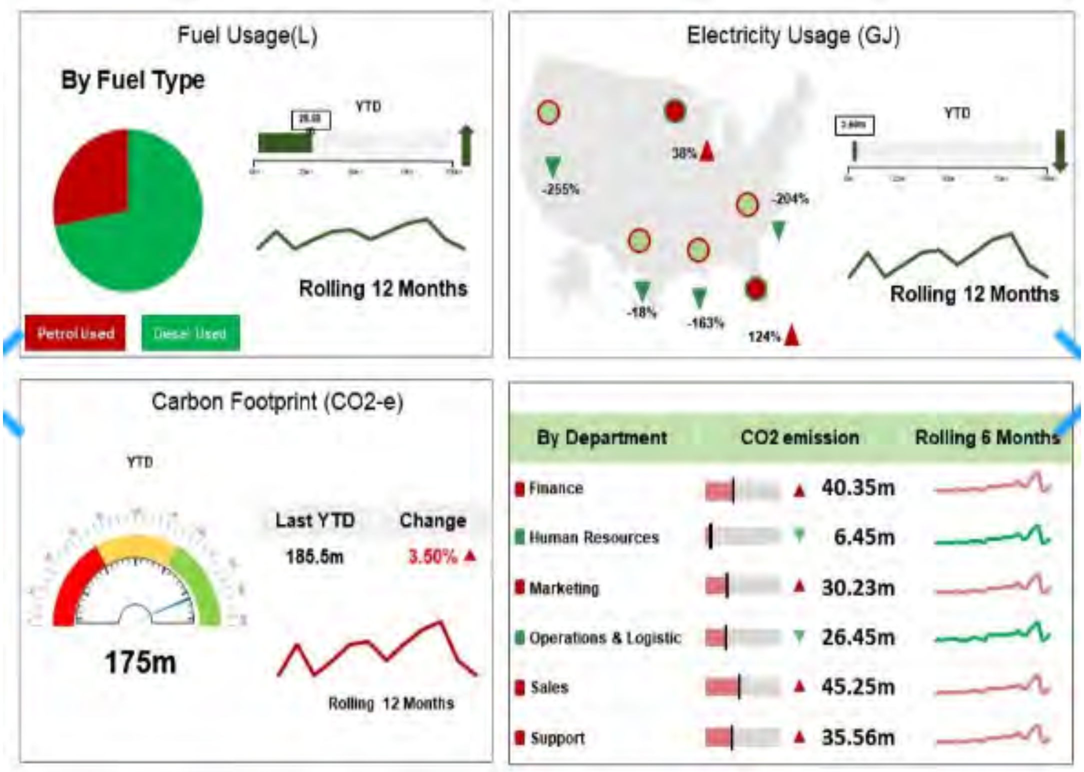
are all topics and terms that have been related to the discussion on green business models (GBM). All topics are more or less being related to the term green and in this case green economy, green business, GBM´s and green technology. Sustainable business models [2] and circular business model [3] communities have tried to embed the GBM into their terms and vocabularies – however with great difficulties, especially when some sustainable and circular business models turns out actually not to be green – green washing [4] – when further and deeper investigated – both in short and long term perspective.

All these green parameters could theoretically but maybe also practically with preference be turned into a Green Business Model Dashboard measuring

How green a Business Model actually is?

and when best in realtime

When green in Business Model Innovation?



Figur 1 Sketch of Dashboard for elected Green Business Model Technology comopent Parameters related to discussed topics [5, 6]

The GBMP´s as mentioned above are seen as different approaches to fulfil the Global Societies vision, mission and goals – in our case focused and seen from the Business Model dimension perspective - to become a green economy and in some cases hopefully close to 100% Co2 neutral.

RESEARCH DESIGN AND METHOLOGY

Our investigation is based on Nordic SME businesses GBMI and development cases/screenings reports from spring 2020 – sprint 2021. Two projects lay the ground for our research – ECSMV – project [27] and EU – Interreg Kask Greenbizz project [28] These were combined with studies of secondary Green Multi business Model cases. We were offered the opportunity to study 122 SME businesses wants for GBM investments and several of these demands and implementation plans of GBM´s. 13 of these businesses rejected to publish and participate in the paper and 3 businesses were sorted away in our research as they fail the criteria to be included in the GBMI research.

Our research approach was firstly to measure the SME´s GBMI related to 7 BM dimension [17] relate to both quantitative and qualitative GBMP. All businesses were screened by a screening questionnaire. All data from this screening was carefully analysed and grouped into different BM dimensions, GBMI Levels and GBMI strategy categories as seen in table 1 and 2.

FINDINGS

Almost all business and BMES we studied were part of the green mission and had green business goals- but turned out to participated and implement these in very different ways. In table

We found that most GBMI projects that the SME´s invested in were taking place on BMI Component layer and BM reconfiguration level – change of AS IS BM´s. This indicates that GBMI in the businesses is taking place at a very small, bottom and limited level in the businesses.

It can also be seen that majority of businesses and limited parts of the business are object to GBMI.

Single Green Business Model Innovation related to Business Model Dimensions					
	Business Model Innovation				**Business Model Design**
Business Model Dimensions	**Business Model Reconfiguration**		**Business Model Development**		
Value Proposition	Green Value Proposition Innovation	19	Green Value Proposition Reconfiguration		Green Value Proposition Development
User and Customer	Green User and Customer Innovation	31	Green User and Customer Reconfiguration	1	Green User and Customer Development
Value Chain Function	Green Value Chain Function Innovation	37	Green Value Chain Function Reconfiguration		Green Value Chain Function Development
Competence	Green Competence Innovation	104	Green Competence Reconfiguration	11	Green Competence Development
Network	Green Network Innovation	30	Green Network reconfiguration		Green Network Development
Value Formula	Green Value Formula Innovation	18	Green Value Formula Reconfiguration		Green Network Development
Relations	Green Relation Innovation	1	Green Relation Reconfiguration		Green Relation Development
Total incidents in 106 businesses		**240**		**12**	**8**

Table 1. Single Green Business Model Innovation related to Business Model Dimensions

As more of the businesses did GBMI at more BM Dimensions and GBMI strategies the incidence mapping as seen in table 1 became higher than the 106 business out of the 109 businesses that was possible to investigate.

Our investigation shows that most GBMI strategies are focused on limited numbers of Business Model dimensions – mostly BM Competence Dimension. It was especially technology BM Component that was innovated – investment in green production technology. Most businesses were focused at business model reconfiguration again at BM Competence Dimension and very few GBM development and GBM Design incidence were found.

Secondly we aimed at measuring the GBMP related to the 7 GBMI levels as seen in table 2

Single Green Business Model Innovation related to Business Model Innovation Levels					
	Green Business Model Innovation				**Business Model Design**
Business Model Innovation Levels	**Business Model Reconfiguration**		**Green Business Model Development**		
Business Model Component –	Green Business Model Component Innovation	104	Green Business Model Component Reconfiguration	11	Green Business Model Component Development
Business Model Dimension –	Green Business Model Dimension Innovation	1	Green Business Model Dimension Reconfiguration		Green Business Model Dimension Development
Single Business Model	Green Business Model Innovation	46	Green Business Model Reconfiguration	2	Green Business Model Development
Business Model Portfolio	Green Business Model Portfolio Innovation	3	Green Business Model Portfolio Reconfiguration		Green Business Model Portfolio Development
Business	Green Business Innovation	43	Green Business Reconfiguration	3	Green Business Development
Business Model Ecosystem	Green Business Model Ecosystem Innovation	42	Green Business Model Ecosystem Reconfiguration	1	Green Business Model Ecosystem Development
Business Model Innovation Process	Green Business Model Process Innovation	2	Green Business Model Process Reconfiguration		Green Business Model Process Development

Total incidents in 106 businesses		**241**		**17**	8

Table 2. Single Green Business Model Innovation related to Business Model Innovation Levels

Our investigation showed that most GBMI projects are taking place on BMI Component layer and BM reconfiguration level – equal to change of existing, AS IS BM´s. This indicates that GBMI in the businesses is taking place at a very small, bottom and limited level in the businesses. Majority of businesses are limiting their GBMI to greening a single business model (46 incidences) and mostly reconfiguration of these single business models – not in particular designing GBM´s. This indicates that businesses have not yet fully adapted the GBM approach and GBMI into the entire and higher levels of the business – and the new BMI area. It indicates that more BMI levels are not included in the GBMI as a core of BMI in the businesses. In other words, GBMI seems still in the very early days - strategically not yet to have been embedded in to critical and larger parts/levels of the businesses.

In our research of the 106 SME´s, we did not find many businesses “playing” the Strategic GBMI and development game. This can be wrong maybe because of lacks in our research approach and depth. However, it seemed as most businesses adapted the single green BMI strategy as seen in table 2.

EU´s latest Horizon 2020 call – The Green Deal Call [7] and even the Chinese Governments new Co2 neutral goal of 2020 [8][9] all try to push businesses to full fill the “future dream” and “want” of Green Business Modelling – although it is extremely difficult to kickstart a demand of becoming green in businesses – and especially on all BM dimensions and BMI Levels. The European Green Deal as an example - the flagship initiative of the European Commission, e.g. aims to cut greenhouse gas (GHG) emissions to 55% by 2030 (from the current target of cutting 40% of 1990 levels) by overhauling fiscal, trading and regulatory regimes. Brussels is well-placed to deliver the interregional distribution or the minutiae of technical regulations that this challenge calls for. Energy diversification is central to EU competitiveness and strategic autonomy – but it is still as can be seen just narrowed down to some elected BM dimensions – mainly competence (Technology) and GBM parameters – energy, green and black energy, resources and materials, waste, pollution, Co2.

GBMP as mentioned above are however more than mentioned – and extremely difficult to measure related to green. On a specific GBMP scale basis as shown in the proposal for a Green Business Model Dashboard in Figure 2 GBMP can have many measurement specifications – both quantitative and qualitative.

Figure 2. A proposal for a Green Business Model Dashboard with some of the elected GBM Parameters

An interactive Greenbizz Dashboard is the goal of Greenbizz project [28] based on both quantitative and qualitative GBMP measured with the BM approach and perspective as indicated in Figure 3.

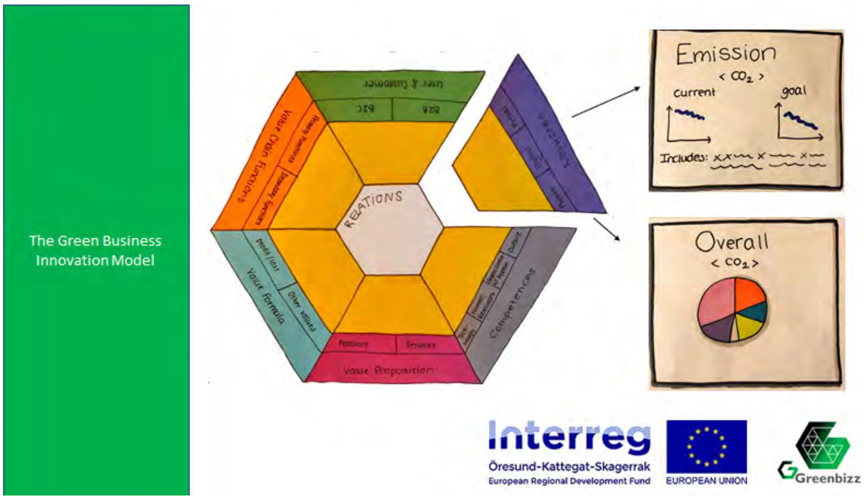


Figure 3. A proposal for a Green Business Model Innovation Dashboard with some elected GBM Parameters shown

As GBMP seems in many cases to be interlinked and impact each other it is important to develop measurements tools that enable measurement on all Business model dimensions and GBMP.

Eight thematic areas - as seen in table 3 - were identified reflecting the key work streams of the European Green Deal vision:

Increasing climate ambition	Sustainable and smart mobility

Clean, affordable and secure energy Industry for a clean and circular economy Energy and resource efficient buildings	Farm to fork Biodiversity and ecosystems Zero-pollution, toxic-free environments

Table 3. EU Horison 2020 Green Deal key work streams

Two horizontal areas aimed at strengthening knowledge and empower EU – businesses in the Green Deal call - addressing a longer-term perspective in achieving the transformations set out in the European Green Deal. The European Green Deal is the European Commission's blueprint and roadmap to make Europe the first climate neutral continent – already by 2050, with a green economy – although heavy investment in green business model innovation (GBMI) was aimed at "leaving business behind". To reach this 2050 vision and goals, EU elected the following actions in different Business Model Ecosystems (BMES) [14], including:

investing in environmentally friendly technologies; supporting Business Model Ecosystems to innovate green; rolling out cleaner, cheaper and healthier forms of private and public transport; decarbonising the energy sector; ensuring buildings are more energy efficient; working with international partners to improve global environmental standards.

Table 4. EU Horison 2020 Green Deal actions [10]

GBMI has attracted much investment [11,12,13] and as an example many proposals were innovated – Green Business Model proposals - to solve the wants and actions of EU Green Deal as seen in table 5.

Call topic	Name	Type of action	Budget (M€)	Projects submitted	Projects to be awarded	Ratio
LC-GD-1-1-2020	Preventing and fighting extreme wildfires with the integration and demonstration of innovative means	CSA	3	6	1	17%
		IA	72	49	4	8%
LC-GD-1-2-2020	Towards Climate-Neutral and Socially Innovative Cities	RIA	53	13	1	8%
LC-GD-1-3-2020	Climate-resilient Innovation Packages for EU regions	CSA	3	4	1	25%
		IA	42	29	3	10%
LC-GD-2-1-2020	Innovative land-based and offshore renewable energy technologies and their integration into the energy system	RIA	18	56	3	5%
		IA	68	42	2	5%
LC-GD-2-2-2020	Develop and demonstrate a 100 MW electrolyser upscaling the link between renewables and commercial/industrial applications	IA	60	16	2	13%
LC-GD-2-3-2020	Accelerating the green transition and energy access Partnership with Africa	IA	40	142	5	4%
LC-GD-3-1-2020	Closing the industrial carbon cycle to combat climate change - Industrial feasibility of catalytic routes for sustainable alternatives to fossil resources	IA	80	16	2	13%
LC-GD-3-2-2020	Demonstration of systemic solutions for the territorial deployment of the circular economy	IA	60	92	4	4%
LC-GD-4-1-2020	Building and renovating in an energy and resource efficient way	IA	60	115	3	3%
LC-GD-5-1-2020	Green airports and ports as multimodal hubs for sustainable and smart mobility	IA	100	44	5	11%
LC-GD-6-1-2020	Testing and demonstrating systemic innovations in support of the Farm to-Fork Strategy	IA	74	260	8	3%
LC-GD-7-1-2020	Restoring biodiversity and ecosystem services	IA	80	72	4	6%
LC-GD-8-1-2020	Innovative, systemic zero-pollution solutions to protect health, environment and natural resources from persistent and mobile chemicals	RIA	40	94	4	4%
LC-GD-8-2-2020	Fostering regulatory science to address combined exposures to industrial chemicals and pharmaceuticals: from science to evidence-based policies	RIA	20	21	4	19%
LC-GD-9-1-2020	European Research Infrastructures capacities and services to address European Green Deal challenges	RIA	28	13	3	23%
LC-GD-9-2-2020	Developing end-user products and services for all stakeholders and citizens supporting climate adaptation and mitigation	RIA	25	89	6	7%
LC-GD-9-3-2020	Transparent & Accessible Seas and Oceans: Towards a Digital Twin of the Ocean	IA	12	4	1	25%
LC-GD-10-1-2020	European capacities for citizen deliberation and participation for the Green Deal	RIA	10	52	2	4%
LC-GD-10-2-2020	Behavioural, social and cultural change for the Green Deal	RIA	10	117	2	2%
LC-GD-10-3-2020	Enabling citizens to act on climate change, for sustainable development and environmental protection through education, citizen science, observation initiatives, and civic engagement	IA	25	204	5	2%

Table 5. EU Horison 2020 Green Deal actions and applications 26 of January 2021 [10]

1550 proposals were handed in on the 26 of January 2021 – all TO BE BM´s - submitted for 75 awards. It made it less than 5% success rate in average to those value networks of businesses that had used BMI resources to apply for Green Deal funding. For LC-GD-5-1 as an example, as can be seen in table 3, 44 proposals were submitted with the expectation of 5 awards to win, which put chance for a proposal on this track at 11% if assumed there were equal number of proposals submitted for Green Airports and Green Ports.

The goal for 20% energy efficiency and carbon reduction by 2020 drove as can be seen many businesses and business model ecosystems (BMES) into strategies that incorporate green business model, green business model innovation designs and reconfiguration to meet the vision, mission and goals for a low carbon and sustainable growth [1, 2].

The GBMI in the cases we investigated take mostly place on greening a single BM (71) and primarily reconfigurating these single BM´s – seldom designing new GBM´s. This indicates that businesses have not yet fully adapted the GBMl approach and GBMI into the entire and important higher levels of the business. It indicates that more businesses model innovation levels are not including generally green business model innovation as a core of business model innovation. In other words, green business model innovation seems still strategically not yet to have been embedded in to critical and larger parts/levels of the businesses.

ANALYSIS

Green Strategic Multi Business Model Innovation is a very new strategic game and tool that can potentially be used in businesses. Many societies and organisation are pushing businesses to adapt the green approach – but creating demands have never been recommended by leading business experts [29]. The advice is to make business aware of that they have a need and then through a careful BMI process make them aware of their demand of GBM´s and GBMI. In this case coopeting could lead to major results [

Our study showed how businesses strategically handle GBMI mostly as single GBMI. Our research showed clearly that GBMI by SME´s in 2020/2021 in the two projects were in the very beginning of roll out – an in more cases not with a very strategic and proactive focus – but more as a necessity or "pushed" by the society, political [27] and different BMES levels.

Many GBMI are subsidised by society [32] – both from national – Denmark, China and EU side [7]. Many SME´s would not go for GBMI without subsidy [because they still not in 2020/2021 could see the efficiency of GBMI.

DISCUSSION

Creating a demand for a BM is generally not possible – and advisable – neither for GBM´s. When forcing demand either by subsidies and new BMES regulations [12][30][31][33] then the GBMI could fail to be really embedded in the core business model in the top business level including vision, mission goals and business culture and values. This we saw clearly was the case in our investigation. Many businesses had not embedded green into their core values – maybe in some cases value propositions but in many cases not strongly linked to the core values of the business.

Some businesses could in these cases fall to "jumping the fence" with a greenwashing [4] strategy – by purpose or by simply not knowing the potential consequences of Greenwashing. This could result in fatale backslash to those businesses [34] if the businesses are caught in such operation. In this sense the question is – What is a Green Business model and How can businesses really measure green related to BM´s. Many Green Business certificates are available but not measured in real time and from a Business Model and Business Model Innovation perspective. The Business Model community [18][19][20][25] combine with the advanced technology (e.g. wireless, IOT, Block Chain) community could in near future support this vision to be realized.

EU mostly push on competence dimension and especially green technology innovation. Many national government follow the same strategy but is a BM green when just some part of a BM Dimension – in this case technology BM component – is green or innovated green.

Subsidies – question is if this method embed deep enough the green into the core of the businesses. Our investigation shows clearly that this has not been the case yet, as most GBMI are taking place in limited area of the BM´s dimensions, at “the lower” levels of the GBMI and as Business Model reconfiguration – not Green Business Model design.

Quantitative GBMP are mostly measured and focused on and again in the BM competence dimension technology component. There is still some way to go before Qualitative GBMP are fully innovated – especially HR, Organisational Systems and Culture. Further we still have to see GBMI in other BM dimensions e.g. value chain function, network, value formula and relations.

CONCLUSION

Almost all business and BMES are pushed to Green Business Model Innovation. We studied a small part of these businesses and there related Business Model Ecosystems to investigate their green vision, mission and green business goals. Although they turned out to participated and implement these in different ways – they mostly focus on BM competence dimension of their business models and in the lower part of the Business Model Innovation levels.

The article reports on an investigation of 109 SME businesses in Denmark and their green business model innovation investments. We studied single green business model Innovation related to two areas - Business Model dimensions and Business Model Innovation Levels.

Secondly, we reported on Green Multi Business Model Innovation referring to GBMI strategies. Green Business Model Innovation in the SME businesses is found to mainly taking place at a very small and limited level in the businesses- often without much strategy and proactive strategy behind. Most business seems not yet to have adapted the green business model approach and green business model innovation into the entire and their higher levels of their business. Further they seemed not to have spread out GBMI into their related user and customers – and network. GBMI seems therefor to still be a single business model case not a value network and a relations axiom case [23].

FURTHER RESEARCH

The researchers intend to investigate further multi business model green business model innovation in the EU KASK GreenBizz project. More than 60 business cases in Norway, Sweden and Denmark will be investigated intensively.

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Innovative Circular Business Models for Reuse

A case study of ReTuna, the world's first reuse-based shopping mall

Heather Schoonover[1],*

[1]Lund University International Institute for Industrial Environmental Economics (IIIEE), Lund, Sweden

*heather.schoonover@iiiee.lu.se

It is widely recognized that the take-make-waste approach that characterizes the linear economy is unsustainable. The waste created by such an approach results in both negative environmental impacts and missed opportunities to create and capture value (Bocken et al., 2015). For example, in the EU, more than 80% of the furniture and textiles that are disposed of are either incinerated or sent to landfill (Forrest et al., 2017; Sandin & Peters, 2018). In addition, many products are disposed of before the end of their useful life (Cox et al., 2013). While this implies potential opportunities for reuse, in practice little reuse occurs (Cox et al., 2013).

Circular business models, by facilitating practices such as reuse, redistribution, repair and refurbishment, can help address these issues by extending product lifetimes and keeping products out of the waste stream (e.g. Geissdoerfer et al., 2020). While the practices themselves are nothing new, we are beginning to see innovative business models that go beyond individual entities such as secondhand shops and repair cafés, and thus hold promise for making these practices more widespread.

One such model is that of ReTuna, in Eskilstuna, Sweden (https://www.retuna.se/). On the surface, ReTuna resembles a traditional shopping mall, with a variety of shops offering goods including clothing, furniture, toys, books, electronics and sporting equipment. However, none of these goods are new. All have been used before, and many have been repaired, refurbished or upcycled. Further, nearly all are sourced from the co-located municipal recycling center. Billed as the world's first reuse-based shopping mall, ReTuna has continued to attract international attention since opening in 2015, with visits from major media and delegations from around the world interested in exploring whether such a concept could be replicated in their own cities. Yet, to date, only two similar examples exist, both in Scandinavia and both on a smaller scale than ReTuna. The question then arises, why do we not see more examples of this type of business model?

The overarching aim of our research is thus to understand whether a reuse-based shopping mall like ReTuna could become more mainstream. Specifically, could ReTuna be replicated elsewhere? To achieve this aim, we pursue three research objectives. The first objective is to better understand ReTuna's business model. Inspired by stakeholder perspectives on sustainable business models (Freudenreich et al., 2020), we seek to understand the different actors involved and how value is created, delivered and captured by and for these different actors. Our second objective is to understand the factors that have enabled ReTuna to be established and contributed to its success. Finally, recognizing the many barriers that circular business models encounter (e.g. Guldmann & Huulgaard, 2020; Tura et al., 2019; Vermunt et al., 2019), we seek to understand the challenges ReTuna has faced and how it has addressed or overcome these barriers.

Since a reuse-based shopping mall is a new phenomenon, our study takes an exploratory, qualitative approach. Empirical data are collected through semi-structured interviews with the different actors involved in establishing and operating ReTuna, as well as reports, news articles and other materials illustrating the discussions and decisions that led to ReTuna's establishment. The interviews are ongoing, and include representatives from different municipal departments connected to the mall, the current and former mall manager, and owners and employees of the individual shops. Interview questions address the business model(s) of both ReTuna as a whole and the individual shops; the motivations and processes behind the development of ReTuna, including the stakeholders involved and decisions made; and the challenges encountered by different actors in ReTuna's establishment and ongoing operation. All of the interviews will be transcribed, and both the transcripts and the supporting documents are analyzed using a qualitative content analysis, in which data regarding the business model(s), enablers, and challenges are coded inductively using NVivo.

As we are still in the early stages of our study, we present preliminary findings here. As our research progresses, we envision creating a framework of enablers and challenges that have contributed to ReTuna's development, implementation, and performance. This, in turn, can shed light on whether and under what conditions such a business model could be replicated in other parts of the word.

Regarding the business model, ReTuna presents an innovative approach to circular business models, particularly in terms of the actors involved and the relationships between them. ReTuna was conceived of by the local municipality, and its central functions are managed by a municipally-owned company that is responsible for the city's waste management services. The supply chain consists almost entirely of donations made by private individuals brought to the municipal recycling center, which are then sorted by employees of a municipal job training program and distributed to the different shops. The cost of these goods is included in the rental fee the shops pay to be part of the mall, but the shops are otherwise independent, with most operating as for-profit companies. The shops vary in whether they repair, refurbish, upcycle, or simply resell the items, as well as whether they provide additional services to consumers, such as custom furniture refurbishment or electronics repair. At the same time, the fact that they coexist in a shared space allows for a shared supply chain and collaborative activities, such as consumer repair and swap events.

Preliminary findings regarding enablers suggest several factors were integral to establishing ReTuna. Responsibility for household waste management in Sweden falls to municipalities, which are encouraged to follow the waste management hierarchy to prioritize reuse. The municipality in which ReTuna is located already had a track record of sustainability, having previously implemented a cutting-edge waste sorting system for which it had received a national award, and was keen to build on this reputation. The municipality had also already identified the need for additional recycling capacity to accommodate a growing population, and thus had the opportunity to design a new facility from scratch. Further, both labor market programs and local educational institutions saw a potential to create jobs and provide educational opportunities through working with and showcasing reuse – factors that continue to be prioritized in ReTuna's current operations.

Some of the ways in which ReTuna creates value are also the source of some of its challenges. For example, although the donation center has increased the number of items diverted from the waste stream and guarantees an ongoing supply of goods for the shops, some items cannot be resold because they don't fit the scope of the existing stores or the high standards ReTuna maintains in order to be an attractive and commercially viable shopping mall. In addition, while the labor market programs that support some of ReTuna's employees provide social value, their focus does not always align with the specific skills needed to run a particular type of retail store, for example.

ReTuna provides insights on organizing for circularity, namely highlighting the role of non-corporate actors in facilitating circular business models, and in particular the role of municipalities (Palm et al., 2019; Voytenko Palgan et al., 2021). Given the variety of actors and the range of business model strategies comprising ReTuna, we also see different types of value created by and for the different actors involved (Jonker & Faber, 2019). ReTuna might also be considered to demonstrate, albeit on a small scale, the sorts of cross-sector collaborations (Pedersen et al., 2020) and collaborative business models (Jonker et al., 2020) that are necessary to facilitate sustainability transitions.

Our study contributes to the literature on circular business models by elucidating an innovative circular business model in which non-corporate actors have played a key role in its development, implementation and operation. By understanding the enablers and challenges that have informed this model, it is also useful for practitioners who are interested in exploring whether such a model could work for them.

Keywords

Circular business models, sustainable business models, reuse, secondhand

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Circular Economy Business Models - Case Plastic Packaging

Maria Antikainen,*,+, Katri Valkokari[1], , Minna Salo[1], Henna Sunddqvist-Andberg[1]

[1]VTT Finland

*maria.antikainen@vtt.fi

Abstract

The aim of our study is to explore the current sustainable and circular business models related to plastic packaging and to add our understanding on the future business opportunities related to the CE of plastics. The methodology used in this study is a multiple case study based on public data including three company cases from Finland: Finn Spring´s Villi water brand, Sulapac and Kamupak. Our results indicate that the case companies are employing several CE business model elements at the same time. Our case study results also show that despite the CE business model elements employed by the case company, the value proposition and value elements seem to be quite similar in each case.

Keywords

circular economy, business model innovation, plastic packaging, case study, sustainability

Main text

INTRODUCTION & AIM

Our whole society including the economic model requires a dramatic change to tackle our great global challenges related to the over usage on natural resources, biodiversity loss, pollution, resource scarcity and excessive land use (Bocken and Short, 2016; Ehrenfeld and Hoffman, 2013; Jackson, 2009; Markard et al., 2012; Meadows et al., 2004; Seiffert and Loch, 2005). Circular economy (CE) has been presented as a concept that can make this change happen by focusing on slowing, closing and narrowing resource loops (Bocken et al., 2016; Geissdoerfer et al., 2017).

Sustainability and circularity of plastics have raised lot of discussions lately in various media. Plastic waste in oceans is a major environmental problem. Currently it is estimated that 10% of global plastic pollution ends up in the oceans each year (Fitzgerald, 2011). The positive side of plastics is its versatility, but on the other hand its durability also means that it stays in our ecosystems a long time, which has a major environmental impact on the ocean's marine life (Schneider et al., 2018). Furthermore, microplastics in the oceans are not only harming the food chain but also cause soil pollution (Rillig, 2012; Duis and Coors, 2016) and freshwater contamination (Wagner et al., 2014).

In Europe, 25.8 million tonnes of plastic waste is generated and less than 30% of that amount is currently collected for recycling (European Commission, 2018). Globally, 58% of plastic waste was discarded or landfilled, while only 18% was recycled (Geyer, Jambeck & Law, 2017), which stresses the importance of increasing the circularity of the plastics. Despite of negative attention related to plastics pollution and littering, only 4% of the world's oil production is used for plastics (Geyer, Jambeck & Law, 2017).

In order to enhance a transition from the current, still quite linear state, towards circularity of plastic, innovations that make the whole system across the entire value chains more circular, are required. Thus, the logic of business need to be re-considered and novel business models are needed.

The aim of our study is to explore the current sustainable and circular business models related to plastic packaging and to add our understanding on the future business opportunities related to the CE of plastics. Among different applications for plastics, plastic packaging is of key concern to both academics and practitioners (Ellen MacArthur Foundation, 2017). *Therefore, we focus our study on plastic packaging, as it creates up the highest proportion of production as well as waste streams.* Plastic packaging represent currently the largest end-use markets with the share of 40 % when looking at plastics demand by segment (Plastics Europe, 2019).

In order to approach the target, we analyse business models of three Finnish companies related to plastic packaging by utilizing existing frameworks on CE-based business models and CE-business model innovation (Antikainen & Valkokari, 2016; Accenture 2014).

SUSTAINABLE AND CIRCULAR BUSINESS MODELS IN PLASTICS

Sustainable and circular business models in a Finnish plastic packaging ecosystem

The role of plastics in our daily life cannot be underestimated – for instance the plastic packaging is crucial for sustainability of our food value chains. Thus, plastic is an important material that still can be improved within the circular economy, as confirmed in the recent report "The New Plastics Economy: Rethinking the future of plastics" (World Economic Forum, 2016). In 2018, the global production of plastic was 359 million tonnes. Europe is the third largest producer of plastic materials, responsible for 17 % of the world production. Packaging applications are the largest application sector, representing 39.9% of the total plastics demand (Plastics Europe, 2019).

In the traditional value network of plastics, high-volume processes and heavy investments have been key drivers. However, in a future-oriented innovation process the challenge is that the content of some – if not all – of these core building blocks are unknown. Thus, an ecosystem approach is needed to broaden the view of the current value network. The transformation from linear value networks of plastics with a high volume of fossil petro-chemistry based polymeric materials towards circularity of materials or even carbon-binding plastics packaging is undoubtedly a complex and a systemic process.

Elements of sustainable and circular business models

The focus of prior studies on CE has been on identifying characteristics of circular business models based on longevity, renewability, reuse, repair, upgrade, refurbishment, capacity sharing, and dematerialization. Circular business models can be defined as business models that are closing, narrowing, slowing, intensifying and dematerializing loops, to minimize the resource inputs into and the waste and emission leakage out of the organizational system (Bocken et al., 2016; Geissfdorfer et al. 2018).

Accenture have named the circular business models as circular supplies, resource recovery, product life extension, sharing platforms and product as a service model (Accenture, 2014). While the circular economy business are very strongly networked models (Beattie and Schmidt, 2013; Antikainen & Valkokari, 2016), network optimization can be a major enabler for circularity. Network optimization is strongly related to the digitalization, for example use of big data and blockchains, which have been identified as major enablers of circular economy business models (Antikainen et al. 2018). The CE business model pie presents the six different circular business models. Instead of concentrating only one sector, the business model of a single company can include several sectors.

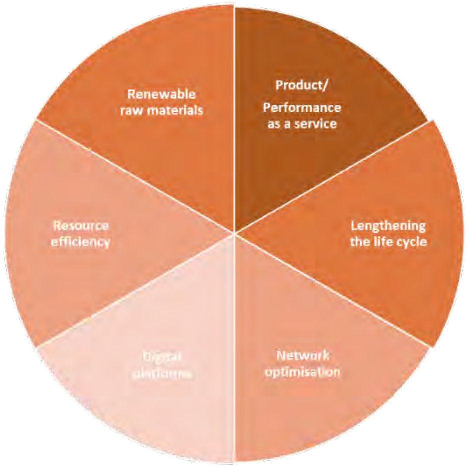

Figure 1. CE business model pie (modified from Accenture, 2014)

CE business model canvas

There is a growing amount of different tools for innovating circular economy or sustainable business models (Bocken et al., 2015; Bocken et al 2018; Dewulf, 2010; Sempels, 2014; Sousa-Zomer 2018). In addition, of being tools for innovation, these tools can be used to describe the exisiting business model in a detailed way. In this paper, we analyse our cases with the existing framework named as sustainable circular business model innovation framework. The framework aims to provide a generic model for business model innovation to support companies in designing, as well as reconfiguring, their business models (Antikainen & Valkokari, 2016).

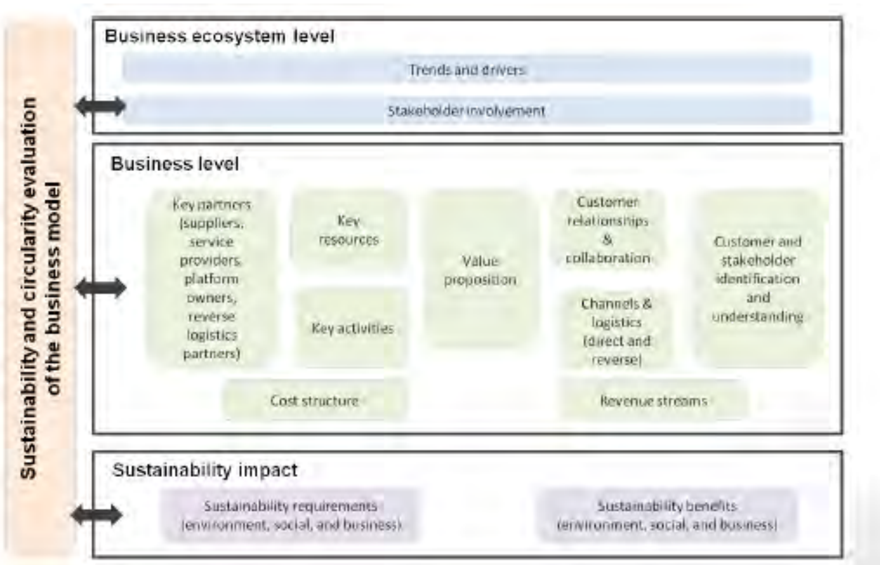

Figure 2. A framework for sustainable circular innovation (Antikainen & Valkokari, 2016)

METHODOLOGY

Our study is a multiple case study including three cases: Finn Spring´s Villi water brand, Sulapac and Kamupak. These cases were selected as they represent well the circular business models in the area of plastics packaging in Finland. The data, used in analysis, is based on public data found in Finnish on the companies´ websites[10].

The initial analysis was conducted independently by three authors, after which the results were deliberated and further analyzed together with all authors. In the analysis we used CE business model pie and a framework for sustainable circular innovation to be able to compare the cases as well as to create an in-depth understanding on the business model in the context of sustainability and circularity.

Case descriptions

Villi water is a responsible water brand of Finn Spring, the largest spring water manufacturer in Finland founded in 1991. Villi water is positioned as being a more responsible brand, and it is the first Finnish bottled water brand that uses bottles made out of recycled polyethylene terephthalate (rPET). Besides using 100% rPET bottles and having, thus, saved 165 tons of virgin plastic in 2020, the company launched several actions to be more responsible, ecological and transparent. Only renewable energy (e.g. solar panels, wind power and wood pellets) is used in the production. Furthermore, the company is investing in the innovative environment solutions and the energy efficiency has improved through recovery of waste heat. The carbon footprint of raw materials, production and logistics is compensated through standardized projects. The packaging materials of the bottles is minimized and the occupancy rate of the transports is optimized.

Sulapac is a start-up company founded in 2016, focusing on bio-based material for packaging. Thus, its strategy for sustainable circular business is to provide (packaging) solutions that integrate renewable materials and luxury design. In addition to material development, the company has developed and patented technological innovations for biomaterial processing. The core of company’s customer value proposition focuses on responsibility and climate change mitigation as the products, including packages, are manufactured from biobased and fully biodegradable material. Its business model is based on licensing the recipes and drop-in manufacturing solutions to its customers.

Kamupak offers deposit-based reusable food containers as a service. The product is designed for takeaway foods at grocery stores and restaurants. The main product, KamuDish is a reusable plastic packaging that works as a more ecological alternative to disposable, single-use packaging. The idea is that customer orders or buys their takeaway food in a reusable KamuDish and pays the deposit along with their purchase. The customer can choose to exchange the returned dish for a fresh one, get their deposit back

[10] Main data sources included: kamupak.fi, villivesi.fi/, finnspring.fi and sulapac.com

or receive a digital KamuCredit. A returned KamuDish is scanned and washed at the location to be reused. The company who offers Kamu prodcuts in their store, will also get marketing material and training from KamuPak.

Kamupak estimates that the operations of the deposit system result in around 2,5 g CO2 eq emissions per use. The main environmental impacts of a KamuDish are caused by its manufacture, material, transportation, and washing. KamuDish is made out of polypropylene, which is a highly durable type of plastic that lasts well in reuse. The manufacture of this raw material is the source of most of the environmental impacts in the life span of a KamuDish. They are also looking into replacing the fossil-based plastic material for one that comes from a renewable source.

RESULTS

The customer value proposition of Villi water brand summarises all of these environmental actions by promising to offer their customers added value with high-quality, cost-efficient and profitable products as well as knowledge about the origin and ecological aspects of the products. The final goal of Finn Spring is to ensure the availability of clean spring water also to the next generations.

The key challenge of this new business innovation of Villi water brand is connected to the differentiation from their competitors. When Villi water brand was established, it was the first Finnish bottled water brand using 100 % rPET bottles. However, there are currently other brands in the market offering bottled water in rPET bottles as well. There are also discussions going on about replacing PET plastic with a bio-based alternative, polyethylene furanoate (PEF), in the future and this change will most propably increase the competition even more. Currently, the only differentiating factor of Finn Spring’s Villi water is the domesticity of the brand and the familiarity of Finn Spring among Finnish consumers regarding the producers of bottled spring water.

Finn Spring creates value to the customers with Villi water brand by offering easily recyclable, environmental friendly and responsible bottled water. The consumers can easily recycle the bottles within the well-performing national deposit-based beverage bottle return system. Currently, the Villi water bottles made out of fully recyclable PET, are available from groceries of Kesko group that is one of the two biggest Finnish grocery traders. Besides Kesko, the other key stakeholders regarding the plastic packaging are Suomen Palautuspakkaus Oy (Palpa), a Finnish company managing the national beverage container return system, and a partner providing carbon offset solutions). The primary CE business model for Finn Spring’s Villi water brand is renewable materials by replacing fossil-based PET plastic with recyclable PET. To complement the primary CE business model, Finn Spring´s Villi water brand also supports the resource efficiency by minimizing the packaging materials of the Villi water bottles and by using only renewable energy in the production phase.

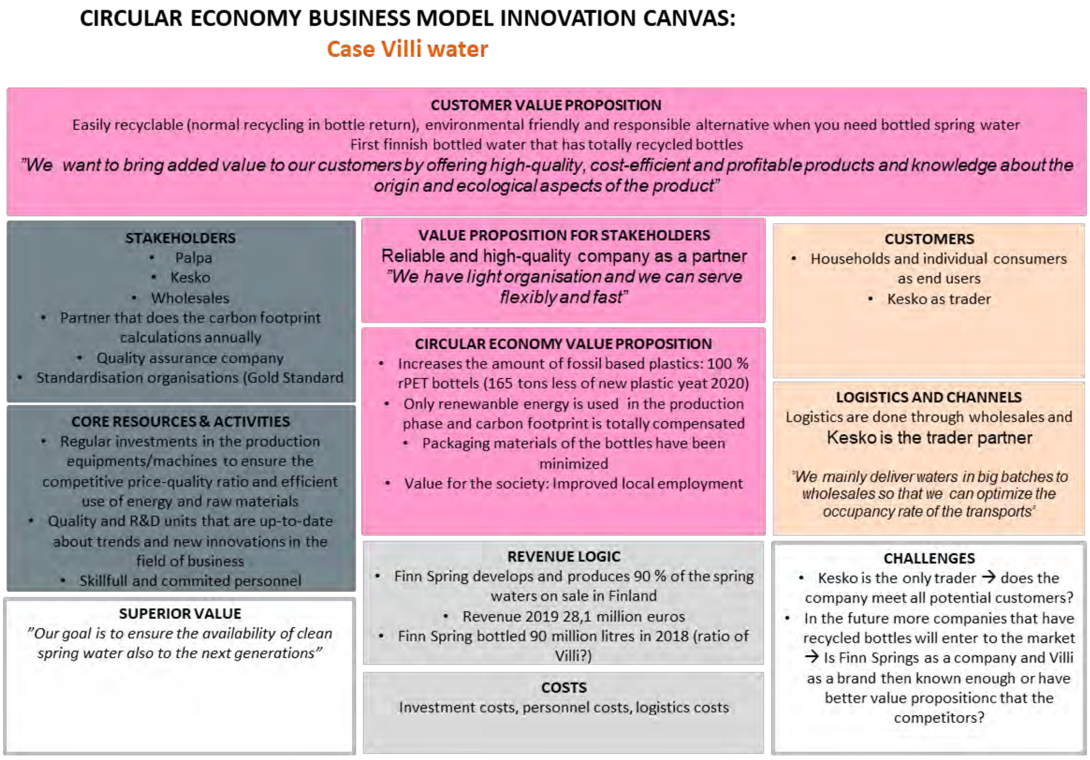

Figure 3. Villi water circular business model canvas

The key challenge (as well as the key advantage) of Sulapac business model is the biodegradability of packages. Even though the plastic package is made from biodegradable material, it does mean that it will degrade easily in the nature. Furthermore, biodegradable plastics may not fit to the existing mechanical recycling systems intended for non-degradable plastics, nor are favored in organic recycling, including industrial composting and anaerobic digestion. Thus, catching the full potential from this innovation requires system level changes.

The primary CE business model of Sulapac is enabling its customers and their customers to replace non-renewable materials with renewable, biodegradable materials. To complement the primary model, the business model also supports the resource efficiency as the biobased materials can be used as drop-in solutions to be processed with the existing machinery.

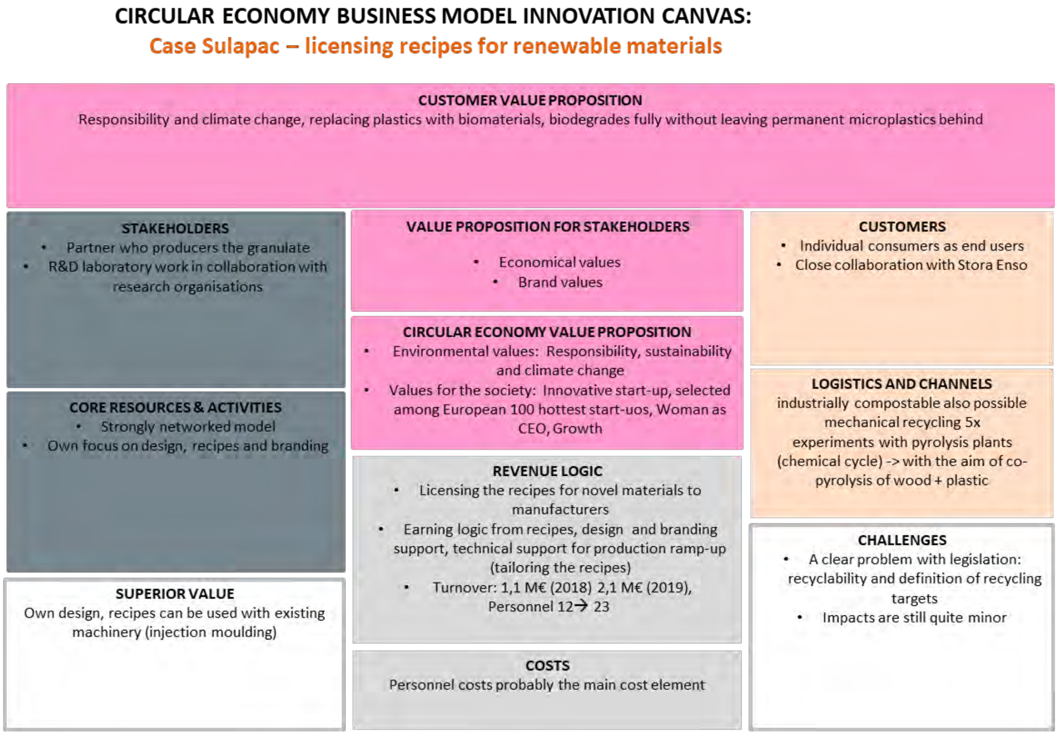

Figure 4. Sulapac circular business model canvas

Kamupak creates value to both the business customers and consumers by reducing amount of single-use packaging waste and lowering the carbon footprint. Yet, the company does not offset their emissions. Currently their product, KamuDish, is available at restaurants and groceries. The main stakeholders constitute of cleaning, logistics and package producers. The environmental part of the CE value proposition is dependent on the usage of the KamuDish: the optimum impact is reached when the product is used more than six times. Society value proposition is related to the local employment that it has potential to increase. The revenue logic is that business customers (groceries and restaurants) pay first only of containers and later there also will be a fee based on the usage on the service system. As a CE business model, Kamupak presents "Product as a service model". Secondly, also lengthening the lifecycle and resource efficiency are promoted by closing the resource loop with their system, and avoiding waste by offering a solution that can be used many times. In addition, offering a digital platform also plays a central role in their business model.

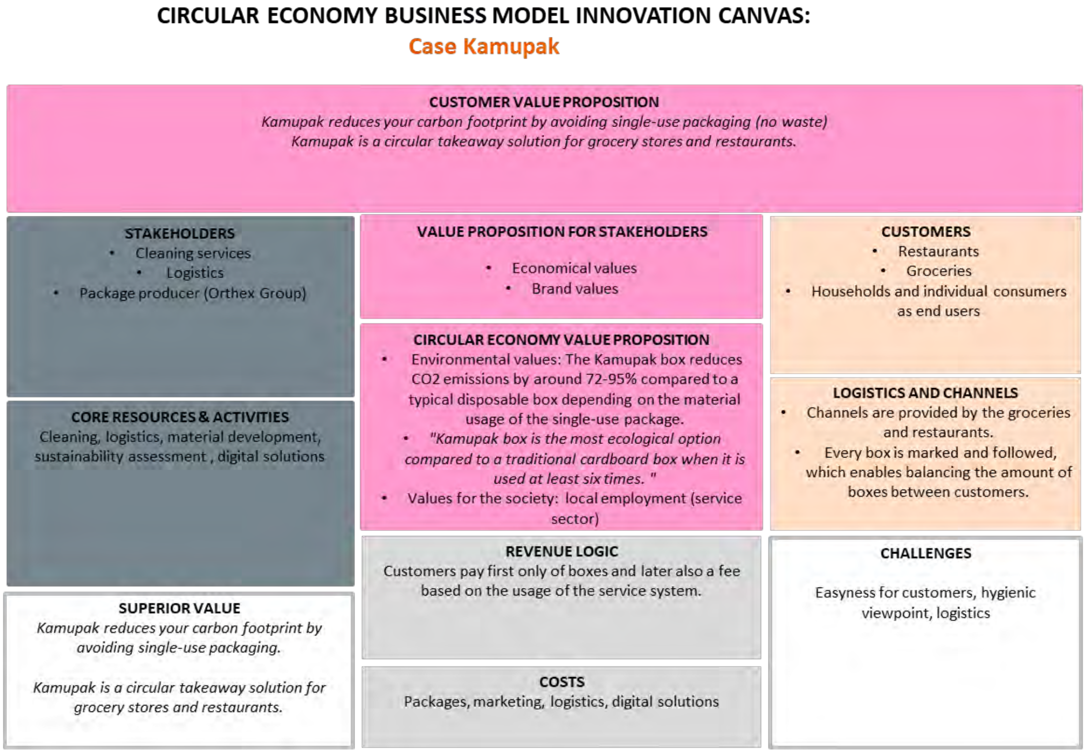

Figure 5. Kamupak circular business model canvas

DISCUSSION & CONCLUSIONS

The main contribution of the study is to increase understanding on the sustainability and circular business model literature stream. Our study showed clearly that all our cases include elements of several CE-based business models identified in the prior studies (Bocken et al. 2016; Geissdorfer et al. 2018). Currently, many companies are having business models that include elements on both the linear and CE business models. Thus, one interesting viewpoint would be to understand transformation process from linear business model towards CE-based business model. Two of our cases (Sulapac and Kamupak) present circular business models that are based on entrepreneurial efforts of start-up companies. These small businesses are coming up with innovative products to enhance the plastics value chains to be more circular. This is in line with the current understanding (Plastics Europe 2019) that the the effort of larger corporations are still rather limited.

Based on our results, we were able to categorize the business models into primary and secondary. Currently, often the discussions on CE-based business models highlights one model per one company. On the other hand, there is an evidence of companies that have implemented several elements of the CE based business model (for example Nike, Houdini etc.). Thus, based on our results, we would like to raise a discussion whether a business model based on only one identified CE-based business model element can really be considered as a CE-business model. There is a need to gain insightful understanding what really is an optimal sustainable CE-business model. In addition, to be able to understand this, business model innovation needs to be closely integrated with the impact measurement. We need more understanding on the created impact for society and environment by sustainable circular business models. Furthermore, it would be interesting to explore what kind of business model combinations would be most fruitful for different kind of businesses and with kind of trade-offs these business models and their combinations may entail.

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Shared Values as Connecting Factor for Upscaling Circular Initiatives

a circular festival crewmember T-shirts concept

Karen Janssen[1,*] Rijnko van Diepen[1]

[1]Avans University of Applied Sciences

**kl.janssen@avans.nl*

Abstract

The current unsustainable production and consumption of cotton in India is depleting the soil and leading to poverty. Farmers are under pressure from unfair markets and are often in debt due to high investment costs and exploitation. An Indian-Dutch team designs and implements community-led initiatives that optimize value and encourage continuous innovation in a regenerative circular system. While a small-scale pilot of sustainable circular T-shirts for festival crewmembers appeared to be successful, they now face the challenge in upscaling. Despite the wide variety of circular initiatives, few companies can develop into robust organizations with circular business models. Organizations are looking for ways to optimize social and environmental values, while maintaining economic viability. For this, companies should not only focus on their own financial gain but should also take the optimization of the entire system into account. The aim of our paper is to gain insights into factors contributing to upscaling circular initiatives. We use a design driven approach to explore how organizations create, deliver and captures value. Findings indicate that co-creation (commitment), transparency and traceability (trust) and partner association (shared values) are important in designing and upscaling a circular initiative. Unburdening (collaborative business model) in combination with creating awareness (new standard) ensures that a situation emerges which contributes to the system change that is needed in the transition to a circular economy. Therefore, circular initiatives will have an enormous impact if shared values are the corner stones of collaborative business models and serve as connecting factor in upscaling those initiatives.

Keywords

Collaborative Business Models, Shared Values, Circular Economy, Upscaling

Main Text

"Less bad isn't good enough." - M. Braungart

1.INTRODUCTION

The linear "take-make-dispose" mentality is under increasing pressure because of its environmental and economic disadvantages. The transition to a circular economy is of great importance. Traditional business models need to be adapted into new circular business models. For this, not only economic aspects, but also social and ecological values need to be considered. Organizations need to collaborate to create and capture the shift to multiple value creation. Organizations do not only need to focus on their own financial gains, but also on the optimization of the entire system. Organizations cannot realize this in isolation, they need to collaborate. These new business models and ways of collaboration revolve around system thinking principles and require a radical system change.

The current unsustainable production and consumption of cotton in India is depleting the soil and leading to poverty. Cotton farmers are under pressure from unfair markets and are often in debt due to high investment costs and exploitation of middlemen, pesticide traders and unfair trading power. Many textile brands have committed themselves to extracting 100% of their raw materials from natural sources. Ecological, social and economic innovations can create a sustainable value system. An Indian-Dutch team designs and implements community-led initiatives that optimize value for farmers and other oppressed rural households. From a holistic systems approach that encourages continuous innovation in a regenerative circular value system, they have joined forces to expand circular textile initiatives.

In 2019, the team delivered sustainable T-shirts to the Tomorrowland festival crewmembers. Where previously each crewmember received five T-shirts for the entire festival, they now received one piece per person. The T-shirts were washed at the festival location and afterwards collected for next year. Non-wearable T-shirts will be recycled into yarn. Where in earlier years 30,000 T-shirts were used at one festival, only 6,000 T-shirts were used in this pilot. Although this small-scale pilot of sustainable circular T-shirts for festival crewmembers appeared to be successful, they now face the challenge to scaling-up in order to increase sustainable impact. They want to sell 900,000 T-shirts on a completely transparent, sustainable way and have set the goal of making regenerative organic farming the standard for their textile farming in India.

Despite the wide variety of circular initiatives, unfortunately, few companies are able to develop into robust organizations with circular business models. Success on a small scale does not guarantee continuation in a successful operational implementation. We used a design-research approach to develop a circular concept for these crewmember T-shirts and explored what factors influence the development of collaborative business models and the upscaling of circular initiatives.

2.UPSCALING IN THE CIRCULAR TRANSITION

Circular economy and system thinking

The transition to a circular economy is one of the most important conditions to promote prosperity while protecting a live-able earth now and later (WCED, 1987). This concept is recognized by both academics and practitioners as a proposition to face today's societal, economic and environmental challenges. Circular economy is defined as an economic and industrial system "where material loops are slowed and closed, and where value creation is aimed for at every chain in the system" (Ellen McArthur Foundation, 2015). To evolve towards a circular economy, several new principles for entrepreneurship need to be developed, such as different ways of working, organizing, doing business, earning, collaboration and value creation. This means that organizations have to 'rethink' how they design their business model. Organisations need to innovate but cannot manage that in isolation: they have to join forces and collaboration is the starting point. For this, radical and systemic innovation is needed, on technical level as well as on business level (e.g. Boons and Lüdeke-Freund, 2013). This means that companies should not only focus on their own financial gains but should also take the optimization of the entire system into account. Systems thinking is therefore key in the transition to a circular economy.

Circular and collaborative business models

Organisations need to reconsider how they maximize their contribution to the system (product) while reducing the usage of natural resources and creating positive societal and environmental impact (Kraaijenhagen et al., 2016). Many organizations struggle with a lack of a framework on how to adapt their existing business model or create new circular business models (Bocken et al., 2015; Antikainen and Valkokari, 2016). Circular business models are networked by nature: they require collaboration, communication and coordination within complex networks of various and different actors and stakeholders (Antikainen & Valkokari, 2016). By working together and truly joining forces, companies in the value system can increase their positive impact for all actors, society and the environment. Communities are formed in which knowledge and ideas can be shared, exchanged and created (Jonker et al., 2018). Sharma et al. (2015) propose that value-based collaboration is more beneficial in the longer term than a collaboration where values are not shared. Business models need to be shaped by different actors as a collective endeavour, referred to as collaborative business model. Collaborative business modelling is a process in which parties jointly examine whether their partnership can create multiple value and design on a business model, or logic, by which the partnership wants to create value. It shows what the participating partners do, what matters for whom, what it takes to realise that and what yields are gained. Commitment, trust and creating a shared identity at collaboration level are of crucial importance (Öberg, 2016; Hessling et al., 2018), but more research is needed into how these aspects are developed and how they contribute to the development of circular business models.

Multiple value creation and business model experimentation

A circular economy requires the repeated use of raw materials with the goal to close cycles (Ellen MacArthur Foundation, 2013; Jonker et al., 2018). A circular economy is based on the effort to recreate value from existing things, aiming to maximising reusability and minimising value destruction. Multiple types of value are considered: in the form of money, human value, social value or natural value (*cf* six capitals, IIRC). It ensures a constant flow of services and goods without the need for new materials or raw materials, through different 'value circles' by slowing, closing and narrowing resource loops (Bocken et al., 2016; Ellen MacArthur Foundation, 2015; Geissdoerfer et al., 2017). When companies collaborate with customers, partners and other stakeholders in value creation, their thinking and behaviour changes. Creating a shared identity is crucial in this respect (e.g. Öberg, 2016). Also, when organisations commit themselves to those shared values, it is more likely that multiple value creation is realised (Jonker et al., 2018).

Many organizations are experimenting with circular value creation and business models innovation. Bocken et al. (2020) refer to this experimentation as ”an iterative approach to testing circular value propositions – i.e., customer offerings that include an environmental focus on closing and/ or slowing resource loops - in a real-life context. It involves learning based on empirical data to provide evidence on the viability of circular value propositions in a rapid and low-cost way. The aim is to learn and reduce uncertainty about future circular value propositions, and, therefore, business risk and cost. In established companies, it can help overcome organizational inertia towards circular business model implementation”. They also call for more research on long-term impact beyond experiments and pilots.

Innovation and upscaling circular initiatives

The development of an innovation usually starts with a ’prompt’ (factor which highlight the need for innovation). In the generation phase, proposals and ideas are shaped, resulting in the prototyping and pilots, where ideas are refined and tested. Sustaining is the phase where ideas are sharpened and strategies for long-term viability of the organisation are sought (Murray et al., 2010). Upscaling usually refers to the process of increasing the number of customers or, to a wider extent, the number of members involved or the number of partnering organisations. It is the phase where strategies can spread, through growth and diffusion, resulting in a systemic change where many elements come together in, for instance, a new business models for an innovation. Upscaling tends to refer to growing as a business, like Ansoff's (1988) growth strategies (market penetration, market development, product development and diversification). However, the focus can be expanded to also include ’increasing impact’ of a business (Bocken et al., 2016).

Organizations that want to scale-up their circular initiatives and aim to address a social issue, face more difficulties in reaching scale, since social issues are harder to sustain financially (Karamchandani et al., 2009). Bocken et al. (2016) found that there are two ways of increasing income generated that are linked to the four growth-strategies: increasing revenue per stream and diversifying revenue streams. Choosing the best strategy requires collaboration, strong leadership and a match between strategies and the mission, values and business model of the company. Therefore, organisations that aim to up-scale their circular initiatives, need to put a lot of effort in alignment between partners with several ambitions.

3.RESEARCH DESIGN

Our paper aims to contribute to accelerate the transition to a circular economy, by gaining insights into the factors that influence upscaling circular initiatives. We have explored how organizations co-create and design their concepts to jointly create, deliver, and capture sustainable value. Sustainable development is a dynamic, multi-dimensional challenge that includes the visions of a large range of stakeholders (Kemp et al., 2007). Differences in interpretation, perceived pressure, opinions and preference results in a plurality of visions and solutions that need to be considered in a value-based system. A 'basket of objectives' is created which expresses the shared visions and goals of the actors. Alignment in these differences is needed to reach shared values.

We used a design-research approach for co-creating a possible concept to upscaling the circular crewmember T-shirt case. Co-creation is a marketing and business strategy which focusses on mutual value creation between organization and consumer (Prahalad and Ramaswamy, 2004). Co-creation involves all stakeholders in an open, transparent and equal setting. Design-research is described as a systematic approach to ‘studying learning in context’ (Barab and Squire, 2004). Design-research is the systematic cycle to development a solution for a complex problem. These problems and its context face many uncertainties which makes designing a solution difficult, as there are no clear pre-set criteria for the solution (Nason, 2017). A cyclical process of discovery, design, testing and learning is needed. The steps of design-research are as follows: determine design requirement(s), design solutions, select the most suitable solution and test the selected solution (Smit, 2018). The circular crewmember T-shirt concept was designed with, presented to and discussed with festival experts and organizations.

For the development of the circular crewmember T-shirt concept, we have used exploratory case-study research of successful pilots (including the Circular Crewmember T-shirt Tomorrowland). Several circular textile initiatives have been examined (Dutch Circular Textile Valley, 2020) to collect learned lessons. Three initiatives (MUD Jeans, LeaseShirt and Swaptee) were selected to design the first concept. This research has exclusively focused on the music festival industry. Festivals are a closed and manageable system. They have a defined period and location, a clear organisation in terms of suppliers, visitors, operators and waste flows. This makes it easier to set-up a controlled system of circular use of products. In addition, the target group of music festivals mainly consists of young people (Kinnunen et al., 2018) and they are the ones who can initiate a system change.

The most suitable concept was discussed with different stakeholders, in different rounds of (online) semi-structured interviews. Interviewees consisted of design and textile experts and included a sponsor and a festival organization to reflect on the design. The interviews were transcribed and analysed via coding. Testing was not considered in this project, due to COVID-19 restrictions, which made the festival being cancelled in 2020 and the first half of 2021.

4.RESULTS

Idea selection

In the first design round, many different concept ideas were developed based on the lessons learned of similar initiatives. The ideas were evaluated based on their impact and possibilities to set a system change in motion. The ideas focused on lifetime extension of the festival crewmember T-shirts. The following ideas have been reviewed:

1. Repairing used crewmember T-shirts with needlework and reuse them.
2. Stitching logos with microwave-thread on monochrome crewmember T-shirts, so they can be removed by industrial microwaves and replaced with new ones.
3. Signing worn crewmember T-shirts with artist signatures and sell them as merchandise.
4. Printing the product passport on the T-shirt and reuse it at different festivals a year, that contribute to the savings. The festival names will be mentioned in the product passport.

The first three ideas appeared to be rather time and labour intensive, which has an increasing effect on the price. The concept needs to compete with conventional T-shirts. Respondents indicated that price is (still) a decisive factor for many organisations. The fourth concept was selected to further develop into a new concept.

Design

Transparency and traceability

Product passports are common principles within the circular economy to generate value by identifying and highlighting the reuse and recycling potential of products for different stakeholders (European Union, 2019). A product passport is ‘a set of data about the components and materials that a product contains, and how they can be disassembled and recycled at the end of the product's useful life’. Showing various data in a product passport leads to transparency and traceability of all stakeholders (Rizos et al., 2015). Respondents indicated that transparency is an important factor for collaboration, but also a great obstacle, since most organisations are not open about their business operations. Transparency often refers to the disclosure of information to partners, customers and consumers, among others. Transparency contributes to partners' capacity for trust (Amed et al., 2019), but also increases consumer awareness. Traceability is an important aspect of full transparency and is therefore important for value creation in the chain. Close collaboration through a long-term relationship is seen as the most applicable method to enable traceability in the supply chain (Obser, 2016). The concept incorporates transparency and traceability by showing the printed product passport on the back of the T-shirts, which shows the use of the product in the form of a timeline. The savings in water, CO_2 and cotton-use are shown at the bottom of the T-shirt. The savings are expressed in numbers and depend on the amount of reuse-cycles. Disclosing this information results in growing consumer awareness of textile impact and the effect of textile reuse. The reuse of the T-shirts takes place at different festival organisations. Results indicate that complexity decreases if these organizations are part of the same parent company, as they are less competing and often share the same targets. This can even result in double promotion of the other festivals of the parent organisation (*see* partner association). Figure 2 shows a visualisation of the concept design of the festival crewmember T-shirts.

FIGURE 2: VISUAL OF CONCEPT ID&T VISUAL OF CONCEPT MOJO

Partner association

Results show that sponsors, like major beverage and beer suppliers, are often responsible for the supply of crewmember T-shirts so they can advertise their products. Companies such as AB InBev, Heineken, Coca-Cola, Grolsch and Swinkels are increasingly concerned with sustainability. Results indicate that these kind of liquor suppliers find it important that the concepts can be associated with aspects they entail. This means that potential sponsors want to be visibly in the design with for instance a printed logo on the T-shirt. Respondents expect that congruence between all collaborating partners (festival organization, sponsor and producer) results in a positive influence on the brand image and the consumer's attitude towards the sponsor. Sponsors were approached after the design of the concept was made in order to explore their interpretation and connection to the concept and determine if these are in line with their business operations. One event coordinator of a big festival organization showed their interest in the concept and was willing to specify the design based on the values of their organization in the future. This indicates that is it important that a sponsor is able to associate it's business operations and goals to the concept and identify itself with the values of the concept. Sponsors can use these kinds of concepts to position and show responsibility in sustainability and take a lead in exemplary behavior to others. Transparency is also in this case an important aspect.

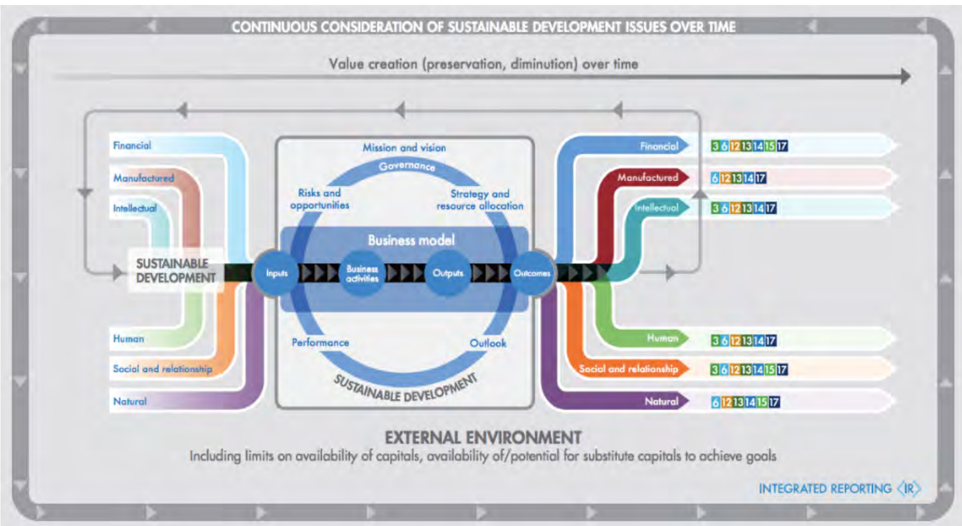
Users influence

Results show that festival organizations have an enormous influence on the choice of supplier(s) and on the design of the T-shirts. For example, festivals can choose whether they purchase crewmember T-shirts from their beverage supplier, the employment agency or another partner. Festival organizers indicated an important point of attention since volunteers see their crewmember T-shirts as collector's item: after the festival, they want to take their crewmember T-shirts home as a souvenir. If all T-shirts are taken home, the circular approach will be hindered. However, the product passport could make volunteers aware of the consequences of textile use, which make them decide to return the T-shirt for re-use in order to influence the system. They are able to connect their sustainable values to a circular initiative and contribute to upscaling. Another suggested solution was that volunteers are offered products (e.g. jeans) that are made with the yarn (of non-wearable T-shirts) that members can buy as collectors' item.

Values and Sustainability

Aligning to SDG's and Six-Capital

More and more organizations align their business operations and working methods with contributing to the various sustainable development goals (SDGs). The SDGs designed to be a 'blueprint to achieve a better and more sustainable future for all'. The goals can be divided into the domains biosphere, society and economy. The way of acting within one domain influences the achievement of the goals in the other domains. The goals can be used to align (sustainable) ambition for a potential collaboration (SDG Netherlands, 2018). Several goals have been incorporated directly into the circular festival crewmember T-



shirts concept, like sustainable production and stimulation of reuse and recycling (SDGs 3, 6, 12, 13, 14, 15 and 17). The concept addresses the domain of biosphere, which is related to six capital 'Natural capital': the creation of ecological value (FIGURE 3). Optimal use of natural capital is key in the transition to a circular economy (Ellen MacArthur Foundation, 2015) and creating awareness of this capital contributes to the transition.

FIGURE 3: SUSTAINABLE DEVELOPMENT GOALS & SIX CAPITALS

Unburdening

Results indicate that festival sponsors and festival organisations are open for possible collaborations since they feel connected to and associated with the concept. These organisations can compare their joint (SDG's) targets to determine if they share values and find a basis to work together. Findings indicate that if large festival organisations, like MOJO events, and festivals sponsors, like ABInBev, Coca Cola or Heineken, will collaborate in joint system of reusing, single festival crewmember T-shirts can be used at several consecutive festivals. This means that festivals need to develop a collaborative business model for crewmember T-shirts. The businesses of the organisations will become intertwined and responsibilities in the systems needs to be negotiated and determined, for instance by using 'lease' constructions or 'product as a service' models. These models focus on unburdening organisations. Findings indicate that crewmember T-shirts are often made available based on a lease construction. Leasing makes reverse logistics possible and the T-shirt stays in the system. After a festival, the T-shirts are picked up, washed, folded and delivered to the next festival. This unburdens the festival organizations since they only have to collect the T-shirts, which they indicate as positive contribution. Another option is that a laundry company can provide this service by offering a fixed pick-up and delivery address at the festival to collect and supply all items. Additionally, at the end of the timeline, all T-shirts need to be collected to determine if they are wearable next year or that they are non-wearable and can be recycled into yarns. These yarns can be used in new clothing (design of this cycle is out of the scope of this paper). Reusing and recycling results in less textile production. This contributes to climate mitigation, e.g. pollution. The business model aims to product lifetime extension and minimizes value destruction.

Awareness

One of the 'Unique Selling Points' of this concept is the social, environmental and economic impact. The Indian-Dutch team strives to use regenerative cotton and supporting better (farmer) wages, less water use and a stronger community. Supporting, or even compensating, farmers with investments is part of their approach. Reusing a single T-shirt once already saves 2,700 litres of water and the concept as such entails that drastically fewer T-shirts need to be produced for the festival industry. Considered that the price of a single T-shirt for the concept will be three times as high as a conventional T-shirt, the reuse aspect will make the price equal or lower. By visualizing this impact on the T-shirt and printing the product passport with it, both the concepts and the festival partners are positioned as sustainable. The concept also created awareness among festival visitors, which could trigger a system change in the field of textile use in the festival industry and later the entire event industry and potentially to textile use in general. A number of respondents even mentioned that this design could be included in the Green Deal, with the result that it initiates the same system change as the Hard Cups.

5.CONCLUSION AND DISCUSSION

Shared values as connecting factor

All stakeholders were interested in the concept of circular festival crewmember T-shirts and each partner contributed to the final concept. Companies were able to *co-create* a circular initiative in several design iterations. For a successful collaboration, it was crucial that the parties pursue the same goals, and therefore align values. Values are fundamental elements of a corporate culture and identity. Values help to build trust between partners (Morgan & Hunt, 1994). When the parties agree about the expectations of the relationship, the commitment will increase. Morgan and Hunt (1994) defined shared values as “the degree to which partners share common beliefs about the behaviours, goals, and policies that are important or unimportant, appropriate or inappropriate, and right or wrong in a relationship”. In addition, shared values relate to the expectations prior to the collaboration and the results achieved afterwards. Commitment plays an important role in co-creating a circular initiative when affective commitment (collaboration) and value-based commitment (to sustainability) go hand in hand. Valente (2012: 586) explains that “what is sustained is a result of a complex interactive and idiosyncratic process where firms and their stakeholders build cognitive complexity within a network system in a way that creates synergistic value”. He suggests that organizations should collaborate in such a way that it (a) includes all relevant organizations and embraces all related systems (inclusion), (b) understands all causes and effects of these systems in interrelationships (interconnectedness) and (c) consider any position of privilege by “a fair distribution of resources, opportunities, basic needs, and property rights” (equity). This indicated that the more an organisation invests in collaborative business models, the more sensitive to inequality partners will become. Inequity in a collaboration can ultimately make it more difficult to continue the collaboration. It is therefore necessary that those involved within a collaboration share the same values and find agreement in the obligations to realize them (Farrelly et al., 2006; Valente, 2012). Transparency and traceability appeared to be important in this context. By providing insight into the production processes, logistics and reuse of the same product at several consecutive festivals, organizations will be able to trust each other. Partners can develop a product passport that radiates their joint responsibility towards a sustainable world.

We demonstrated a design-research approach for societal challenges in the transition to circular economy, specifically in textile (re)use. By designing a concept for the reuse of festival crewmember T-shirts, and discussing the values of this concept, we conclude that connecting to shared values creates new opportunities for developing and upscaling collaborative business models in a circular economy. In this aspect, it appears to be important that partners can associate themselves with each other's sustainable ambition. *In sum*, we identified several factors that are important in the design of circular initiatives: co-creation (commitment), transparency and traceability (trust) and partner association (shared values) are important in designing and upscaling a circular initiative. When organization comply to these factors, they are able to develop and upscale a circular initiative.

Upscaling

Crewmember clothing is very suitable for circularity, both in terms of production process and in terms of logistics. However, it appeared that the higher price of these T-shirts (in this stage) is a discouraging factor. To lower the price to an acceptable level, the T-shirts need be reused at least 3 times. In co-creation with partners in the value system, a concept has been designed in which these sustainable T-shirts are (re)used at various consecutive festivals (e.g. in the same season) of the same umbrella organization. Consequently, upscaling can be realized if organizations collaborate in multiple rounds of reuse. The collaborative business model focusses on product lifetime extension and shared values are the cornerstones of this model. Responsibilities need to be negotiated within the system. Sponsors and festival organisations appreciate it if they are unburdened in the transition to a circular economy by collaboration partners.

Festival organizations work together towards a circular economy by reusing and recycling material to save enormous amounts of water and carbon emissions. By visualizing both the savings and the product passport on the T-shirts, awareness of the impact of reusing clothing is exposed to a large public. Including sponsor-logo's next to that, the sustainable value of the T-shirts increases. Festival visitors start to think about the use of textiles in general and develop a 'new standard' in which it is no longer normal to use 'disposable textiles'. Just like Hard Cups have ensured that 'disposable plastic' is no longer normal at festivals. In sum, unburdening (collaborative business model) in combination with creating awareness (new standard) ensures that a situation emerges which contributes to the system change that is needed in the transition to a circular economy.

6.IMPLICATIONS

Small-wins

A wicked problem is a social or cultural problem that's difficult or impossible to solve—normally because of its complex and interconnected nature. For these kinds of problems, Termeer and Dewulf (2018) suggest focussing on 'small wins'. Small-wins are clear, actionable ideas, with depth, that are at the same time radical in nature. The focus is on 'small, but visible and/or tangible results'. This prevents those involved from becoming overwhelmed by the complex totality of the issue. Small-wins can eventually roll out into larger-scale and profound system changes. It requires fundamental changes in human behaviour, technologies and institutions. In this research, we identified a concept that can accelerate circular textile use, both from a design as well as a user perspective. Small steps also evoke less resistance. Small-wins on a small-scale show how to break through barriers, such as tensions with established interests, ingrained routines or dominant business models. As a result, lessons learned from small-wins provide knowledge about impact opportunities that are applicable in many more sectors, if or not for other textile flows, whether or not for processing outside the textile industry.

Theoretical and practical contribution

Circular initiatives can have an enormous impact on the transition if stakeholders share the same values and if these values are the corner stones in a collaborative business model. Our findings contribute to the literature on business model innovation and provide concrete insights for practice on the importance of values in collaboration and up-scaling circular initiatives. In the transition to a circular economy, it is important that organizations collaborate in multiple value creation and that they share these values in order to have a long-term cooperation and viable business model. Shared values then become the connecting factor for upscaling circular initiatives.

COVID-19 impact on testing

The COVID-19 virus has had a huge impact on the industry in which this research was conducted. Festival sponsors and organizations were reluctant to give interviews or to participate, since they needed to focus on surviving. The focus of these organizations was not on designing and implementing new concepts. For this reason, one sponsor and one festival organization participated in the design research. As a result, the external validity of the research is low. The results cannot be generalized to a larger population. However, the focus of the research was on designing a concept, and many different stakeholders contributed to that, like experts and designers. The actual design is therefore strongly substantiated with statements made by them.

In addition, all festivals have been cancelled in the 2020 and early 2021 season. The concept could therefore not be tested at festivals in practice. It was also not possible to organize a panel discussion with more sponsors and festival organizations. The final phase of design research testing the concept design, was therefore not included in this research. A scenario-analysis might be done to offer insights into the uncertainties of future developments (for the festival industry) due to the COVID-19 virus. Scenarios are used when the future is so uncertain that you cannot make good predictions. (Baarsma, 2018) By developing scenarios, the uncertainty about the future will be mapped out to identify the opportunities in various visions about the future. Decision makers can use the results to respond as effectively as possible to a broadly mapped out future.

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System Elements and Resource Features Facilitating the Implementation of Material-Service Systems

Case studies from the footwear industry

Jingtong Ng[1,] Anouk Zeeuw van der Laan[1], Marco Aurisicchio[1,*]

[1]Imperial College London, Dyson School of Design Engineering

*m.aurisicchio@imperial.ac.uk

Abstract

Material-Service Systems (MSSs) are novel business models for the circular and performance economy where material suppliers provide raw materials as a service to product manufacturers, retaining ownership of the materials and the associated end-of-life obligations. Using four case studies from the footwear industry, we investigate the system elements of emerging supply chains and the features of the resources flowing to understand how they contribute to circularity. We then model a hypothetical closed-loop footwear supply chain extended with a MSS showing how material and product resources would be exchanged by stakeholders. Next, we demonstrate that stakeholder collaboration, the existence of a Product-Service System (PSS) and of a collection service and the adoption of a closed-loop design are system elements that facilitate the implementation of a MSS. Among the features of a resource favouring a MSS, there is the minimisation of materials and components as well as the removal of permanent assembly methods. Finally, we reflect on the value added by a MSS to improve a closed-loop supply chain. The principal contribution is a change in the dynamics of the supply chain as material suppliers are incentivised to drive the recovery of materials and lead the innovation to offer new portfolios of highly recyclable materials to manufacturers.

Keywords

Material-Service Systems, Product-Service Systems, Circular Economy, Design for Sustainability, Footwear.

INTRODUCTION

Since its emergence in the 1970s, the Circular Economy (CE) has increasingly been gaining momentum. The CE suggests to decouple economic activity from the consumption of finite resources and extract higher value from materials by establishing circular flows of resources, i.e. materials, components and products (EMF, 2020). Circular flows of resources are derived from strategies in the waste hierarchy (Ceschin and Gaziulusoy, 2020) and have three main objectives, namely moving fewer resources in a narrow loop, using resources longer in a slow loop, and using resources continuously in a closed loop (Bocken et al., 2016). Materials and products can be managed in a single loop meeting the three objectives (Stahel, 2019a) and this can be established by system design. A crucial part of the system to manage resources is the supply chain, which involves a network of organisations that move resources upstream and downstream (Mentzer et al., 2001). Traditional supply chains focus on the forward movement of resources, while closed-loop supply chains focus also on taking back products from customers, recovering value (Guide and Van Wassenhove, 2009) and managing materials, components and products in circular flows (Stahel, 2019a; Stahel, 2019b). Closed-loop supply chains establish resource flows that align with principles for resource efficiency (Prendeville et al., 2014)

Companies are progressingly setting up closed-loop supply chains. However, such supply chains require effective management to be successful (Guide and Van Wassenhove, 2009; Mentzer et al., 2001). A popularly adopted business model to create closed-loop supply chains is the Product-Service System (PSS), which offers the use or result of products through services rather than transacting ownership. The PSS has the potential to slow down the consumption of resources (Tukker, 2004). However, despite an increased emphasis on services and performance and a focus on circular flows, current initiatives are still inefficient for a variety of reasons, including inherent process losses (e.g. at manufacturing, collection, and recovery level), lack of financial incentives and profitability, limited availability of materials for circulation and growing material demand (van Ewijk, 2018). In this context it seems indispensable that new research on closed-loop supply chains focuses not only on their technical operation but also on their management as profitable business propositions (Guide and Van Wassenhove, 2009). This suggests that inefficiencies can be addressed by rethinking the business models, including exploring business models that sit upstream of the PSS and integrate the operations of stakeholders.

Centralising resource ownership and providing material resources as a service has the potential to help us shift towards closed-loops supply chains and the Performance Economy (PE), i.e. an economy based on the maintenance and exploitation of material and product stocks (Stahel, 2019b). Various types of service systems have been proposed across industry sectors and developed to address these issues, e.g. Chemical Leasing (UNIDO, 2016), Steel as a Service (Ness et al., 2015) and Material-Service Systems (Aurisicchio et al., 2020). The Material-Service System (MSS) is a novel business model where suppliers provide raw materials as a service to product manufacturers, retaining the ownership of materials and associated end-of-life obligations (Aurisicchio et al., 2020; Engelmann et al., 2021). This business model encourages a transition to the CE by enabling dematerialised consumption of materials as suppliers sell the performance of materials as a service instead of transacting ownership. Nevertheless, the model is in its early stages of conceptual exploration and there is a need to understand the system elements that favour its use in closed-loop supply chains and how a MSS would improve the management of closed-loop supply chains. This understanding is necessary to determine the viability and practicality of the MSS as well as its ability to support the transition to a CE.

This paper explores how a MSS can improve the supply chain of a footwear product. In this research a supply chain is interpreted as part of a larger system that produces a circular resource flow. Such a resource flow consists of a single loop in which a resource takes the form of a material, component or product (Stahel, 2019a). The system that produces the flow is made of interconnected physical and non-physical elements (Meadows, 2008), which are required or favoured (Zeeuw van der Laan and Aurisicchio, 2020) to produce the resource flow (Zeeuw van der Laan, 2021). Whether resources flow circularly, thus, depends on the behaviour of the system over time, which is the result of the dynamics of elements across societal and technical domains (Charnley et al., 2011). In addition, the flowing resources change along their journey, and their evolving features can also influence how and if resources flow (Zeeuw van der Laan, 2021). This work focuses both on system elements and resource features aiming to answer three questions:

- Q1: What are the system elements and resource features of emerging supply chains in the footwear industry?
- Q2: What system elements and resource features of a current closed-loop supply chain favour the implementation of a MSS?
- Q3: How does a MSS incentivise the development of a closed-loop supply chain?

To investigate Q1, four case studies of current and emerging footwear products are identified and analysed. A case of an emerging closed-loop footwear supply chain is selected to answer Q2 and specifically understand, which of its system elements and resource features would support the implementation of a MSS. Finally, Q3 is answered considering how a MSS would support the closed-loop supply chain investigated in the research. This paper aims to contribute to the Theme 1 ‘Exploring the system level’ by introducing a new business model for the circular and performance economy.

Current service systems

Servitization of goods is a concept that has become popular through Walter Stahel's work on the PE (Stahel, 2019b). It refers to selling the performance of goods rather than the goods themselves for the purpose of dematerialising the consumption of resources (Stahel, 2010). In this conception, ownership and the liability of resources are retained by economic actors upstream of the end consumers such as producers or service providers, incentivising them to prevent losses and waste over the full service life of objects. Currently, the most widely adopted service system is the Product-Service System (PSS) (Tukker, 2004), where instead of buying a product, consumers purchase its service and the product manufacturer or service provider retains ownership (Blomsma et al., 2018). Examples include companies such as ZipCar offering car rentals and Philips' 'Pay-per-lux' offering lighting as a service.

In addition to the PSS, the PE has been explored in terms of other resources and within multiple industrial sectors. The concept, indeed, can be extended from selling the performance of product resources to that of more upstream states of resources such as chemicals and raw materials. Services, in fact, exist across a broad spectrum of resource states including Material-Service Systems (MSS), Component-Service Systems (CSS) and Product-Service Systems (PSS) (Blomsma et al., 2020). Further, proposed services include both theoretical concepts (i.e. License to mine and MSS) as well as practical applications (i.e. Chemical Leasing and Steel as a Service).

Chemical Leasing has been reported as an example of a PSS (UNEP, 2015) where a provider charges customers monthly or yearly fees for handling chemical substances. In our interpretation of Chemical Leasing, a chemical is a product rather than a material and, contrary to a traditional PSS, only the unused product is returned (Stoughton et al., 2003). On the other hand, Steel as a Service is an early stage concept for a business model under which steel is servitised (Ness et al., 2015) as either a CSS or a PSS. The primary purpose of such a business model is to align the incentives of both the service provider and buyer to reduce life-cycle costs as well as reducing resource consumption through supply chain management.

The Material-Service System (MSS) is a novel business model where material suppliers offer producers the use of materials through services, whilst retaining ownership throughout the supply chain (Aurisicchio et al., 2020). The centralisation of ownership creates a shift from traditional material purchasing transactions to leasing and pay-per-use models, similar to the PSS, with the aim of improving resource efficiency through control on the flow of resources in the entire supply chain. Engelmann showed how a MSS would transform the supply chain of steel industrial drums (Engelmann et al., 2021). To understand the feasibility of introducing new business models such as the MSS, there is now a need to explore how a MSS would integrate into a supply chain and whether there are system elements and resource features of existing supply chains which would facilitate its uptake. There is also a need to understand how the shift in the relationship between supplier and manufacturer would affect downstream relationships between manufacturers and end consumers.

METHODOLOGICAL APPROACH

The way in which the elements of a system are interconnected allows the system to behave in a certain way (Buede, 2009; Meadows, 2008; Seiffert and Loch, 2005). In other words, the system elements and how they are interconnected ensure that the system operates in a certain way (Sushil, 2012; Meadows, 2008; Senge, 2006), for example, producing a resource flow (Zeeuw van der Laan, 2021). System elements are the physical and non-physical parts of a system that can be seen, felt, counted or measured at any given time (Meadows, 2008), such as the location of a resource, the quantity of a resource or an individual's motivation to recycle. Such elements can be identified in supply chains and business models. For example, PSSs may embed elements that enable the business models behind them to deliver a closed-loop resource flow (Zeeuw van der Laan and Aurisicchio, 2020). Changing any individual element can influence the operations of the system and could thus determine if a flow of resources can be produced. In this research we distinguish system elements in five types including *principles* (rules and circumstances that do not easily change, e.g. legislation), *value* (agreements and activities that deliver business value, e.g. service activities, transactions), *actors* (drivers, actions and behaviours of and between stakeholders and resources, e.g. motivation, interaction), *data* (facts gathered and provided, e.g. data on resources, user instructions) and *infrastructure* (equipment and consumables, e.g. technology, means and energy) (Zeeuw van der Laan, 2021). They are important in understanding the foundation of a system because they represent a core part of the structure (Meadows, 2008).

In addition to the system elements, the resource itself also influences whether resources will be able to flow or not. A flowing resource can take the form of a material, component or product within a single flow (Blomsma et al., 2020; Stahel, 2019a; Zeeuw van der Laan, 2021). Its features may hinder or favour resource flows (Zeeuw van der Laan, 2021), for example, packaging that is dirty may not be recognised in a Material Recovery Facility and therefore fail to remain in a resource flow (Ali and Courtenay, 2014).

This research involved three phases as described below.

Phase 1. The aim of the first phase was to identify the system elements present in the supply chains of current footwear systems and the resource features of the products flowing. As a result of the review of traditional and emerging sneaker offerings, we selected four cases of footwear products to investigate in detail, see Table 1. The data for the four cases were collected from publicly available information sources including websites, magazines and research articles. The first case, used as a benchmark, represents the status quo in footwear design, i.e. a multi-material and difficult to recycle product with a linear supply chain and an offering centred on exchange of product ownership. The remaining three cases represent systems that have shifted away from the status quo to address sustainability and circularity issues. The second case, Pangaia, is a commercial sneaker made of plant-based grape leather, recycled rubber, natural cotton and bio-based water glue (Pangaia, 2021). Importantly, the grape leather is made repurposing waste from the Italian wine industry (i.e. discarded grape skins, stalks and seeds) and the recycled rubber is produced from industrial waste (i.e. unused samples, prototypes and products). Although with this sneaker Pangaia establishes new utility for biomass and industrial waste, the supply chain remains linear as it appears that the materials are not recovered at the end of life. Further, as in the traditional sneaker, the offering to consumers consists of selling the product. The third case, Adidas Futurecraft Loop, is a mono-material sneaker made of TPU (Adidas, 2021) developed through a beta programme in collaboration with BASF and underpinned by a closed-loop supply chain focused on returning end-of-life products for material recovery. To date the product has been made available to Adidas creators including athletes, musicians and artists plus selected media partners and employees. However, if the programme becomes commercial, the intention is to usher in an era of shoe subscriptions and take-back services. The fourth case, On Cyclon, is a new bi-material shoe, i.e. PA11 and Pebax, developed in collaboration with Arkema and due to be launched in Fall 2021. It will be offered to consumers through a subscription model rather than traditional exchange of product ownership (On, 2021) and is underpinned by a closed-loop supply chain aimed at returning end-of-life products to recover materials.

Table 1 The four sneaker case studies

Case 1 Traditional sneaker	**Case 2 Pangaia sneaker (Pangaia, 2021)**	**Case 3 Adidas Futurecraft Loop sneaker (Adidas, 2021)**	**Case 4 On Cyclon sneaker (On, 2021)**
Linear supply chain	Linear supply chain	Closed-loop supply chain	Closed-loop supply chain
Selling ownership	Selling ownership	Subscription model	Subscription model
Commercially available	Commercially available	Under development	Under development
			

Phase 2. The aim of the second phase was to research the system elements and resource features in a closed-loop footwear supply chain to understand which of these facilitate the implementation of a MSS. This is important to understand how a MSS can be used to improve future supply chains, and how supply chains could be adapted to facilitate the MSS business model. For this purpose we first modelled a closed-loop supply chain to include a MSS. The model details both the forward and reverse movements and transformations of a resource. It also shows changes of resource ownership (Engelmann et al., 2021). Then, framing the MSS as a system element and an incentive for material

suppliers to regain control upon and revalorise materials, we conducted a critical analysis of the system elements and resource features in the Adidas Futurecraft Loop supply chain to understand which ones favour the uptake of a MSS. In this exercise we distinguished between two types: necessary and favourable system elements and resource features.

Phase 3. The aim of the third phase was to reflect on how a MSS improves a closed-loop footwear supply chain. Departing from the theoretical contributions of a MSS reported in (Aurisicchio et al., 2020), we reasoned to understand which incentives the MSS introduces that make a closed-loop supply chain work more effectively than when the MSS is not included.

KEY RESULTS

Current supply chains in the footwear industry

Table 2 provides an overview of the most significant system elements and resource features for the four footwear case studies.

System Elements. As seen in Table 2, the Adidas Futurecraft Loop and On Cyclon supply chains have stakeholders beyond the consumer. This shows a need for closed-loop supply chains to extend traditional partnership and collaboration to recyclers. However, setting partnerships with recyclers to close resource flows can be a challenge. For example, Adidas reported that they experienced difficulties in collaborating with recyclers willing to accept their shoes and recycle and return raw materials back to them (Adidas, 2021). Despite this, they were eventually able to identify an external recycler who currently washes their shoes, grinds them into pellets and melts them to create TPU components for new shoes (Adidas, 2021).

The business model between suppliers and shoe manufacturers is always based on the selling of materials, see Table 2. Conversely, the business model between manufacturers and consumers varies. In the Adidas Futurecraft Loop and On Cyclon cases, a use-oriented PSS (i.e. subscription model) has, in fact, replaced the traditional selling of products. It can also be seen that the Adidas Futurecraft Loop and On Cyclon supply chains have mechanisms and infrastructure to collect used up products. For example, the supply chains include infrastructure to take shoes back at the end of their life through mail delivery services (Adidas, 2021). More so, in the Adidas Futurecraft Loop case it has also been reported that to help remind customers when it is time to return obsolete shoes, they will be able to register in an application using the QR code painted in the shoe's tongue and that the company is planning on refunding between $10 and $20 or possibly more to their customers (Rutherford, 2019). As a consequence, in these cases obsolete shoes benefit from routes to begin their journey back up the supply chain. Furthermore, in the Adidas Futurecraft Loop and On Cyclon cases, recycling is the designated end-of-life option and there is also a clear intent to create a closed-loop supply chain as opposed to the linear supply chains behind the Pangaia and conventional sneaker, see Table 2.

Resource Features. To start with, the features of the resource at material level are considered. With the exception of some materials used in the traditional sneaker and in the Pangaia sneaker (e.g. grape leather), the materials adopted in the four supply chains are often recyclable, see Table 2. However, only in the Adidas Futurecraft Loop and On Cyclon cases have the materials been selected to work in a closed-loop system. For example, Adidas has selected TPU as a material with the idea of recycling and reusing it over multiple generations of shoes. In the On Cyclon case, the materials, made from castor bean polyamides, have also been selected with a view to use them as recycled content in next generation shoes and phase out virgin materials.

Next, the features of the resource at product level are discussed. A traditional sneaker has between 12-15 materials and at least 8 different components in its construction (Theodoros et al., 2006). In addition, many sneakers are made using cold cement construction, which utilises a polyurethane glue to permanently bond parts together (Theodoros et al., 2006). This means that although many of the components are made from recyclable materials such as EVA and polyurethane, the shoe cannot be disassembled and the majority of sneakers end up in landfill (Theodoros et al., 2006). In the Pangaia case, the shoe has fewer materials than a traditional sneaker but it still employs a Strobel shoe construction where the upper is cemented to the outsole (Pangaia, 2021). In the Adidas Futurecraft Loop and On Cyclon cases, important efforts have been made to minimise complex material mixes, reduce the number of components and use non-permanent joining techniques. For example, On Cyclon has achieved this by innovatively creating a shoe that uses two materials, see Table 2. Adidas has gone even further by designing a shoe that uses just one material, see Table 2. The single-piece upper is fused to the sole using just heat and pressure with no additional adhesives. By fusing mono-material components together, they have entirely removed the need for a disassembly and/or sorting process and the end-of-life shoes can be directly processed for recycling.

Summary. The traditional sneaker, made of multiple virgin materials, is often hard to separate and has a linear supply chain. The Pangaia sneaker differs as it uses materials incorporating biomass waste and industrial waste but it still has a linear supply chain. Among the two closed-loop supply chains, the Adidas Futurecraft Loop supply chain stands out as the most advanced one in terms of current embodiment and effort to achieve resource efficiency and circular material flows. The intentionality of creating a second generation shoe represents a clear statement of circularity. The existence of the PSS means that there is already infrastructure in place for collection of shoes from consumers. Finally, the mono-material design makes the product optimal for streamlining the reverse chain, as the end-of-life shoes can be sent directly back for recycling without an intermediate disassembly process. For these reasons, the Adidas Futurecraft Loop supply chain is used in the subsequent parts of the research.

Table 2. Four footwear case studies

		Case 1: Traditional sneaker	Case 2: Pangaia sneaker	Case 3: Adidas Futurecraft Loop sneaker	Case 4: On Cyclon sneaker
System elements	**Stakeholder collaboration**	Material supplier, Manufacturer, Retailer, Consumer	Wine producer, Material supplier, Manufacturer, Retailer, Consumer	Material supplier, Manufacturer, Retailer, Consumer, Recycler	Material supplier, Manufacturer, Retailer, Consumer, Recycler
	Business model	Sales of materials; sales of products	Sales of materials; sales of products	Sales of materials; use-oriented PSS (subscription model)	Sales of materials; use-oriented PSS (subscription model)
	Consumer return behaviour	-	-	Testers of the 1st generation shoe have returned	Unknown
	Return reward	-	-	10-20$ reward	-
	Reminder to return			QR code painted on shoe tongue + app	
	Collection service	Local authority waste collection	Local authority waste collection	Postal system Mound of piled up shoes	Postal system
	End-of-life	Landfill	Landfill	Cleaning, Recycling	Recycling
	Closed-loop system	Linear supply chain	Linear supply chain	Closed-loop supply chain. Made to be remade - 2nd generation shoe	Closed-loop supply chain. Backloop - 2nd generation shoe
Resource features	**Material source**	Virgin	Virgin, Biomass, Recycled	Virgin, Recycled	Biomass
	Types of materials	Polyester, Rubber, Polyurethane, EVA foam, Cotton, Leather, etc.	Grape leather, Recycled rubber, Water-based glue, Cotton	TPU	PA11, Pebax
	Recyclability (material and product)	Product not recyclable due to complex material mix	Grape leather not biodegradable/ difficult to recycle	100% recyclable	100% recyclable
	Minimised material No.	12 – 15	4	1	2
	Minimised component No.	> 8 - Upper, Tongue, Insole, Midsole, Outsole, Glue, Eyelets, Laces	6 - Upper, Lower, Insole, Stitched sole, Glue, Laces	3 - Single-piece knitted upper, Patented Boost foam sole, Laces	3 - Single-piece knitted upper, Sole, Laces
	Assembly Process	Cold cement construction; components fixed with glue	Strobel shoe construction; made in Portugal	Different TPU components are fused together with heat	Different polyamide components are fused together with heat
	Ease of	Complex material	Material mixes	Used shoes are	Used shoes are

	Disassembly	mixes and joining methods make it hard to separate	and joining methods do not make it easy to separate	washed, ground into pellets and melted to create new sneakers	washed, ground into pellets and melted to create new sneakers

A closed-loop footwear supply chain with a MSS

A closed-loop supply chain inspired by the Adidas Futurecraft Loop case is conceptualised here and extended to implement a MSS, see Figure 1. Three configurations are presented, accounting for alternative ways in which the closed-loop supply chain could work. All configurations are invariant in the forward supply chain. A material supplier leases TPU to a shoe manufacturer using a MSS whilst retaining ownership of the physical material (*physical material ownership*) and its value (*material value ownership*), see Figure 1. The footwear manufacturer, who acquires psychological ownership over the TPU (*material psychological ownership*), is charged, over an agreed period of time, for the volume of raw materials ordered to make shoes. Using the right-to-use the TPU (*material right-to-use ownership*) and its own production technology, i.e. Adidas' Speedfactory automated technology, the manufacturer transforms the material into market-ready shoes, i.e. Adidas Futurecraft Loop sneakers. In this way, the manufacturer acquires ownership of the physical transformations made to the TPU (*physical material transformation ownership*) and of the shoe added value (*product value ownership*), see Figure 1. Subsequently, the manufacturer leases the shoes to consumers using a PSS. Consumers acquire the right-to-use the shoes (*product right-to-use ownership*) and attain psychological ownership over the shoes (*product psychological ownership*), see Figure 1.

At the end of life, the shoes are returned by consumers to one of three possible stakeholders. In configuration 1, the shoes go back to the manufacturer, who disassemble them and return them to the material supplier. In configuration 2, the shoes go directly back to the material supplier. In configuration 3, the shoes go back to a third-party organisation for the purpose of being disassembled and returned to the material supplier. In the case of the Adidas Futurecraft Loop supply chain, given that the shoe is mono-material, disassembly is not necessary and there is, therefore, no need to pass through the manufacturer (configuration 1). Collected shoes can go either directly to a material supplier if this has recycling infrastructure and technology to process them (configuration 2) or to a third-party recycler (configuration 3).

Overall, the introduction of an MSS in a supply chain offers three main benefits. Firstly, it dematerialises the consumption of materials as value is decoupled from material throughput. This is because raw materials are not physically consumed by shoe manufacturers. Rather, the time that manufacturers spend with materials is charged. The utility of materials is leased for an agreed period of time, allowing the shoe manufacturer to create the derivative utility of a shoe and, in turn, lease it as a service to consumers. Secondly, it improves resource utility and resource value retention. By retaining ownership and ultimate control over materials, suppliers are incentivised to offer raw materials that are more easily recoverable at the end of product life. There is also a push for manufacturers to design more easily recyclable products through design for disassembly, thereby enhancing the purity of re-materialised raw materials. Finally, these dynamics imply controlled flows of resources and avoid losses or waste by ensuring interception of end-of-life resources.

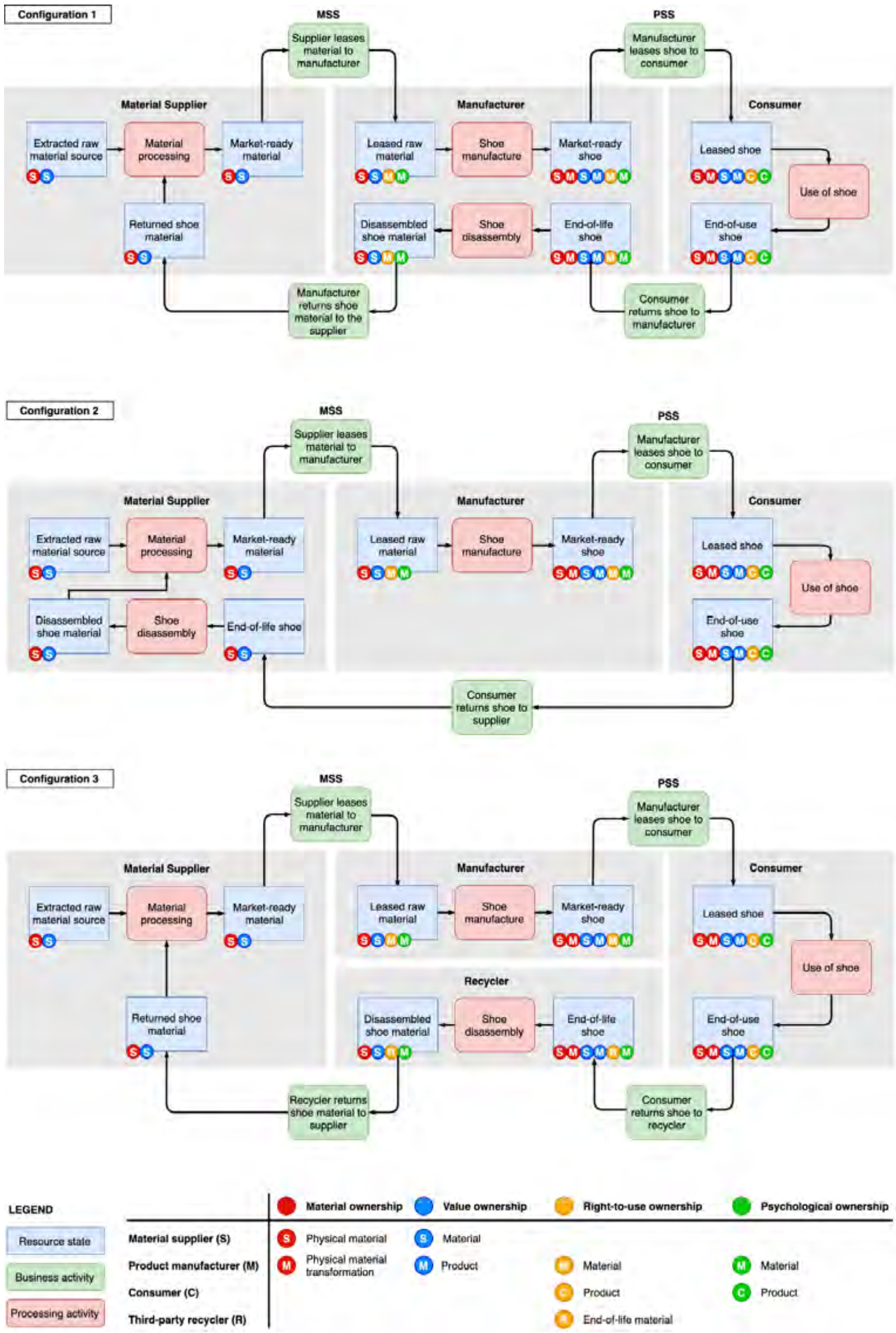

Figure 1. Closed-loop footwear supply chain with a MSS: three configurations

System elements and resource features facilitating the implementation of a MSS in a closed-loop supply chain

Table 3 shows which system elements and resource features, identified in the Adidas system, facilitate the implementation of a MSS. The system elements and resource features are described below.

Effective *stakeholder collaboration* is widely accepted as a necessary element to enable a circular economy. Pre-existing collaborations between material suppliers, manufacturers and recyclers are expected to be helpful in facilitating the implementation of a MSS. For example, in the Futurecraft Loop supply chain, Adidas already collaborates with a recycler who takes care of recovering the value of post-consumer shoes. The existence of this collaboration is expected to offer a fertile ground to develop new relationships.

A *proprietary material* is considered a favourable condition to implement a MSS. If a material supplier flows a material that underwent significant investment to make it recyclable, it is possible that the supplier has interest in retaining control over the material avoiding that it goes through generic recycling schemes or ends up in landfill altogether.

A MSS proposes a shift towards a performance economy targeting the relationship between suppliers and manufacturers. If a closed-loop supply chain already has a *business model* offering utility over ownership through a PSS, this is expected to favour MSS implementation as stakeholders will already have an understanding of the value of non-ownership. *Consumer engagement* in returning obsolete products and a *collection service* to gather used-up products are both necessary to implement a MSS. For example, if the Adidas Futurecraft Loop supply chain were to implement a MSS, it would be able to rely on its system to take shoes back at the end of life through a mail delivery service. Importantly in a supply chain operating with a MSS, manufacturers could be subjected to contractual obligations to return materials including penalties if a quota of the leased materials is not returned. Hence, it would be vitally important that the collection system from consumers aims to recover as many as possible of the leased products.

At the *end of life* stage, recycling is considered to be a necessary element for the implementation of a MSS. Recycling revalorises materials and creates value for suppliers who retain ownership of materials. On the other hand, a *closed-loop system* is considered to be a favourable condition but not essential. As the properties of materials can degrade over time, suppliers may find it more effective, in some cases, to offer recovered materials for use in an open-loop supply system. For example, in the Adidas Futurecraft Loop supply chain, the materials properties of recycled TPU degrade to the extent that Adidas is only able to reuse 5-10% of the original material and virgin TPU must be added to make the second generation of shoes (Rutherford, 2019). Hence, the target of creating a purely closed-loop system is not yet feasible and Adidas currently uses the rest of the recycled material to make other products (Rutherford, 2019). Resource features such as the *number of materials and components* and the *ease of disassembly* are clearly necessary considerations to implement a MSS. This is because they increase the chances of resources retaining value. For example, to retain resource value Adidas Futurecraft Loop has shifted towards a mono-material shoe design made of just three components without using adhesives.

Table 3. System elements and resource features facilitating MSS implementation

System element/ resource feature	Why it supports MSS
Stakeholder collaboration (Actor)	Allows a resource to continue its journey and transformation benefiting from the expertise of multiple actors. This element is **necessary** to implement a MSS
Proprietary material (Value)	Incentivises control on materials. This feature is a **favourable condition** to implement a MSS
Business model - use-oriented PSS (Value, Actor)	Creates a shift away from ownership exchange, introduces a performance economy and makes the manufacturer responsible to manage materials. This element is a **favourable condition** to introduce a MSS
Consumer engagement (Actor)	Entails a sense of potential and inherent value in used products and enables return. This element is **necessary** to implement a MSS
Collection service - postal system (Infrastructure)	Enables a product to start its return journey and aggregate. This element is **necessary** to implement a MSS
End of life - cleaning & recycling (Infrastructure)	Enables a product to be recovered and continue its journey and transformation. This element is **necessary** to implement a MSS
Closed-loop system - made to be remade and 10% recycled material in 2nd generation product (Value, Resource)	Creates a shift away from sourcing virgin materials and towards value generation through use of recycled materials. It also shows that closed loop revalorisation is possible. This element is a **favourable condition** to implement a MSS.
Recyclability - material has high recyclability (Resource)	Allows to retain value and makes more worthwhile for the supplier to own a material. This feature is a **favourable condition** to implement a MSS
Miminised material number (Resource)	Accelerates return to supplier, facilitates material recovery, allows to keep the material pure and retain value, and makes it worthwhile for the supplier to own a material. This is a **favourable condition** to implement a MSS
Minimised component number (Resource)	
Ease of disassembly - non-permanent joints (Resource)	

How a MSS improves a closed-loop supply chain

Following the analysis of the system elements and resource features that facilitate the adoption of a MSS, we now reflect on how a MSS can improve a closed-loop supply chain. In a closed-loop supply chain with a MSS, it is expected that the collaboration between stakeholders would change, offering new opportunities to all parties. Material suppliers will be incentivised to drive the recovery of materials and help shift supply chains towards more effective material management. This is, for example, expected to help manufacturers address struggles similar to that faced by Adidas who initially did not find a recycling partner willing to collaborate with them on material recovery and reuse. Material suppliers could either partner with manufacturers to identify a third-party recycling organisation willing to recycle materials or directly invest in their own recycling facilities.

Further, in a closed-loop supply chain with a MSS, suppliers will invest in innovation to make materials more recyclable as this increases the chances of recovering valuable materials at the end of life. This is expected to lead to new portfolios of circular materials offered to manufacturers, helping them overcome current barriers and accelerate innovation. For example, in November 2019 Adidas reported that their efforts to identify a recyclable material and design a 100% recyclable shoe were nearing a decade of work (Adidas, 2021). With a MSS, suppliers are also expected to be incentivised in investing in segregated recovery of materials. For example, if a material supplier has introduced a new material in the market they may like to control it and develop a collection system to get it back. The effect of suppliers implementing segregated recovery is to create a form of centralisation that allows for a better flow of materials within supply chains. Finally, in a closed-loop supply chain with a MSS, manufacturers will set more ambitious circularity targets and have to satisfy design for material minimisation, component minimisation and non permanent joints. Although Adidas has shown that the achievement of these objectives is possible also without a MSS, it is important to acknowledge that this is the result of the commitment of a leading company in the footwear industry rather than the norm. If we expect that more companies design their products for a circular economy a business model such as a MSS seems valuable support.

DISCUSSION AND CONCLUSIONS

This research has explored a new business model called MSS that if integrated in a supply chain has the potential to lead to a more effective management of material resources. To understand how a MSS can be implemented in industry, we first investigated the system elements and resource features of four footwear supply chains. This work showed that some emerging footwear supply chains have been configured as closed-loop systems (i.e. Adidas Futurecraft Loop and On Cyclon) and have several new system elements and resource features compared to traditional operations in the industry. Following this analysis, we demonstrated how a closed-loop footwear supply chain can be adapted to introduce a MSS. In particular, we showed how stakeholders including a material supplier, a manufacturer, consumers and other parties would exchange resources to make business. Next, we studied the system elements and resource features of a closed-loop footwear supply chain that facilitate the implementation of a MSS. The chain studied was found to already possess multiple system elements that can facilitate the implementation of a MSS, namely the intentionality to design for a closed-loop system, a business model where the manufacturer retains ownership of the product and a collection service. If a

MSS is implemented in conjunction with these system elements it would further support effective resource management. The chain studied was also found to flow resources with features that facilitate the implementation of MSSs, such as high material recyclability, minimisation of materials and components and removal of permanent joining methods. These resource features were found to be as critical as the system elements for effective resource management. Overall, this research contributes new understanding of MSSs that can support the shift towards resource performance over consumption. It is important to mention that this research is based on the analysis of emerging closed-loop footwear supply chains. The system elements and resource features that facilitate the implementation of a MSS were identified based on publicly available information. They are an initial rather than a complete set of system elements and resource features. More research on detailed cases studies is needed to advance this initial understanding.

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Making hash out of an elephant - Public-private Circular business model development

Herman Stål[1,*] Maria Bengtsson[2], Siarhei Manzhynski[2],

[1]Gothenburg School of Business, Economics and Law, Gothenburg University, Sweden; [2]Umea School of Business, Economics and Statistics, Umea University, Sweden.

*herman.stal@gu.se

Abstract

A transition to a Circular economy depends on the development of circular business models. Extant research suggests the need for business to cooperate broadly to address sustainability issues of a systemic nature. Thus this paper seeks to explore and explain how business and public actors work together to develop circular business models. We conduct a longitudinal case study of coordination and cooperation between city planners and private developers for vehicle access-without-ownership provision for residents in an area they are planning together. Drawing on an understanding of coordination and cooperation as contingent on its institutional context, we show how frictions between rules, norms and understandings pervade efforts at deciding on value creation and capture. Thus we contribute to the understanding of circular business model development in general and public-private development in particular.

Keywords

Public-private partnership, circular business model, circular economy, cooperation, coordination, institutional theory, housing, construction

INTRODUCTION

The Circular economy is gaining popularity among business leaders and policy makers, particularly in the EU (Geissdoerfer *et al.*, 2017), referring to attempts to go beyond prevailing, linear, take-make-waste resource and product flows for an economy that is “restorative and regenerative by design and provides benefits for business, society, and the environment” (Ellen MacArthur Foundation (EMAF), 2017, p. 22). A transition to a

Circular economy depends on its implementation within business, thus circular business models (CBMs) need to be developed (Pieroni, McAloone and Pigosso, 2019).

CBMs are suggested to create and capture value by turning products into services (Tukker, 2015; Corvellec and Stål, 2017), narrowing, slowing or closing resource flows (Bocken *et al.*, 2016), or by "utilizing economic value retained in products after use in the production of new offerings" (Linder and Williander, 2017, p. 183). Yet, because CBMs also aim for integrated environmental, social and economic value creation (Bocken *et al.*, 2014), and thereby address issues of a systemic nature, research is increasingly stressing the importance engaging for business to engage with stakeholders beyond those typically found in value chains and industries (Fehrer and Wieland, 2021). For instance favorable regulation and public policies are important for the success of CBMs (Corvellec and Stål, 2019) and public actors, such as cities, are also important drivers of CBM development in sectors such as infrastructure and housing where they are the ones to initiate, plan and procure business activities. Nonetheless, so far we know little of how business develop CBMs together public partners, although this is becoming more common (Christensen, 2021) and if effective, engagements could speed up CBM development, which despite its suggested benefits, is lagging (Tura *et al.*, 2019). Subsequently, in this paper we seek to *explore and explain how business and public actors work together to develop CBMs*.

LITERATURE REVIEW

Circular economy and circular business model development

Definitions of CBMs diverge, but they can be distinguished through their underlying principles for value creation and capture, two key dimensions of any business model (Teece, 2010). Here Tukker (2015), among others, draws on the vast product-service systems literature to showcase how circularity involves turning products into services, as in providing customers with access, via leasing, lending, sharing and pooling, and not ownership. Several others also make use of the business model canvas (Osterwalder and Pigneur, 2010) to suggest different CBM-types (e.g., Lewandowski, 2016).

Among product-services systems, providing access instead of ownership is an oft mentioned CBM-type, where product ownership is retained with the producer or an intermediate provider, e.g., a provider of a car pool. These models are assumed to extend and increase the utilization of products and thus replace the purchase of new ones, and thereby curb the energy, material and waste that goes into virgin production. Moreover, when customers lease rather than own products they pay the cost of their usage and tend to use products less, which has environmental benefits for such products, e.g., fossil cars, that have their impacts during use. Lastly, when ownership is retained, and products are not dispersed among customers, it can be easier to recycle or remanufacture them, their materials and components, as they remain with firms. Providing access instead of ownership is particularly important for the product exemplified in this case study, namely fossil cars. Business models that provide the sharing instead of owning of cars have been around for some time, and mounting evidence suggests that these CBMs provide environmental benefits (Amatuni *et al.*, 2020).

Besides seeking to define what CBMs are, there is a growing agreement that CBM development call for joint action among broader groups of stakeholders (Fehrer and Wieland, 2021). For one resource flows extend beyond the reach of single firms (Bocken, Schuit and Kraaijenhagen, 2018; Parida *et al.*, 2019), and thus closing loops call for coordination and cooperation, even among competitors (Manzhynski and Figge, 2019). Such interactions can reduce the risks and uncertainties that accompany CBM development (Brown *et al.*, 2021), so that by adjusting several business models a new offer is made possible (Hellstrom *et al.*, 2015) and systemic change is enabled (Perey, Benn and Edwards, 2018).

Importantly, the systemic nature of the sustainability issues that CBMs pertain to address also demands, and enables, forms of collective action that go beyond business ecosystems (Fehrer and Wieland, 2021). It demands such action because CBM development needs both policy support and regulatory adjustment, for instance car pools severely depend on whether the cities in which they operate subsidize, or neglect, their parking needs (Bocken *et al.*, 2020). But equally important is also that CBM development enables cross-sectoral cooperation because they align business goals with those of policy makers, and increasingly so as Circular economy policies are proliferating. For instance, in the example of car pools, city planners have recently begun to set aside space and subsidies in the plans made for new residential areas, increasingly promoting car pools while problematizing the use of private cars. Thus CBM development suggests interactions between “partners [that] might be quite different from ‘conventional’ value chain partners” (Bocken et al., (2018, p. 82).

Cooperation and coordination

To advance knowledge of public and private CBM development we review research into collaboration, coordination and cooperation, three terms that have been used interchangeably to understand inter-organizational relationships (Cropper *et al.*, 2009; Gulati, Wohlgezogen and Zhelyazkov, 2012; Castañer and Oliveira, 2020). Somewhat simplified these terms refer to interactions that differ from the arm-length market transactions between buyers and sellers, and from the hierarchal relations between owners and subsidiaries. Instead they entail communication, trust and commitment (Hardy, Phillips and Thomas B. Lawrence, 2003) but also asymmetric power, negotiation and conflict (Hardy and Phillips, 1998). The importance of joint goals are often stressed, although Cropper et al., (2009) observe that partners typically have mixed motives.

Because we are interested in interactions between private and public partners we draw on Castañer and Oliveira (2020) who assume a broad focus in their efforts to clearly define the meaning of collaboration, cooperation and coordination. They stress the importance of the goals that partners jointly set, as few partnership proceed without first having agreed upon goals to strive for, and suggest that goal setting and goal implementation are two distinct parts of inter-organizational relationships, demarcated by time. They refer to the former as *coordination*, and the latter as *cooperation*.

Nonetheless, both coordination and cooperation are assumed to be dynamic, as much about sharing of resources and mutual learning as they are about political maneuvering (Hardy, Phillips and Lawrence, 2003). Here extant research has stressed the need to consider the *institutional context* in which coordination and cooperation take place – the rules, norms and understandings partners perceive and enact – to explain events.

Institutional context

To analyze such contexts we turn to institutional theory, where institutions are historically entrenched patterns of behavior that have acquired the "status of taken for granted facts which, in turn, shape future interactions and negotiations" (Barley & Tolbert, 1997: 99). They are made up of rules, norms and understandings that, depending on how coherent and structured an institution is, may be more or less aligned (Stål, Bonnedahl and Eriksson, 2015). *Rules* refer to legal regulations that are backed up by the coercive potential of the state, thus rule-based prescriptions of stakeholders' rights and responsibilities come with a threat of legal sanction (Hoffman, 1999). *Norms* refer to the values that prevail in a context, what is considered right or morally appropriate (Maguire and Hardy, 2009). These can be embedded in professional values or codes of conduct (Scott, 2008), but recently sustainability has emerged as a new powerful moral theme among organizations, one that defines what is morally legitimate to do (Hengst *et al.*, 2020). Lastly with beliefs institutionalists refer to the culturally-cognitive, "shared conceptions that constitute the nature of social reality" (Scott, 2001: 57). Thus understandings are often taken-for-granted and unquestioned as they describe deep-seated assumptions of how the world, or a particular industry (Stål, Bonnedahl and Eriksson, 2013), works and why (Hoffman, 1999). Such understandings are ontological, and thus they form the basis of pragmatic legitimacy, what actors believe *can* be done. Understandings appear as facts, so that their socially constructed origin is hid from view.

When rules, norms and understandings align they effectively stabilize and reproduce roles, relationships and practices in the domains in which they prevail, maintaining an "iron cage" that positions stakeholders and interests, in other words, the world appears as it is and should be (DiMaggio and Powell, 1983). However as elements are always somewhat heterogeneous (Greenwood *et al.*, 2011), there is room for dynamics, prompting actors to reflect upon the state of their practices, interests and ambitions (Garud, Hardy and Maguire, 2007). From an institutional perspective such reflections are signs that rules, norms and understandings have become misaligned or contradictory, causing institutional friction (Fehrer and Wieland, 2021). For instance, contradictions can appear as functional gaps (Stål and Corvellec, 2021), where some institutional elements, for instance the laws that prevail, appear incapable of achieving treasured results (Seo and Creed, 2002). Contradictions motivate stakeholders to seek out change. A case in point are social and environmental objectives, increasingly seen as morally appropriate within business yet contradictory and misaligned with perceptions of how markets work (Hahn *et al.*, 2014). For instance, policy makers are not susceptible to market pressures in the same way as commercial businesses are, and therefore perceive social and environmental objectives from the perspective of political, instead of market, interest (Stål, Bonnedahl and Eriksson, 2013).

In conclusion, to explore and explain how business and public actors work together to develop CBMs we apply a conceptual frame that:

1) Acknowledges value creation and value capture as two key dimensions of CBMs

2) Distinguishes between coordination and cooperation.

3) Analyses effects of rules, norms and understandings.

METHOD

To explore and explain how business and public actors work together to develop CBMs we followed the advice of Flyvbjerg (2006) who argues that case studies are imperative for providing deep and contextual insights into less explored, dynamic and processual phenomena. Our pre-knowledge of the housing sector led us to believe that this constituted an empirical setting with much public and private cooperation in a highly structured, ut also problematized, institutional context.

A CBM for residential mobility

Our case refers to public-private CBM development undertaken in Burg, a fast growing, anonymized, medium-sized city in Sweden. Here civil servants from Burg's planning departments (planners), and representatives from seven (7) real-estate and construction firms (developers) are jointly planning, from scratch, Burg's largest residential development project, Santalodge. Santalodge is to contain 3000 apartments and 70000 square meters of workplaces and to be built in three stages between 2024 and 2030. Partners' cooperation is unusually close as planning is usually solely done by cities. Coordination began already 2017 when planners and developers jointly set a vision and goals for the area, and we followed cooperation through interviews and observations between 2019 and 2021.

One of the most difficult issues for these partners has been the goal to provide reduce residents' dependence on owning cars. For this goal providing vehicle access-without-ownership services is key. Access to vehicles such as electric cars, electric bikes and cargo bikes, along with digital mobility-as-a-service prescriptions, are to enable residents to live without cars, and instead make room for Santalodge's children, pedestrians and bikers, to reduce CO_2 emissions and city congestion and to improve Burg's poor air quality. Through cooperation it is decided that these circular services are to be physically located in *mobility hubs*, multi-functional facilities that also provide private parking space. To implement the goal, partners repeatedly stress their quest of finding an appropriate business model that can integrate their sustainability aspirations with what is perceived economically viable. This has proven Santalodge's most important and difficult task, perceived equivalent to trying to "make hash out of an elephant".

Data collection

We collected our via 51 interviews and 32 meeting observations and used Santalodge's documents (deposited at Share point) to verify our interpretations. All interviews were recorded and transcribed verbatim. Observed meetings were of three different types: Project meetings open to all participants, Mobility meetings open to ten (10) participants devoted especially to hubs and mobility, and Business model-meetings, open to the two project leaders (planners X1 and X2), three particularly involved developers (Y1-3) and their coordinator (YC). The Mobility and Business model-meetings were observed by the first author, because they were confidential he could not record them but nevertheless managed to transcribe large parts of them verbatim.

We asked respondents to explain the rules, norms and understandings they perceived, but as understandings are difficult for respondents to accurately describe, we also asked them to describe their interests, what they did and why, and how they explained the various happening. While our interviews provided us with a rich contextual understanding, our meeting observations gave us a first-hand experience of cooperation, as in particular norms and understandings "played out" during the lengthy efforts to nail down value creation and capture.

Data analysis

Following the recommendation of Eisenhardt (1989) we wrote up a case description, to provide initial insights among us. We also constructed a rough time-line over project events, enabling us to demarcate coordination from cooperation. As goals were clearly formulated in Santalodge's Sustainability program, we defined coordination (goal setting) as the activities resulting in the program, while cooperation meant when partners worked together on the legally binding plans that would turn goals into "built environment". We divided data excerpts into those that referred to coordination and those that referred to cooperation, e.g., talk about how goals were set, why they mattered, and how they related to planning as such were coded as "coordination" and talk about details of hubs, their costs and practicalities, were coded as "cooperation".

We then embarked on a new theory-driven coding as we looked for excerpts that referred to rules, norms and understandings within coordination and cooperation respectively. For instance, we coded any talk about the Swedish building law as an example of how rules were perceived and enacted, talk about environmental and social issues as examples of norms. After some consideration we decided that the recurring statements, primarily from developers, of "bringing the market to the table" (Y8) or stressing costs and economic viability, were best seen as examples of taken-for-granted understandings, both among planners and developers of how the housing world works. Even if these statements clearly had a normative side to them, especially in their implications, we found it better to consider them examples of what institutionalists label understandings as they seemed so taken-for-granted and ontological in nature. Having listened to respondents throughout multiple meetings and hours of transcribed recordings we realized that they were simply describing what they perceived as "economic realities", the world as they perceived it to be, not necessarily the world as they wanted it to be.

FINDINGS

Coordination

Rules – Burg's planning monopoly. Santalodge came about as a group of developers approached Burg's politicians with the idea to turn the forest at Santalodge into a "sustainability profiled" residential area, which was timely, as politicians were contemplating new ways of working with developers. Politicians and planners perceived that the planning monopoly that the Swedish building law gave them, was not enough to achieve sustainability outcomes. Developers knew this: "[Y]ou're not forced to build anything. The zoning plan is about what you can do. It doesn't mean you have to do it." The law only grants the right to determine what *can* be built, not to actually get it built. There has to be developers that are interested, otherwise "nothing gets built" (Y9). Sometimes developers will secure building permits only to turn around and protest that they cannot follow plans and build. And as X5 explains:

> Then we're not able to say: no, you're wrong, because we can't force them to build something they can't sell. And it happens sometimes that they come and say something like that. And then we have to decide if we really want the houses to be built, then we might have to redo the zoning plan. We don't want to because it takes a lot of energy.

Another possibility is cheating:

> They don't trust us because [planners] want to control [building] materials and other things. In some way, they are right. I do understand them because there are many builders in Sweden who have done awful buildings, awful really (Y12).

Rules - land allocation. There are also laws regulating land sales, cities have much freedom to decide how they sell their land, Burg can decide rather freely which developer will get what piece of land. Thus for developers joining forces seemed as a way to access land to build on. Y3 explains: "[T]his is a lot of land […] if we get one project or one land plot then we will be satisfied. If we don't get that of course we will not be satisfied." Planners know that in a growing city like Burg, land is precious: "[I]t is very important for them [to] get the land. Or if they get to build 50 apartments or 500. It's very important for each company. In [City], which is a growing city, many companies want to build. So which ones should we pick to get the chance to build?"

Yet even these rules do not grant planners with full control because land deals do not effect building permits, there are recognized loopholes, as Y9 explains:

> And Building Permits, that department, can only look at the laws and regulations, they can't look at land allocation, the contract. So I think in Burg and other cities there's been a lot of times that people said, company said: 'I will do this, and I will do that.' And then nothing happened. They just built a regular box house. And the problem here is that is hard to regulate.

Thus despite rules, politicians and planners perceived frustration in being able to realize their plans. In Beach, a previous, now finished project, planners wanted social and environmental qualities, but Beach turned out a failure, as a Burg politician explains: "[W]hen [developers] got their land plots, they went away from [agreements]. […] And that area doesn't look good." Even worse, developers complained about the zoning plans and got them changed, something which costs planners time, money and prestige.

Thus, even before coordination for Santalodge began, politicians and planners had realized that rules did not enable them to get the sustainability results they wanted. Seemingly there was a functional gap between what institutionalized rules enabled and what their sustainability aspirations implied. Looking at developments around Sweden they saw an array of social and environmental quality improvements being made in new housing projects, just not in Burg.

Norms – sustainability. Functional gaps seemed propelled by norms emerging in the Swedish construction sector that both planners and developers perceived. Y6 explains "Sustainability is such a big question now in every company" and Y2 knew that: "If there is a sustainability project somewhere in Sweden then the CEO goes there for the first dig or to cut the ribbon".

Thus the rather unique decision was made to allow developers to partake in planning Santalodge and setting its sustainability goals, as politicians, planners, and developers participated in City lab, a an externally driven one year program. Here partners translated 17 SDGs into a five goals for Santalodge, and wrote them into the Sustainability program, a 48-page document signed by Burg's major. During the work it became apparent that developers had rather vague notions of sustainability, stating "we see this is education, you see this as a chance to try this and engage in the participation may give some benefits". Planner X1 had to admit that "three fourths were written by civil servants from the municipality and one forth was written by developers". Burg, on the other hand, had worked much with sustainability, in particular with mobility, and the goal to decrease car dependency ended up in the program, where it was stated that all residents should "become members of car pools" and thereby be "highly mobile without having to own a car" (Sustainability program, 2018, p. 28). Cars, in turn, should be parked in joint facilities, referred to as "mobility hubs". Thus already in goal setting it was clear that Santalodge should enable vehicle access-without-ownership for its residents and contain "mobility hubs".

That car reduction was perceived very differently between planners and developers was soon realized, as traffic planner Y14 explains:

> One example was that in the beginning a lot of developers, and their coordinator, jointly said that ' If we can reduce family car ownership from two to one then we have achieved a

> lot'. […] I had to ask my statisticians to dig up numbers that showed that it is more common in Burg for families to own zero cars than to have two.

Nonetheless, partners managed to set joint goals because they explicitly choose to just focus on what was desirable, to entirely disregard how they were going to achieve it. After coordination, hopes seemed high, and perhaps, naïve:

> Stated from both sides: we're willing to put working with sustainability first and try to find the business models and the win-win solutions afterwards. […] But there are not many conflicting goals between companies, and with us, the municipality. Because right now at least, we have an agreement […] That is our sustainability program (X1).

Thus Santalodge ended up with an ambitious goal to reduce cars via car- and vehicle pools and mobility hubs, an ambition that aligned with planners wishes but seemed unfamiliar to developers. To implement this goal, they hoped to, somehow, bring forth "win-win solutions afterwards".

Cooperation

In 2018 implementation began by inscribing goals into the legally binding plan documents, e.g., the maps and texts, that according to the law governs any construction. Things now grew more problematic. Now the sustainability norm, expressed in the goal to reduce cars, came in full confrontation with the understandings of developers. Developers now began to (Y9) "bring the market to the table" and problematize things:

> I mean, if I have a good location I will sell all of apartments. That will always work. It's location, location, location, you know, the first course in real estate. This location isn't A, it's probably B. […] But the biggest problem is that it's 3000 apartments. 50% is rental and 50% is condominium. (Y2)

Developers tried to make sure that there would be room for cars in Santalodge, as they believed that buyers would want that. Y2 had learnt that "they just do not buy the apartments if parking is not convenient" and planners also grew more ambivalent: "People [may] not want to live here if there is no possibility to park a car. [This is not] central Stockholm or Gothenburg. [We have another] challenge [in Burg]."

Thus a new type of institutional friction arose, between how sustainability norms were expressed, and how the housing market was understood. In 2019 this friction became apparent to all, as an argument over how close car parking should be broke out. Conflicts temporary halted planning for months, but as one planner left in protest and a new one (X2) took over, a special "business model group" was formed. Here a more focused search for a business model began, with less planners and developers involved. Y1 explained to the others the challenge the group faced: "Yes, you can say it is difficult, it is damn difficult, but we are working on it".

Thus more focused discussions regarding value creation and capture emerged as issues became more challenging. These discussions were both as a direct outcome of the goals set (to have car pools and mobility hubs) but also sought as a way to align conflicting views, as X2 explained: "We need a compromise, somewhere in between".

Value creation. The CBM was to create value for residents by facilitating convenient daily travel to and from the area without relying on cheap, convenient and plentiful parking spaces that residents rent on a monthly basis. Parking spaces create "linear" value as they presuppose, and facilitates, the buying and ownership of private cars. With mobility hubs, parking is instead restricted and located further from residents. In parallel, space is made for vehicle pools, with cars, cargo- and electrical bikes, with the intent that residents can use these when they need to transport things or people. While car pools and parking could have been separated, as planners initially wanted, one outcome of the previously mentioned conflict was that they would be co-located in the hubs, in other words, car pools would not be closer to residents than their own cars. Thus hubs should contain elements of both circular and linear value creation. As developers and planners continued to plan, CBMs came to center on hubs, as tension between sustainability aspirations and developers' perception of realism continued:

First, as mentioned, developers protested plans to separate linear and circular elements and put parking outside Santalodge, Y2 explained: "I think 300 meters is reasonable. That is where you can have your parking. But if it is 600 or 700 meters – it may not sound much but it is damn far. And you are to walk there every morning."

Second, developers problematized the idea to have houses built entirely without parking, although zero-parking houses represent the "cutting edge":

> A zero parking project – how to we handle it in X years when we see that it does not work? When we have already built a parking house, I do not see the long-term perspective with this type of goal. It is show-off, I cannot see that it is feasible over time. We have to have a base, parking between 0,5 and 0.35 [spaces per apartment] (Y1)

Thus a decision was made to have 0.5 parking spaces per apartment and one (1) pool car per 50 apartments. The first hub built, meant to service 800 apartments would thus mainly contain regular parking (400 spaces).

Subsequently it is perhaps understandable that the business model-group became primarily devoted to figure out how to build the house, difficult because, as Y3 explained: "The problem is that we don't know if and when we will get land, we cannot pay for building the hub before we have our land deals, and those could take five years to complete".

After four months, X2 frustrated exclaimed: "And here is the parrot again – don't forget the mobility services!". Being satisfied that they had come up with an idea of how to build the thing, developers now participated in planners initiative to describe hubs' circular elements as well. Yet, after complaining that Burg has taken control again, after another four months it was time to, again, focus on the economic side of things, as Y2 explained: "The stress is almost unhealthy" and that "We have to focus on the economic sustainability, otherwise this all ends up as just fancy ideas". Focused now turned to value capture.

Value capture. The costs of the CBM stem primarily from the physical construction of parking spaces, both for private cars and for pool ones. Construction costs vary quite a lot, depending on how fancy the hub should look, but developers were convinced that they could build at 150-200 thousand SEK for each space. Thus a hub with 400 spaces would cost between 60 Million and 80 Million SEK to build, not a negligible cost, and if each space cost 200 thousand, at 0.5 spaces per apartment, apartment prices would increase by 100 thousand because of the hub.

With costs fairly known, the big question was now the revenue model:

1) Developers could pay a large sum upfront, enough to both build the hub and establish to a mobility fund to subsidize residents' membership and use of vehicle pools. Both planners and developers believed that residents would not just by themselves use the pool if there were no incentives. On the other hand they assumed that demand for parking was stable, in other words, they did not themselves believe that the market really wanted what they offered, but still Y1 believed that "in the long run car pools will sustain themselves".

2) Developers could pay less upfront and instead use monthly revenues from parking to pay both for construction costs and the mobility fund, Y1 explained: "200 per space, we pay some of it upfront and then make monthly parking rent expensive. We charge car owners a substantial amount so that we can built a mobility fund for the future".

Thus in both these revenue models car owners would subsidize circular services, in other words, for the model to work there would have to be enough conventional car parking to provide revenues. But if residents' relative demand for pool vehicles grew then these would need less subsidies and conventional parking spaces could be "turned" into pool ones. However, the apparent risk was that it could go the other way, if car pools end up unused then residents may want to turn their space into ordinary car parking instead. This pointed to the risk of future ownership, what would happen to their aspirations when things had been built and they would move on to other projects.

Primarily, the choice between the two models depended on who would own the hub. Either it would be turned over to residents, who would then own and manage the hub via an elected residential board, or it would be built and owned by some external parking company. The latter worried Y1:

> It feels really awkward. I cannot from [My company] send away millions to Parkhub, there has to be some security for my condo residents that they will be able to use [the hub] for 25 years.[…] When we tried to squeeze the quy (Parkhub representative) he would not reveal anything. We need to sit down and look at their business, how they can guarantee things, after all we are going to give them 50 Million.

On the other hand neither planners nor developers trusted residents to be professional enough to be able to manage the hub with its dual linear and circular elements:

> We cannot have 10 different condo associations trying to figure out management for themselves […] how to make it work in practice with pool cars, maintenance, who cleans and has the keys? We have to have a finalized, safe, solution. Buy it from someone, don't make it difficult. If we expect that the condo associations will handle all of this, it will generate so much negative media attention so then it is better for my company to stay out of it.(Y1)

For three months planners, and in particular developers, racked their brains, but then Y1 thought he found a solution: “I have tried to weigh everything we have said together, and an idea have started to emerge, that I think would work both for the building and running the hub”. His idea was for developers to build the hub and then commission Burg’s parking company, an actor they all trusted, to manage its funds and operations on behalf of Santalodge’s residents. That would take care of the ownership risks. Nonetheless, after almost two years of high-stress cooperation the group had made several important decisions regarding value creation and value capture at least for the first hubs to be built.

DISCUSSION

In this paper we set out to explore and explain how business and public actors work together to develop CBMs. Our review of the literature led us to focus on joint efforts as a process consisting of two parts: coordination and cooperation, shaped by rules, norms and understandings. Below we tentatively discuss our observations.

The CBM literature is pervaded by a stubborn insistence on the business model canvas as key for understanding CBM development and the inter-organizational relationships it entails. The canvas portrays relationships in a static way, as being about exchange. This seems like a gross over-simplification, what appears is instead a process fraught with tensions, learning and, sometimes creativity, energized by those underpinning institutional frictions that fuel corporate sustainability at large.

Public-private CBM development as motivated by institutional frictions

Institutions are suggested to particularly matter for CBM development because this development goes beyond mere matters of competitive advantage, aiming also for social, environmental and economic integration (Fehrer and Wieland, 2021). In our case we show how this mattering surfaces in two ways:

First, CBM development is embedded within a joint effort that comes about out of experiences of institutional misalignments, a frustration over the difficulty to achieve sustainability results via the inter-organizational relationships and roles prescribed by the law. As Bryson and colleagues (2015) observe in their many studies of private-public partnerships, experiences of failure often motivated actors to engage in cooperation to make up for the short-comings of single sector approaches. Thus public-private CBM development occurs in a context of partners trying to challenge institutions, research needs to consider that CBM development has this meaning. It makes public-private CBM development extra challenging, as it needs not only to deal with the many challenges that CBM development represents, but also has to cope with the challenges that comes with challenging institutions.

Second, CBM development is not only characterized by such above-mentioned motives but is also understood as a *solution* to institutional frictions: CBMs are examples of business models for sustainability (Schaltegger, Luedeke-Freund and Hansen, 2016) and as such represent, for actors, this quest for "win-wins", for being able to integrate social, environmental and economic objectives. Thus ingrained in CBM development is this hope of coming to terms with another type of institutional tensions, between the normative aspirations of sustainability and the perceived economic realities of doing business in a market (Stål and Bonnedahl, 2016; Stål, 2018).

Public-private CBM development as permeated by institutional friction

Our second observation is that while the business model-literature, just like the planners and developers we examined, hope for creative ways to combine the moral and the pragmatic, and finding these "win-wins", in practice CBM development turns out to be laden with tensions, trade-offs and potential conflicts, demanding hard work to soldier through numerous issues and decisions without losing pace, energy or determination. These efforts can be highly emotional, and are just as much about creativity as about needing to be systematically worked through, as creative solutions often fail to materialize themselves. It is about stamina and perseverance, just as much as about creativity and genius. Institutional frictions do not end as CBM development beings, they pervade its entire process. Through the multiple issues and details that must be decided institutional frictions repeatedly get new chances to manifest themselves and come "alive". This process is as much about "win-wins" as it is about endless bargaining as partners try to have each other to assume responsibility for costs and responsibilities. Yet at the same time there is learning, as partners oscillate move between common and private interests, helping *and* tricking each other, sometimes honestly trying to solve the problems at hand.

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Learning from frontrunners and their circular business model strategies

How do company's characteristics affect its circular business model?

Izquierdo-Montfort, Josep Oriol[1,*], Sirilertsuwan, Petchprakai[1], De Rongé, Yves[1]

[1] Université Catholique de Louvain, LouRIM (Louvain Research Institute in Management and Organizations), 1348, Louvain-la-Neuve, Belgium

* josep.izquierdo@uclouvain.be

ADDRESSED PROBLEM

To enable a shift of a circular economy (CE) towards the highest possible resource value maximization with minimum resource consumption, it is essential to configure new circular business models (CBMs) (Pieroni et al., 2020). CBMs have been studied by several authors (Bocken et al., 2016; Geissdoerfer et al., 2018; Lewandowski, 2016; Lüdeke-Freund et al., 2019; Mentink, 2014; Rosa et al., 2019; Ünal et al., 2019; Vegter et al., 2020) and several definitions have been conceived/proposed. In this paper, the concept of CBM will be based on the definition provided by Rovanto and Bask (2020: page 5):

> "A circular business model is the company-level application of a CE. It is the logic of slowing and/or closing material loops, by which an organization creates, delivers and captures value with long-term environmental, economic and social implications in a systemic manner on the micro, meso and macro levels to accomplish sustainable development"

Since 2013, there has been a limited but increasing number of publications from both academia and grey literature focusing on CBMs and their classification (Bocken et al., 2016; Hollander and Bakker, 2016; Lacy et al., 2013; Moreno et al., 2016; Pieroni et al., 2020; Planing, 2018; Rosa et al., 2019). According to Rosa et al. (2019) the most common CBMs in literature are related to recycling practices and use-oriented product-as-a-service system (PAAS or PSS), while other practices that are less considered in literature also unveil strategic potential for a shift towards CBMs. However, a number of existing CE and CBM studies still lack a focus on analyzing CBMs across various industries and company's characteristics. In this paper we classify companies by not only their industry, but also according to the following company's characteristics: native/adopter, enabler /transformer, Start-up/SME/MNC, B2B/B2C, HQ location, if they have branded products or services, and the year they started implementing their CBM. Understanding which CBM are being implemented by different types of companies potentially lead to the analysis of how to develop specific strategies to enhance the implementation of CBM by focusing on companies' characteristics and the adaptation of concrete elements from their business model (BM) shedding light on the importance of the systemic perspective of CE. Therefore, the research questions (RQs) of this paper are as follows:

- Which circular business models are the most implemented by circular economy frontrunners?
- To what extend do company's characteristics affect its circular business model?

METHODOLOGY

As we focus on CBM, we choose to study companies that have been recognized as implementing CE in their businesses. Therefore, our sample is formed by the companies that have performed the case studies described by the Ellen Macarthur Foundation (EMF), a referent actor in the CE ecosystem. The EMF describe 95 circular case studies in their website, after an analysis we have identified 74 micro level cases performed by private companies. The other 21 cases have been excluded for being case studies focused on the macro or meso level and for being performed by cities, governments, state-owned companies or NGOs. The research will consist on a document content analysis of the case studies to identify the CBM implemented by using the framework developed by Pieroni et al. (2020), that, not only classifies 20 types of CBM, but it also identifies the key elements of a company's business model that needs to be addressed when implementing a specific CBM. In order to validate and complement this analysis, content analysis will be performed on the companies' websites. This complementary step, will not only serve as a way to validate and complement the identification of CBM, but also to properly classify the companies according to the beforementioned criteria. Once this analysis is performed, and with the aim to reduce subjectivity and bias, the co-authors of this paper will individually check the results and jointly discuss those in where there is a disagreement. Later on, exploratory data analysis will be used to find patterns among the implemented CBM, different industries, company's characteristics, and the elements of the business model that require adaptation in order to implement a specific CBM.

Expected results and preliminary conclusions

Firstly, we expect to reveal diverse CBM across various industries and types of companies, beyond product-as-a-service and recycling, which are the most commonly described CBM strategies. Secondly, based on the analysis of how different types of companies influence the implemented CBM, we will be able to identify key relations between companies' characteristics and the kind of CBM implemented. Finally, we will be able to identify the key elements of a company's business model to be considered to embed CE principles, such as its relationship with its key suppliers or with its customers, shedding light on the importance of stakeholders and the systemic perspective of CE.

Contribution

Besides the identification of the most implemented CBM among frontrunners, our findings will help future research and practitioners realize the importance of company's characteristics when implementing CE and the diversity of CE implementations within the private sector. We expect to shed light on the relationships among company's characteristics, implemented CBMs and the key elements of their business models to be considered for a successful CE implementation.

Keywords

Circular economy, Circular business models, Circular strategies, business model, Content analysis

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Locality Matters - Understanding the Emergence of Circular Service Business Models across Different Countries

Dihui Han[1,*] Nancy Bocken[1], Marc Dijk[1], Jan Konietzko[1]

[1]Maastricht Sustainability Institute, School of Business and Economics

Maastricht University, Tapijn 11, 6211 ME Maastricht

*d.han@maastrichtuniversity.nl

BACKGROUND

Companies have started to experiment with new circular service business models (CSBMs) fuelled by resource and climate pressures, changing consumer preferences, stakeholder pressures, volatile commodity prices, limited resource accessibility and enabled by recent developments in information technology (Lewandowski, 2016; Tunn et al., 2020). As-a-service models such as rental and lease help businesses to be more circular by innovating the service part of the business model (De Pádua Pieroni et al., 2018) to achieve resource savings, superior customer value, and sustainability benefits (Tukker, 2015). This type of business model allows companies to retain the product ownership or extend product responsibility, incentivising them to extend their products' life-cycles (Tukker, 2015) CSBMs are important because they have the potential to achieve 90% reductions in environmental impact (Tukker, 2004). Despite the interest in CSBMs in recent years, large corporates still lag behind in implementing them (Ritala et al., 2018).

Some multinationals have begun to experiment across different geographies (Electrolux, 2019; Ellen MacArthur Foundation, 2020; H&M Group, 2020; Philips, 2020). However, there were still variations in the design of CSBMs when different locations are considered (Circular X, 2021). A recent development from the business innovators' side suggests that business model innovation is conducted differently across different countries. Cultural and other contextual factors differ across locations and may influence the outcomes and the scalability of these business models across geographies (Gust-Bardon, 2012; Hansen & Coenen, 2015; Köhler et al., 2019; Rask, 2014). Regulatory, market, technology and information, supply and demand network and socio-cultural factors are frequently identified by scholars and practitioners to be impactful on circular or service oriented business models (Geng & Doberstein, 2008; Guldmann & Huulgaard, 2020; Mont, 2002; Oghazi & Mostaghel, 2018; Ranta et al., 2018; Tura et al., 2019).

Innovation is a highly localised process configured to the local context is important for a firm's performance (Porter, 1990). This is also the case for business model innovations. Firms need to design their business models according to their network and markets to ensure performance (Zott & Amit, 2010). Despite the development of the geography of innovation research in the past 20 years, the spatial dimension of the circular business model innovation is unexplored and is needed to explain why and how companies adopt different strategies in different countries. For practitioners, this knowledge might help in their future implementation of new CSBMs in different environments. This would also help policymakers to create a more enabling environment for new CSBMs.

This paper seeks to answer the following research questions: What local factors influence circular service business model design? To what extent do these factors influence the CSBM design? How do these local factors begin to evolve and transform due to the introduction of CSBM?

The aim of this paper is to build a conceptual framework that links circular service business models (CSBMs) to these local factors. We evaluate how circular business model innovations emerge from different locations. From this, we highlight relevant factors that could help companies develop circular service business models in multiple locations. The framework of local factors emerges from both existing research and multiple case studies of relevant circular practices.

METHODS

First, a literature review is conducted to develop the preliminary list of location factors contributing to CSBM design. This list is generated through several iterative stages. The first stage involves an overview of factors impacting circular or service-oriented business models. This search is not limited to academic papers, but also includes non-academic company sustainability reports, because of the focus on practical examples. The second stage generates a shorter list of factors by only keeping those external to the organisational environment and could be location relevant. The last stage consists of evolving and enriching this list with primary and secondary data collected through multiple case studies.

Case study selection is limited to companies that have launched CSBM initiatives across different countries. The study specifically investigates the trailing of CSBMs of those companies in Europe, China and US, who all have distinct and prominent environmental policies and goals. The case study is built on both primary and secondary data. Primary data includes semi-structured interviews with key decision-makers at the companies being investigated. This is supplemented by company reports and press releases.

RESULTS

This paper develops a framework that maps the location factors that impact CSBM design. The multiple case study spans six different sectors and multiple countries can help to enrich the framework from different perspectives. Building on the framework, companies might be able to better prepare themselves for local and global implementations of new CSBMs. It will provide policymakers with insight into the factors in their institutional context that might inhibit or encourage CSBM development, which should help them create better alignment with their ambitious circular economy goals.

CONCLUSIONS

Circular service business model initiatives are highly dependent on the local conditions of the pilot country. Preliminary research suggests that the socio-cultural related factors such as the potential acceptance of pre-owned goods and values of ownership matter most for CSBM experimentation as these tend to differ significantly. Due to the novelty of the field, many cases included in this study were still at the planning and piloting phase. Future research could implement a longitudinal study to follow a CSBM throughout its development stages from ideation to scale-up to understand how the firm experiment and evolve the business model according to the local factors.

Session Contribution

This paper can contribute to the following tracks at the NBM 2021 Conference.

Track 1.4 – Business Models for the Circular Economy

Track 2.2 – Design Thinking, Actor Engagement, and Legitimation in the Context of Circular Business Model Innovation

Track 2.7: New Business Models in an International Context

Keywords

Circular Service Business Model, Locality, Sustainable Transition, Circular Business Model Innovation

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Track 1.5.

Natural Ecosystem Services as Enablers for the Transition to Sustainable Business Models

Track 1.5. Natural Ecosystem Services as Enablers for the Transition to Sustainable Business Models

Track chairs: Anna Hansson, Niklas Karlsson, Marie Mattsson
Halmstad University, Sweden

This track aims to explore how sustainable value creation can be supported and facilitated through preservation, regeneration, and processing of services provided from natural ecosystems.

Ecosystem services are the benefits that natural ecosystems provide humans and are critical to the function of life-support systems on earth (Costanza et al., 1997). They are characterised as provisioning (e.g. food or biomass production), regulating (e.g. climate, floods or water quality), cultural (e.g. recreational, spiritual and aesthetic) and supporting (e.g. photosynthesis, soil formation and nutrient cycling). These ecosystem services are valued in relation to benefits they provide to humans, playing an important part in securing societal needs of long-term functioning ecosystems.

Due to human activities over the past several decades, the goods and services that ecosystems provide have been significantly degraded along with the global financial value of these services (Costanza et al., 2017). As a result, there is a need to explicitly consider how preservation, regeneration, and processing of ecosystem services can be part of the sustainable value creating business activities. By developing existing business models to include a wider range of ecosystem services, businesses and their stakeholders can benefit from new innovative business opportunities. However, traditional business models fail to capture intangible environmental and social value generated by natural ecosystems, such as climate regulation and opportunities for improved health (Freudenreich et al., 2019). Thus, the facilitation of sustainable value creation based on commercialisation of ecosystem services can play a crucial role in maintaining and improving competitiveness in a long-term perspective (Freudenreich et al., 2019; Schaltegger et al., 2017).

However, previous research shows that business managers associate sustainable value creation from ecosystem services with increased costs as a result of their maintenance and uncertain incomes due to their intangibility and long termism (Bocken and Geradts, 2019; Karlsson, 2019). Such barriers especially apply to business activities that require radical business model changes that do not follow standardised innovation processes (Täuscher and Abdelkafi, 2017). Therefore, we invite contributions from different research contexts that can ignite and contribute to the unpacking of sustainable value creation from ecosystem services that can address, but are not limited to, the following:

- What kind of actors, roles, and competencies, are needed to create market demand and pricing of environmental and social value connected to ecosystem services?
- How can we design business models to support value capture from ecosystem services? How can the process be facilitated, organised, and governed?
- What are the barriers and drivers to explicitly include ecosystem services in business models?
- What are the possible methodological approaches to study how ecosystem services can contribute to sustainable value creation for and with stakeholders?
- How can the contribution of ecosystem services for sustainable business model success be evaluated and measured? What are possible indicators and evaluative tools to be used?

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Business model and capability development for underutilized local food resources

A case of Baltic sea fish

Wiebke Reim[1,*], Daria Sas[1]

[1]Entrepreneurship and Innovation, Luleå University of Technology, Sweden

*wiebke.reim@ltu.se

In order to maintain Earth's ability to sustain the growing human population and decrease food import dependency, local food resources and side streams in food production should be better utilized (Zucchella and Previtali, 2019). Over the last decades, the share as well as the variation of food resources used for human consumption has decreased (Costanza et al., 2017). For example, in the Bothnian Bay, the northern most part of the Baltic sea, only a few fish species are caught for commercial human consumption. Catching overrepresented fish species has positive effects. First, it would significantly reduce overfertilization of the Baltic sea as the abundance of minerals and nutrients would be moved from sea to land. Otherwise, overfertilization can cause fish mortality and poor water transparency. Secondly, such fish species are a great source of local food supply. However, currently the overrepresented fish species such as bream are not common for human consumption. One reason is that the processing is more complex in terms of the bone-removal process and preparation for sale that is needed to get a tasteful product. Therefore, it is crucial that the commercialization of overrepresented fish species becomes economic feasible to create incentives for fishing industry to catch them. This will also lead to valuable effect on natural ecosystem service. Natural ecosystem services can be defined as the benefits that natural ecosystems provide humans and are critical to the function of life-support systems on earth (Costanza et al., 1997). They can be grouped into four broad categories provisioning (e.g. food or biomass production), regulating (e.g. climate, floods or water quality), cultural (e.g. recreational, spiritual and aesthetic) and supporting (e.g. photosynthesis, soil formation and nutrient cycling) (Assessment, 2005).

To use fish species such as bream as a resource for human consumption would fit to all four categories of natural ecosystem services. Bream would be used for provisioning food with high nutrition, and the water quality would be regulated and improved. Also, the connection with the previous culture where bream was a common fish for human consumption could be reestablished, and finally it would contribute to nutrient circulation from water to land. The usage of the existing supplies of food resources as well as improvement of the ecosystem in the Baltic sea is a promising sustainable value creation where natural ecosystem services are utilized and regenerated. However, the common challenge is a lack of knowledge about how to develop business models that create and capture social and environmental values in a way that incentivizes large scale commercial application. which would be needed to utilize that full potential of the initiative. Commonly, these initiatives are initiated through governmental funding bodies in project form that develop appropriate technologies but have challenges to be transformed into a sustainable business model that generates, economic, social and environmental value (Tongur and Engwall, 2014). There is especially a need to understand the market and customer acceptance and value perception to design sustainable and circular business models.

Therefore, the purpose of this study is to understand how business model and capability development can support the commercialization of underutilized food resources. In this study we have chosen to define capabilities according to Teece, Pisano & Shuen (1997) as a firm's ability to integrate, build, and reconfigure internal and external resources to generate returns. The results are based on a single case study with an innovative fish processing company in northern Sweden established in 1992. It is a small and medium sized enterprise (SME) with 10 employees. The case company has been investing in technology to industrialize the utilization of side streams and has broadened its product portfolio to reach out to a larger customer segment. The collected data for this exploratory case study is based on 15 interviews with representatives from the case company and respondents from organizations that belong or could belong to the business ecosystem of the case company. The data from the interviews was analyzed and coded through thematic analysis through with we identified challenges and capabilities related to business model development. The case company intensively works with its business model to be able to capture the value that comes simultaneously from the food production, the benefits for the Baltic sea ecosystem and the increased local food supply.

As a result of the study several challenges were identified. One of the obstacles is to enhance society's willingness to accept that local business could change the consumption habits and to pay a higher price for locally produced products. A lack of experience and tradition around new food resources as well as an insecurity about the perception of the new food and flavors as also seen as hinders. In addition, SMEs in sparsely populated areas like north of Sweden, have limited resources to invest in marketing and information campaigns to educate customers. This leads to a high dependency on supporting actors such as environmental organizations and innovation actors to spread their initiatives. Focus on relationship building and collaboration with larger even public organizations has a positive impact on the business as well as focus on process improvements. For example, municipalities could become customers to show their engagement in the establishment of sustainable and local food supply. Overall, only long-term perspectives of a sustainable business model will incentivize local actors that utilize natural ecosystem services to also regenerate them and create conditions for well-functioning ecosystems in the future. For sustainable business models that focus on environmental ecosystem, it is important to find a way to capture the social and environmental value that is created. This research contributes to the sustainable business model literature by conceptualizing the development of business models and capabilities for sustainable value creation from natural ecosystem services by not only utilizing but also regenerating. It also highlights the role of the stakeholder perspective and the need for customer awareness and acceptance.

Keywords

Business model; Sustainability; Ecosystem services; Sustainable value creation; Customer acceptance

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Development of Business Model for Sustainability Tool Within Context: Reframing of existing tools to cater for protected areas.

Hellen Lillian Atieno Dawo[1, *], Thomas B. Long[1], Else Ragni Yttredal[2]

[1] University of Groningen, The Netherlands; [2] Norwegian University of Science and Technology (NTNU)

* h.l.a.dawo@rug.nl

Abstract

In the light of grand challenges such as climate change and recovery from the COVID 19 pandemic, the need for solutions that enhance sustainability has become acute. Especially important are approaches that foster inclusion of previously overlooked enterprises, such as those located in protected areas. For businesses to transform their practices to sustainability they need to understand their current process flows, develop new ideas and materialize sustainable value for stakeholders. This is especially true for enterprises located in protected areas such as World Heritage sites. The available transformational tools are often designed for large or medium-sized companies with clear departmentalisation. However, in protected nature areas, businesses involved in tourism are often small in scale and embedded at their location. Most are family run, with limited input from employees. These businesses interact with various stakeholders including nature area authorities, local government authorities, in addition to investors, suppliers and customers. Our study aims to integrate elements from available sustainable business model development tools, to facilitate visualization and improvement of the sustainable business models that exist/can exist in protected area context. We will then test this tool with the businesses in World Heritage sites in the North Sea region, in order to develop a good fit from the feedback received. We apply a design thinking approach with participation and feedback loops from relevant stakeholders in the World Heritage sites.

This study will contribute to existing literature by contextualizing a business model development tool, to satisfy the unique needs of protected areas.

Keywords

Development of Sustainable Business Model Tool, design thinking process, contextualisation, protected areas

Track 2.1.

Corporate Strategic Management and Sustainable and New Business Models

Track 2.1. Corporate Strategic Management and Sustainable and New Business Models

Track chairs: Romana Rauter[1], Yuliya Snihur[2]

[1]University of Graz, Austria; [2]Toulouse Business School, France

Sustainable and new business models are intensively discussed as a means to foster a transition towards more sustainable societies. On the one hand, a multitude of examples of business models with a sustainable core, like circular business models and asset-sharing business models, exist. On the other hand, there are also many examples of "regular" business models that are being tuned towards higher levels of sustainability, for example through the use of partnerships, more inclusive stakeholder value propositions, ecosystem-centered governance (Ricart et al., 2020), or other resource-minimizing choices.

Building and innovating sustainable business models is dependent upon a number of different factors, both internal and external. Amongst them, strategic decisions to invest in a more sustainable business version of the existing business model(s), or to experiment with and develop new and sustainable business models from ground up. Our point is that building new and sustainable business models rests upon strategic management decision-making within the firm, as does the subsequent management of the business model portfolio. In turn, new and sustainable business models might also lead to changes in strategy and the wider organizational setting. In this context, we highlight the relevance of the inclusion of sustainability goals in corporate strategy and the business model(s), potentially offering a "set of guidelines that determines decisions into the future" (Mintzberg, 1978: 935).

We welcome conceptual and theoretical contributions as well as empirical papers from various backgrounds delivering novel insights on this topic. Contributions that specifically, but not exclusively, deal with the following topics are invited:

- Which insights can be gained from the established theories of strategic management, such as the resource-based view (e.g., Amit, Snihur & Zott, 2020) or stakeholder theory (e.g., Ricart et al., 2020), and how can these be used for designing, implementing and improving new and sustainable business models?
- What are the barriers and enablers of success in implementing and innovating sustainable business models from a strategic point of view?
- What are the challenges and opportunities for companies that manage portfolios of (more-or-less) sustainable business models?
- How can new sustainable business models be developed to enhance existing business ecosystems and drive sustainability transitions in larger society?

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Success Factors for Environmentally Benign and Less Packaging Through Business Model Innovation

A Comparative Analysis of German Retailers

Sabrina Schmidt[1,*], Eva Wiesemann[1], Frieder Rubik[1]

[1]Institute for Ecological Economy Research (IÖW)

*sabrina.schmidt@ioew.de

Packaging, and especially plastic packaging, represents an enormous source of waste and thus environmental problem. In addition to efficient collection and recycling processes, the main preventative measure should be to produce less and – if needed – more environmentally benign packaging. This would shift away focus from campaigns for sustainable consumption, which largely place the burden of solving the problem on the individual consumer, and onto the companies responsible for large production volumes of products with short lifespans such as packaging (PlasticsEurope, 2019).

We argue that retailers, as the intermediate between producers and consumers, are capable of driving the reduction of packaging and facilitate the use of sustainable solutions - especially given the bargaining power of large retailers towards their suppliers (Twede & Clarke, 2004). This requires new retail business models that place greater emphasis on sustainability and, consequently, sustainable packaging. In the retail sector, we are witnessing the emergence of new business models (such as zero waste stores) as well as the adaptation and further development of existing business models (Beitzen-Heineke, Balta-Ozkan & Reefke, 2017; Schaverien, 2019). At the same time, retail companies show great diversity e.g., in terms of their product portfolios, distribution channels, company sizes, customer segments and sustainability orientations. Therefore, it can be assumed that – for example – a large drugstore chain and a small online marketplace for sustainable fashion have to make different strategic decisions to successfully reconfigure their business models to achieve the same goal: more environmentally benign and less packaging.

To test this assumption, we conducted seven semi-structured interviews with chief executives and managers of German retail companies about potential success factors and barriers for business model innovation in the context of a modified packaging management. The companies range from a small zero waste store to a multinational online fashion retailer. The interviews and analysis employ the "factor mapping grid" method to determine not only critical success factors, but also how they relate to each other (Ma *et al.*, 2019).

Three raters independently coded the positive and negative aspects, both internal and external to the company. The three individual classifications were compared und differences in the coding were discussed leading to a consolidated version. The codes per success category were counted, summed up and weighted according to the interviewee's remarks. The coding scheme is based on a systematic literature review in which 14 of the 372 publications were included on basis of their content fit (i.a. Fibitz & Ulrich, 2018; Laukkanen & Patala, 2014). Based on a content synthesis, 13 categories of successful business model innovations emerged: as *external factors* 1) political and regulatory framework, 2) societal actors and values, 3) consumers, 4) market and economy, 5) technology and 6) collaboration, as well as the *internal factors* 7) organizational knowledge, 8) product and packaging, 9) organizational structures, 10) strategy and management, 11) employees, 12) profitability and 13) corporate culture.

The interviewed companies differ in terms of their dominant business model (e.g., value proposition, customer segments and relationships, importance of sustainability in key resources and activities). But more interestingly, the interviews showed that they display differences in the emphasis and interpretation of certain success factors and barriers for business model innovation. Therefore, we conclude that the seven companies can be divided into three groups: 1) packaging as value proposition, 2) organic products/sustainability as value proposition, 3) diverse customer segments are targeted.

In terms of *internal factors*, profitability is the factor that is interpreted most differently. Especially for large retailers with diverse target groups, profitability is of key importance. Retailers driven by sustainability and specializing in zero waste packaging indicate that the *Profitability* of new solutions is of little importance. However, there are also meaningful differences in the assessment of aspects that fall under the categories *Strategy and Management* (e.g., setting clear organizational goals for more sustainability and environmentally friendly packaging) and *Product and Packaging* (e.g., technical requirements for safe packaging).

Regarding the *factors external* to the company, the three categories *Technology*, *Market and Economy*, and *Consumers* are of major importance and show considerable variations. The big companies with diverse target groups assign great importance for the success of new packaging solutions to their customers and the market conditions. Customers are also a success factor for medium-sized companies whose brand core lies in sustainability, but they also refer strongly to technological aspects, such as the availability of innovative packaging materials. The small zero waste companies see themselves dependent on technological factors as well, yet they also point to the importance of market aspects (e.g., influence on the value chain) and collaboration with other players such as suppliers. Surprisingly, aspects such as corporate culture, organizational knowledge and skills of employees as well as regulatory guidelines or the influence of media and societal values were of little importance to the interviewees.

Our results demonstrate that there is no one-size-fits-all approach when it comes to success factors and barriers of implementing a new business model. One companies' success factor can be a barrier for another company (Ma *et al.*, 2019). The strategic decisions based on those factors and setting the framework for innovating a business model and associated activities are always dependent on a company's current positioning and setup. Of course, this positioning is not static as it depends on strategic development paths and corresponding management decisions. Managers have to consider a wide range of internal and external success factors and barriers regarding their applicability for their company to create more sustainable business models.

Keywords

Sustainable business models, fast-moving-consumer-goods, plastic reduction, strategic management decisions, factor mapping grid

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From meat to meat alternatives

The transition of a product niche to mainstream and its implications for business

Michaela Feiglová[1], Matthias Lehner[1,*]

[1] The International Institute for Industrial Environmental Economics (IIIEE), Lund University, Tegnérsplatsen 4, 223 05 Lund, Sweden

*matthias.lehner@iiiee.lu.se

Plant based meat alternatives (hereafter 'plant based meat', PBM) are mainly plant-based products that purposely imitate the look and taste of meat and could play a part in stimulating a healthier and more sustainable diet (Apostolidis & McLeay, 2016). While in the past similar products targeted vegans and vegetarians, the current PBM products are primarily designated for meat-eaters. These products have the potential to reach a much bigger consumer group and open new opportunities for businesses (Moradian & Røsand, 2019). The meat industry has traditionally been viewed as conservative, with limited innovation and low R&D investments. However, owing to technological advancements and increasing market demand for healthy and sustainable food, the pace of innovation has increased (Schoen, 2017). Among some of the major events that triggered further development were the food safety crises within the meat industry in the early 2000s such as BSE (CDC, 2018), documentaries showing the negative sides of the meat industry (e.g. Cowspiracy or Dominion), and increasing popularity among celebrities who popularized vegan diet and started investing into companies developing new plant-based meat products (Hoek *et al.*, 2011; Mousel & Tang, 2016; Tziva *et al.*, 2020). He et al. (2020), who divide the history of plant-based protein products into three stages – the traditional usage, the first generation of PBM products, and a second generation of PBM –, explains that the second generation PBM is marked by technological advances. To mimic meat as realistically as possible, the industry invented products with leghemoglobin, that have similar attributes as myoglobin in raw and cooked meat – such as changing color from red to brown when cooked (Lee *et al.*, 2020). Today, besides the PBM protein, other conventional meat alternatives development directions include fungi-based products, insect-based protein, and lab-grown meat (He *et al.*, 2020). In the last decade, companies such as Impossible Foods and Beyond Meat (founded in 2011 and 2012, respectively), both currently leading in the global PBM landscape, have started targeting meat-eaters with products with similar texture, appearance, and taste as meat (Hu, Otis and McCarthy, 2019).

The current literature suggests that in developed countries the main reasons for shifting away from meat from the consumer perspective are environmental reasons, health and animal welfare (Loria, 2018; Moradian & Røsand, 2019). Main barriers, according to Tang and Mousel (2016) are a lack of information and knowledge about the product, its health implications compared to meat, and how is it better for the environment. In addition, cultural barriers are important, which relate to the meaning and traditions of food and cooking. In a study from the Netherlands, He et al. (2020) found a low willingness to give up the enjoyment from eating meat, concerns that vegan diet is nutritionally unbalanced, lower convenience related to not knowing how to cook PBM, and lastly low eagerness to change well-established routines. Furthermore, Michel et al. (2021) argue that more information on future challenges, aspirations, and possibilities for these items is required in order to encourage a more healthy diet of alternatives to beef as a source of protein instead of meat. From the producer perspective, critical aspects apart from market demand are technology and skills, legislation, and the public discourse (Bolton & Hannon, 2016; Mousel & Tang, 2016; van Waes *et al.*, 2018; Moradian & Røsand, 2019).

Overall, the understanding for how the transition from animal-based protein supply to plant-based protein supply will take place remains understudied. This is relevant, as despite the increasing number of products and brands with PBM on the market, the industry accounts for less than 1% of the number of goods created by the meat industry globally (Piper, 2020). PBM thus remain a niche, though growing fast.

The study builds on a number of semi-structured interviews with experts and practitioners from the PBM sector. The research relies on the multi-level perspective (MLP) (Geels, 2002), to consider various aspects of the transformation of a niche industry to become mainstream. In our research, we treat PBM as a successful innovation that has managed to break out of the niche in which it had initially developed. The focus of the research will be the impact of the MLP-framework's regime factors (technology, infrastructure, markets, regulation, culture, etc.) on the PBM-niche and the steps in which PBM has developed from a niche towards more mainstream acceptance (cf. Rischen, 2018).

The expected result from this research will be a detailed understanding regarding the interaction between company-internal decisions and actions, and changes to the socio-technical regime that enabled, and in some ways hindered, the development of the PBM niche to mainstream. Our results provide insights about businesses' role and dependencies when it comes to mainstreaming sustainable business models.

Keywords

Plant based meat, food industry, multi-level perspective, sustainable business model, niche to mainstream transition

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Enabling Business Model Transformation for Sustainability

The Role of Organizational Dynamics at Sustainability Pioneer VAUDE

Thomas Wunder[1*], Andreas Kasseckert[2]

[1] Neu-Ulm University of Applied Sciences, Germany;
[2] Ulm University of Applied Sciences, Germany

*Thomas.Wunder@hnu.de

Abstract

This research project contributes to the field of business model for sustainability (BMfS) by integrating organization theory to the business model perspective. We demonstrate how the German sustainability pioneer VAUDE has been managing tensions since the transformation toward a business model for sustainability was initiated in 2009.

Keywords

business model for sustainability, organizational dynamics, transformation, management of tensions, sustainability pioneer

INTRODUCTION/PURPOSE OF THE PAPER

The socio-ecological context in which companies operate has significantly changed over the last decades (UNFCCC, 2021; UNEP, 2021; World Economic Forum, 2020). Socioecological variables provide us with signals of systems disruption that are not only a societal but also a significant business concern (e.g. Bansal, Grewatsch, & Sharma, 2021; Henderson, 2020; Schaltegger, 2020; Wunder, 2019). Companies are increasingly expected to provide effective contributions to sustainable development, which requires them to rethink and sometimes innovate their business models (e.g. Bolton & Hannon, 2016; Bocken et al., 2014). Given these developments, the emergent research field of Business models for sustainability (BMfS) has received increased attention among scholars but still lacks studies that integrate organizational level theory to explain the transformation of companies towards business models for sustainability (e.g. Pinkse et al., 2020; Roome & Louche 2016; Schaltegger, Lüdeke-Freund, & Hansen, 2016; Zollo, Cennamo & Neumann, 2013).

Following the notion of "strategy as practice" our objective is to empirically examine an European sustainability "champion" regarding its business model transformation toward sustainability. By comprehensively understanding this case, we aim to gain insights on the role of managerial tensions and its management for developing and implementing a BMfS from an organizational science perspective. The VAUDE GmbH & Co.KG is a family-owned outdoor and mountain sports apparel manufacturer based in Germany. In 2019, the company employed more than 500 people and generated a turnover of over 105 million Euros (VAUDE, 2020a, b). Since the founder's daughter took over the helm of the company in 2009, profound organizational change was initiated to enable the transformation from a conventional business model toward a BMfS. During this transformation process, the company has been dealing with various tensions and paradox decision situations. We consider this an extreme case that is particularly suitable for our study to provide insights for the transformation toward BMfS.

THEORETICAL BACKGROUND

Business Models for Sustainability

Since the research field of business models has emerged at the end of the 20th century various approaches and definitions have been produced (Zott et al., 2011), such as Teece´s (2010, 172) interpretation as a model that "…describes the design or architecture of the value creation, delivery, and capture mechanisms [a firm] employs. The essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit." The primary goal of those approaches focuses on financial value creation for the company which can be seen as shortcoming because they "do not factor in the resulting complexities when companies deliberately aim for ecological and social value creation beyond financial profits." (Schaltegger, Lüdeke-Freund, & Hansen, 2016, 267).

Scientific interest in in Business Models for Sustainability (BMfS) is relatively recent compared to the general research field of Business Models, but has already resulted in an extensive body of work (e.g. Massa, Tucci, & Afuah, 2017; Schaltegger, Lüdeke-Freund, & Hansen 2016). One reason for this development is seen in the high value the business model concept offers for sustainable development (Lovins, Lovins, & Hawken, 1999). It is argued that it is particularly appropriate for studying the relationships between companies and their natural, social, and economic environment (Marcus, Kurucz, & Colbert, 2010) and it provides a solid basis for designing alternative and potentially more sustainable business architectures within the given environment (Upward & Jones, 2016). The business model concept is also suitable to understand organizational transformation (Teece, 2018).

Tensions in Managing Sustainable Business Models

Scholars in the field of management research agree that integrating sustainability into the core business, that goes beyond "siloed" sustainability initiatives, requires firms to simultaneously address economic, environmental and social value creation and the systematic coordination of various stakeholder demands (e.g. Schaltegger, Lüdeke-Freund, & Hansen 2016; Hahn, Pinkse, Preuss, & Figge, 2015). This broadened scope raises multiple tensions at different levels (individual, organizational, systemic), which leads to an increased complexity regarding the need to manage a wide range of interconnected, contractionary, and seemingly incompatible aspects (Hahn, Pinkse, Preuss & Figge, 2015). Scholars state that to successfully integrating sustainability into the core of a firm´s business model requires decision makers to overcome the instrumental logic in coping with these tensions (Van Bommel, 2018; Haffar & Searcy, 2017; Smith & Lewis, 2011). Thus, to drive the positive impact of firms on the socio-economic system, scholars highlight the value of paradoxical thinking (Hahn, Figge, Pinkse, & Preuss, 2018). As Lüscher and Lewis (2008) argue, the identification, acceptance, and management of tensions is particular important for organizational change.

While tensions in the corporate sustainability literature have received increased attention over the past years (Van der Byl & Slawinski, 2015), scholars are just starting to consider tensions in the field of BMfS (Stubbs, 2019). Recent studies have aimed to identify trade-offs between product quality and commercial profitability in sustainable business model innovation (SBMI) (Clube & Tennant, 2020), investigated hybridity-related tensions in BMfS (Matzembacher et al., 2020; Davies & Chambers, 2018), or analyzed how relational leadership addresses tensions in strategic sustainability (Kurucz et al., 2017). Laasch (2017) examined which value logics are combined in sustainable business models and which complementarities and tensions exist in the resulting heterogeneous value logic (e.g. between commercial vs. sustainable business model logics). Furthermore, with a focus on paradox theory, Stubbs (2019) analyzed the management of tensions in SBMI at an Australian BCorp, and van Bommel (2018) explored instrumental and integrative strategies to manage tensions in SBMI. For the purpose of our study, we will refer to the "paradoxical tensions"-literature and in particular to the organizational paradox framework of Smith and Lewis (2011).

METHODOLOGY

Research Design

We use a single case research design to explore the transformation from a conventional business model to a BMfS at sustainability champion VAUDE. According to Yin (2018) a single case study is well-suited when the case represents an extreme case. Furthermore, it is justified for exploring a significant phenomenon under rare or extreme circumstances (Eisenhardt & Graebner, 2007). This applies for the presented case company, especially under the light of the mentioned sustainability performance of VAUDE. To understand the organizational transformation process that moved VAUDE toward a BMfS, we integrate organizational level theory through determining VAUDE´s multi-level change initiatives as core unit of analysis and analyzing their impact regarding the dimensions of the organizational adaptive capacity framework of Zollo, Cennamo, & Neumann (2013). We consider this framework as suitable as it is intended to capture the corporate sustainability phenomenon in its entirety instead of leveraging only distinct spheres of knowledge that are focusing on specific sustainability issues (e.g. in supply chain management, integrated reporting, environmental management). The authors focus on change initiatives which they define as a "project or set of concerted actions undertaken to address and overcome a sustainability issue" (Zollo, Cennamo, & Neumann, 2013, p. 245). Considering the interplay between the organizational attributes (i.e. strategy making process, organizing processes, capabilities, relational quality) and the change initiatives is defined as the organizational adaptive capacity, which is considered key to the understanding how companies move towards sustainability. Furthermore, on individual level we aim to analyze VAUDE´s ability to manage paradoxical tension. To gather rich and multifaceted insights, as well as to increase the internal validity of the study (Gibbert, Ruigrok, & Wicki, 2008), we integrate multiple levels of analysis within the company. In general, we use Triangulation of data to ensure validity, which means to combine "data drawn from different sources and at different time, in different places or from different people" (Flick, 2004, p. 178).

Justification of the Research Setting

The case company VAUDE GmbH & Co. KG was chosen for three reasons. First, the company is seen as champion in their contribution to sustainable development among third parties. This can be seen among external auditing processes and the various prices and awards they received over the years.

Insert Table 1

Second, with the imagination to become Europa´s most sustainable brand, the company often took a pioneer role in integrating sustainability into its organizational practices. By doing so, instead of just reacting to external stakeholder requirements VAUDE shows their intrinsic motivation. Taking the pioneer role as argumentation to justify our case is in line with Roome and Louche (2016).

Insert Table 2

Third, the company has been engaging in profound organizational transformation toward a BMfS. Beginning with the handover of the company management of Albrecht von Dewitz to his daughter Antje von Dewitz in 2009, an extensive restructuring of the company's strategy, structure, and culture was initiated. After defining their new Vision of becoming Europa's most sustainable brand (Von Dewitz, 2020), the company has been constantly challenging their status quo and as consequence has been implementing a broad range of initiatives to improve their environmental and social performance. Currently the company aims to further reduce their climate emissions by committing to global climate neutrality. To achieve this, VAUDE has joined the Science-Based Targets initiative in 2019. Insights from this strategic transformation process toward sustainability are increasingly valuable for business organizations today as they have to effectively deal with socio-ecological systems disruption in their operating environment and are increasingly expected to effectively contribute to sustainable development by various stakeholder groups (Wunder, 2019). Furthermore, learning from these “outliers” is considered particularly valuable for research in strategy and business model innovation (e.g. Baliga, & Santalainen, 2016; Bocken et al., 2014; Büchel et al., 2013).

Data Collection

We develop the case based on primary and secondary sources to achieve data triangulation. Primary data collection is based on interviews with key personnel at different organizational levels as well as external stakeholders to develop a comprehensive understanding of the organizational transformation from various perspectives. We aim to conduct the interviews in two time-delayed rounds. The first round included 12 one-hour-interviews, 9 with internal VAUDE members and 3 with external partners. It was conducted in November 2020. The internal participants were chosen based on their organizational function and, thus, their thematical contribution to the study as well as how long they have remained with the company to cover the transformation process since 2009. The second round, conducted in March-May 2021, was intended to widen the external perspective thus included external actors from NGO´s, industry associations, suppliers, and political actors (i.e. Ministry of the Federal Government and a State Government Minister) but also focused on interviews with further internal members. In sum, the second round included 7 external stakeholders and 6 internal VAUDE members. The overall goal is to get a multifaceted view on the transformation process, outcomes, and tensions from various perspectives. Secondary data includes the company’s website, sustainability reports, and other publicly available data (e.g. press reports, book chapters) as well as internal management documents.

The data collection process was organized as follows. Based on the theory of Zollo, Cennamo, and Neumann (2013) and the insights from the organizational paradox literature, a case study protocol was developed. In the following we derived a semi-structured interview and orientation guide which we sent to the participants about 2 weeks prior to the interviews. This was done to provide background on our research study and create a shared understanding of the key concepts such as BMfS, sustainability initiative, and tensions in corporate sustainability. To further reduce potential biases in our interview, also with regard to the given preparation time, the interviews were conducted without referring directly to the questions sent out beforehand but in an open conversation mode. The interviews are recorded, with permission of the participants, to allow for qualitative content analysis.

Data Analysis

We use qualitative content analysis to examine the transcribed interviews. With the objective to develop an inductive, data-driven understanding of perceived tensions and the management of tensions at VAUDE, we begin with an open coding process of paraphrases that discussed either organizational dynamics, perceived tensions, and management practices that were applied to handle tensions. We use the theory of organizational adaptive capacity (Zollo, Cennamo, & Neumann, 2013) to understand the organizational dynamics of VAUDE that were crucial in handling perceived tensions. Within our analysis, we focus on both instrumental (e.g. win-win, trade-off) and integrative/paradoxical strategies (Hahn, Pinkse, Preuss, Figge, 2015; Van Bommel, 2019) to explain the management of perceived tension and we are also aware of situations in which no appropriate strategy could be applied. Following the methodology of Gioia et al. (2013), in the first step the text segments are abstracted using the informants' own words or expressions ("in-vivo"). Parallel to this, we aggregate thematically similar concepts or expressions that are described in the empirical data into a set of first-order codes. These codes still are closely connected to the empirical material. Overlapping with the first step, we start to compare the first-order codes regarding their theoretical connection and implication (Siltaloppi, Rajala, Hietala, 2020) and developed second-order codes. This second step therefore changes the focus from a descriptive to a more theoretically informed mode of analysis (Gioia et al., 2013). The final review loop will allow us to refine our coding structure and theoretically connect the tensions and management practices to the business model logic. To ensure reliability we develop a case study protocol and coding system (Mayring, 2015). To ensure the intracoder-reliability the process of categorization will be undertaken in time-delayed cycles. Further, a representative section of the data will be analyzed by two coders independently to ensure also the intercoder-reliability (Mayring, 2000).

Preliminary Observations and Explorations

We cannot provide solid preliminary results at this point in our still ongoing research project but would like to still highlight some observations and explorations:

- Extraordinary role of an organizational "culture of trust" and a corresponding delegation of decision authority to manage tensions.
- Ongoing leadership and employee development program based on self-efficacy to resolve tensions by creating a sense of democracy of opinions and decisions within the organization.

- As strong sense of "purpose" within the top management team seems to be a key driver to push the organization toward a sustainability performance that is far above average.
- Keeping the reputation as a "pioneer" along with potential first mover advantages (or avoidance of first mover disadvantages) seem to be a strong "business case" for sustainability.
- An interdisciplinary, cross-departmental "CSR team" is considered a key organizational element for resolving any tensions that arise from fulfilling the company's sustainability aspiration.
- Engagement with external stakeholders to create "systems impact" at the level of the industry and beyond.
- Influencing political decision-making process and public opinion through what can be labeled "corporate political activism".

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Appendix

TABLE 4: VAUDE RANKINGS AND AWARDS BY THIRD PARTIES*

Year	Rankings and Awards by Third Parties
2015	VAUDE is ranked as “Leader” by the Brand Performance Check of the Fair Wear Foundation for their outstanding social responsibility engagement the supply chain
2015	In 2015, VAUDE is nominated for the international “Boldness in Business Award 2015” as one of the top 6 companies worldwide in the category “Corporate Responsibility/Environment”
2015	VAUDE received the German Sustainability Award and thus is elated with being named “Germany´s Most Sustainable Brand”

2017	VAUDE received the European Business Award: Best in Class for Environmental and Corporate Sustainability
2018	VAUDE received the GreenTec Award, one of the world´s most important environmental awards, for its innovative, sustainable GreenShape Core Collection
2018	VAUDE is awarded the „Umweltpreis für Unternehmen 2018“ (Environment Prize for Companies 2018) by the Baden-Württemberg Ministry of the Environment for outstanding achievement in environmental protection activities within the company and for exemplary environment-oriented business management
2018	VAUDE achieved a high result in the external audit of the Economy of Common Good. With a balance sheet total of 631 points on a scale of -3600 to +1000 the company received the leader status. The following aspects were especially highlighted: - The corporate philosophy and positioning, which are strongly focused on sustainability. - Exemplary supplier management with strict ecological and social criteria and a review by external auditors, despite VAUDE’s lower level of market power. VAUDE achieved Leader Status. - Investments and ongoing expenditure in environmental improvements and other sustainability issues. - The established corporate culture, which is based on appreciation and openness and in which ecological issues are also firmly rooted. - Ongoing efforts in product development in order to cease dependency on harmful chemicals that to date have seemed unavoidable in the outdoor industry. - Assuming social responsibility through regional job creation, good cooperation with NGOs and the political engagement of the company.
2019	VAUDE achieved the first place in the nationwide ranking of sustainability reports and wins the best transparency award for sustainability. The independent ranking is supported by the Federal Ministry of Labor and Social Affairs (BMAS) and is carried out by the Institute for Ecological Economy Research (IÖW) and the business association “future – verantwortung unternehmen”.
2019	VAUDE receives the Brand Award, one of Germany´s most prestigious marketing honors, for 1st place in the category "Best Sustainability Strategy".

2019	Antje von Dewitz receives the international TRIGOS Prize of Honor, Austria´s most renowned award for responsible business management.

*Note: VAUDE company references have been excluded for the purpose of this proposal but will be captured in the final paper.

TABLE 5: VAUDE PIONEER ROLE*

Year	Pioneer Role
2008	As the first company in the outdoor industry, VAUDE introduced an environmental management system in accordance with EMAS (Environmental Management and Audit Scheme) and ISO 14001.
2014	VAUDE is a founding member of the "Bündnis für nachhaltige Textilien" (Alliance for Sustainable Textiles), which the Federal Government launched in 2014.
2015	As the first company in the outdoor industry, VAUDE published an audited Balance Sheet under the Economy of Common Goods concept.

*Note: VAUDE company references have been excluded for the purpose of this proposal but will be captured in the final paper.

Pushing the Boundaries: Exploring the Relationship between Organisational Demarcation Lines, Corporate Sustainability and Business Model Innovation

Esben Rahbek Gjerdrum Pedersen[1]*, Francesco Rosati[2], Else Skjold[3], Kirsti Reitan Andersen[1]

[1]Copenhagen Business School, Denmark; [2]Technical University of Denmark; [3]Danish Royal Academy of Fine Arts

* ergp.msc@cbs.dk

Abstract

The aim of this paper is to explore the relationship between organisational boundaries, corporate sustainability and business model innovation. So far, the literature has primarily addressed the boundary concept implicitly and/or in isolation (value, temporality, function, profession etc.). The paper contributes to the corporate sustainability literature by examining the connection between the multiple demarcation lines set by the organisation and the dominant approaches to corporate sustainability and sustainable business model innovation. The paper is based on insights from an online survey among 100+ Danish fashion companies.

Keywords

Organisational Boundaries, Corporate Sustainability, Business Model Innovation.

Making Sense of Circularity.

An institutional logic perspective on circular business model transitions in incumbent firms.

Lisa Heldt[1,*]

[1]IIIEE, Lund University;

*lisa.heldt@iiiee.lu.se

Abstract

Circular business models (CBMs) promise improved resource efficiency, value creation and retention. Still, CBM operationalization among large incumbents remains slow in practice. Yet, this plays a critical role in driving industry transformations towards sustainability. Prior research outlines challenges that incumbents encounter when operationalizing CBMs - yet remains fragmented and unable to explain where these tensions come from and how to effectively address them. This paper draws on institutional logics and paradox theory to explore underlying logic tensions as a potential explanatory factor and conceptualizes incumbents' transition to CBMs from an institutional logics perspective. It thereby aims to strengthen CBM research's theoretical grounding and provide a more systematic, actionable understanding of challenges faced by established firms. The findings delineate the competing institutional logics that incumbents need to accommodate when transitioning to circularity (established 'business logic' and emerging 'circular logic'). Relating this to the business model, the paper structures and explains CBM challenges as logic tensions with incumbents' established business model, structures and routines. Subsequently, organizational responses based on logic hybridization are derived and exemplified through illustrative cases. This paper suggests that considering the multiple logics that incumbents in transition to circularity face as a missing link between idea and action helps (A) rationalize incumbents' challenges with (and hesitation towards) CBM operationalization and (B) develop organizational responses for more effective CBM uptake. Further research is needed to empirically validate the conceptualized logics and test how the theorized relations to CBM challenges and corresponding management strategies hold true in practice.

Keywords

Business model; circularity; logic hybridization; incumbent firms; transformation

INTRODUCTION

Circular business models (CBM) are a type of sustainable business model focused on "closing, narrowing, slowing, intensifying, and dematerializing loops" (Geissdoerfer *et al.*, 2018:p.713), e.g. through rental or pay-per-use models (Bocken *et al.*, 2014). Interest in CBMs is increasing in research and practice. However, uptake among incumbent firms is lagging despite playing a critical role in driving industry transformation towards sustainability (Hockerts & Wüstenhagen, 2010). While research exists on how established firms manage complexity between business models (Snihur & Tarzijan, 2018) or inherent paradoxical tensions in corporate sustainability (Hahn *et al.*, 2018, 2015), it remains unclear how they navigate transition processes and emerging tensions when implementing CBMs in the context of their existing business, structures, and thinking. Simultaneously, calls to consolidate and strengthen sustainable and CBM research by grounding it in existing theory are growing (Foss & Saebi, 2018; Pieroni, McAloone & Pigosso, 2019; Lüdeke-Freund, 2020).

Business models for sustainability and circularity have been described as a "paradigm shift" (Lüdeke-Freund, Gold & Bocken, 2019:p.6), a "fundamentally new logic of doing business" (Schaltegger, Lüdeke-Freund & Hansen, 2016:p.270) and "change in the basic logic of value creation" (Rauter, Jonker & Baumgartner, 2017:p.146). Likewise, circular economy is discussed as an emerging paradigm (Geissdoerfer *et al.*, 2017) and institution (Stål & Corvellec, 2018). Still, research that explicitly explores CBM operationalization from an institutional logics perspective is missing, beyond few recent exceptions (Ranta, Keränen & Aarikka-Stenroos, 2020; Fehrer & Wieland, 2020; Stål & Corvellec, 2018). Institutional logics are implicit guiding principles (Friedland & Alford, 1991) that shape organizational behavior and decision making (DiMaggio & Powell, 1983), often referred to as the "rules of the game" (Thornton & Ocasio, 2012:p.112) that prescribe 'how we do things around here'. They represent socially constructed frames of thought that assign legitimacy to specific objectives (e.g. profit optimization, economic value creation), values and practices, and thereby help actors understand and navigate their social and organizational reality (Greenwood *et al.*, 2011; Besharov & Smith, 2014; Thornton & Ocasio, 2012).

For established companies, the process of going circular, thus, implies adopting a different logic than 'business as usual': This applies to product (or service or product-service-system) design, but extends further – changing the sales and marketing functions' relation to customers (more continuous, long-term), supply decisions (managing reverse logistics, remanufacturing or closed loops, rethinking supply planning) and accounting for circular assets. Essentially, CBMs entail a different understanding of legitimate goals (Optimization of profits but also resource efficiency and effectiveness; Value creation – what type of value & for whom, shareholders or stakeholders?) and legitimate means to reach these goals (e.g. servitization, sufficiency business models) that reflect a different underlying rationale – a different logic – than incumbents' current business. Yet, incumbents' established business model, structures and routines continue to co-exist with the new business model. While CBMs are not necessarily incompatible with conventional business logic – CBMs can be both resource effective and profitable – they add complexity and friction which can create conflict if left unmanaged.

This paper argues that incumbents' challenges with (and hesitation towards) CBM operationalization can be explained and rationalized when viewing the multiple institutional logics that incumbents in transition to circularity face as a missing link between idea and action. To conceptually develop this, the paper uses existing insights on conflicting logics from hybrid organizations (Besharov & Smith, 2014; Battilana *et al.*, 2015; Battilana & Dorado, 2010) and sustainable entrepreneurship research (York, Hargrave & Pacheco, 2016), and combines them with the related paradox theory (Smith & Lewis, 2011). Applied in corporate sustainability research (Byl & Slawinski, 2015; Hahn *et al.*, 2015, 2014), it focuses on "strategies that accept tensions and attend to different sustainability objectives simultaneously, even if they are conflicting" (Hahn *et al.*, 2018:p.237) and brings in an agency element for managing tensions, not explained by institutional logics. The research aim is to strengthen the theoretical foundation of CBMs by clarifying the role of underlying logics as a missing link to understanding CBMs' uptake and strategic management in incumbent firms.

The paper is structured as follows. First, it reviews research on business models for sustainability and circularity and their respective operationalization in industry to position this work in context. Next, the paper develops the theoretical basis, reviewing conflicting logics and tensions discussed in hybrid organizations, sustainable entrepreneurship and corporate sustainability literature. Third, the paper conceptualizes logic tensions encountered by incumbents when implementing CBMs: It applies paradox theory to categorize tensions and institutional logics to explain where tensions come from and how they are systematically connected. Based on this, the paper develops a conceptual model of incumbent responses. Illustrative cases are used to exemplify findings. Lastly, the conceptual work is discussed and conclusions for research and practice provided.

EXPECTED RESULTS

First, applying the institutional logics perspective, this paper differentiates and defines two distinct, potentially conflicting logics that occur in incumbents in transition to circularity. Logic tensions typically originate from different understandings of legitimate goals or legitimate means to achieve these prescribed goals. The logics are contrasted concerning primary goals (optimize profits vs. resource use), legitimate means of value creation (Sell goods vs. redesign-reduce-servitize-reuse-refurbish etc.) and legitimate ways of organizing (Hierarchical, top-down management & efficient coordination vs. Collaboration and interdependencies across departments & value chain).

Second, the paper theorizes how these underlying logic tensions play out on business model level and materialize as paradoxical tensions (Smith & Lewis, 2011)) in business model elements as clashes between old and new ways of working. This lens is then applied to systematically link and explain prior empirical findings concerning challenges faced by incumbents.

Third, after proposing logic tensions as the root cause of incumbents' struggles, the paper conceptualizes logic hybridization pathways and organizational responses to paradoxical tensions. Essentially, incumbents in transition to circularity need to accommodate elements from both (established commercial and emerging circular) institutional logics. Specifically, two, tiered pathways are discerned in a 2x2-matrix: (A) incumbents who first hybridize logics across BM elements within distinct business divisions and, subsequently, roll this out across the organization (linked to business model experimentation, intrapreneurship, corporate venturing, acquisitions etc.). Alternatively, (linked to incremental innovation, strategic change, framing circularity as 'good business'), (B) incumbents first hybridize business and circular logics across divisions with focus on single element and, subsequently, broaden the scope across the business model.

PRELIMINARY CONTRIBUTIONS AND IMPLICATIONS

The intended contributions are threefold: First, the article strengthens the theoretical grounding of CBM research by applying institutional logics to organize and explain challenges faced by incumbent firms when operationalizing CBMs. Second, it develops a conceptual framework of organizational responses to logic tensions. Third, it provides a basis for further research and theory building across CBM and organization research.

Research is needed to empirically test, challenge and further develop the framework and defined relations based on organizational behavior found in practice. Further research could expand on organizational responses and develop corresponding management strategies to better understand active agency in hybridization processes, e.g., by further developing the connection to paradox theory. Research on business model experimentation offers a promising direction for understanding corporate venturing and intrapreneurship pathways towards logic hybridization and business model transition. Further research is needed to understand the second pathway and role of organizational change and strategic management in enabling and executing the transition towards circularity.

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Decarbonizing The Business Model.

Transition Barriers For Global Manufacturing Companies.

Nele Van Campfort[1], Federica Balestrucci[2], Jennie Åkesso[2], Gustavo Garcia Botero[3] ,Koteshwar Chirumalla[2]

[1]Volvo Construction Equipment[1]; Mälardalen University[2]; Vrije Universiteit Brussel[3]

*nele.van.campfort@volvo.com

Extended abstract

Efforts for decarbonization of the global economy as stipulated in the UN Paris Agreement have gained momentum in 2020 despite the ongoing Covid19 health crisis: Progressive legislative initiatives such as the European Green Deal was voted and adopted on a supranational level. Moreover, a growing number of national, regional and local legislative initiatives are addressing climate change. A leading example is the "Carbon Neutral Cities Initiative" (CNCA) that brings a growing number of cities across the world together to set ambitious sustainable procurement standards. In addition, renewable energy prices have dropped steadily (Taylor, Ralon & IIas, 2016), consumers preferences are shifting towards greener products (Zhang & Dong, 2020; Mostaghel & Chirumalla, 2021), and capital markets are increasingly divesting from fossil-related industries (Norrestad, 2020).

In the industry ecosystems of global manufacturing companies, the need for decarbonization translates into a need to transition from a linear to a circular economy implying a complete overhaul of a manufacturer's supply chain (Parida et al.). This includes a transition from traditional 'linear' business models to circular business models, for instance through the adoption of Equipment-as-a-Service (EaaS) Business Models, through financial-related solutions, and through the sales of a combination of software and services. In essence, the global manufacturing firm's business model should shift away from the question of "*how to produce more products while reducing cost?*" towards the question "*how to increase revenues while producing less products considering environmental aspects?*".

The rise of digitalization and new digital technologies such as connectivity, the Internet of Things (IOT) and AI have been major enablers for the emergence of service-oriented digitally-based business model innovation (Paiola & Gebauer, 2020; Rachinger et al., 2018). For example, the remote monitoring of equipment allows manufacturers to access relevant data such as equipment location, equipment utilization, equipment misuse and drivers' behavioral patterns. Access to these data allows for scalability and risk reduction in the implementation of circular business models that charge customers on hourly or daily use rates instead of charging a one-off payment for an equipment purchase. Such use- or outcome-based business models are beneficial for customers because it improves their cash flow position, it removes the risk of investing in an on-balance asset, and it reduces their exposure in downward economic cycles. Moreover, for manufacturers circular business models are also beneficial because they generate recurring income streams, they ensure a continuous relation with the end-customer allowing for additional sales of software and services, and they can protect manufacturers when profit margins from equipment sales decrease due to market fluctuations or increased competition.

If the benefits of use- and outcome-based business models are mutually beneficial for manufacturing firms and for customers, then the question should be asked why global manufacturing companies are generally slow in the adoption of such models. What is more, under classic economic theory in which economic actors have full access to information and are entirely driven by rational decision-making, circular business models should long have been common practice. This observation leads to the hypothesis that different transition barriers are at play that prevent global manufacturing firms from successfully transitioning from traditional business models to circular business models.

Scientific literature regarding such tradition barriers has grown steadily in recent years (Vermunt et al, 2019). Nonetheless, there is a need for further scrutiny of transition barriers that are specific to global manufacturing firms. For example, research on the behavioral transition barriers in the strategic decision-making process at global manufacturing firms, such as different types of biases or incentive misalignment, is still limited. Another example is the need for further research on legacy barriers that are specific to global manufacturing firm's transition to use-and outcome-based business models, such as previous strategic decisions, previous experiences, system landscapes and employee's skill-sets. Moreover, limited research exists on mitigation mechanisms that global manufacturing firms can apply to successfully address transition barriers.

Consequently, the purpose of this paper is to propose a typology of barriers of global manufacturing companies that are most influencing the transition from traditional business models to circular business models. The analysis shows 5 types of transition barriers for global manufacturing companies. They include:

1) behavioral barriers
2) Legacy barriers
3) Ecosystem barriers

4) Financial barriers
5) Organizational barriers

Following the detailed description of these transition barriers deducted from the experiential evidence, the paper will present guidelines to support the strategic decision-making process of global manufacturing companies in light of their transition to circular business models.

The applied method is a two-step qualitative analysis: First, data collection through 20 semi-structured interviews and exchanges was performed with people from several functions who have different roles in the organisational hierarchy of a global manufacturing company. Second, a qualitative analysis of the company's Key Performance Indicators (KPIs), organizational structures and incentive mechanisms was performed.

The paper concludes with suggesting further research in the following three areas:

1) the proposed typology of transition barriers of global manufacturing companies, 2) the mitigation strategies that can be adopted by global manufacturing companies that wish to accelerate their transition to circular business models, 3) Policy instruments that can address global manufacturing company's transition barriers.

The three identified areas of suggested further research will contribute to the acceleration of the decarbonization of the global economy and the transition from a linear to a circular economy through the adoption of circular business models by global manufacturing companies.

Keywords

circular business models, decarbonization, global manufacturing firms, transition barriers

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Track 2.2.

Design Thinking, Actor Engagement, and Legitimation in the Context of Circular Business Model Innovation

Track 2.2. Systemic design, Actor Engagement, and Legitimation in the Context of Circular Business Model Innovation

Track chairs: Francesca Ostuzzi[1], Katrien Verleye, Fatima Khitous[2]
[1]Universiteit Gent, Belgium; [2]University of Oulu, Finland

Researchers and practitioners increasingly acknowledge that circular business model innovation is not a linear step-by-step process, but rather a complex iterative process where value is co-created by diverse and spatially dispersed actors (Fehrer and Wieland 2020, Upward and Jones, 2015). Building on Kurt Lewin's statement that there is nothing so practical as a good theory, this track aims to explore how the concepts of design thinking, actor engagement, and legitimation advance business model innovation in the context of a circular economy.

Viewing the business model as system, instead of a sum of different parts that can be explored and designed singularly, there have been a call for further developments on implementing design, systemic design and systems-thinking approaches to business model innovation processes, frameworks and tools (Fehrer and Wieland 2020, Bryant et al. 2020). Furthermore, business model innovation, conceptualized as a socio-political process for gaining acceptance rather than a rational choice (Bunduchi 2017, Verleye et al. 2019), puts the focus on a better understanding of actor engagement (e.g. Vijverman et al. 2019) and legitimation (e.g., Koskela-Huotari et al. 2016, Fehrer and Wieland, 2020).

To explore the connections among design thinking, actor engagement, and legitimation in the context of the circular economy, this track welcomes scholars from different disciplines and fields whose research relates to the following topics:

- What systemic design practices contribute to the transition towards circular business models?
- How does systemic design affect actor engagement with circular business models?
- Which tools, heuristics, methods typical of systemic design can support the implementation of circular business models?
- How to engage all actors with circular business models or circular business model innovation?
- How to foster institutions that encourage/ facilitate actors' engagement with circular business models?
- What strategies can actors use to legitimize circular business models?
- How has the legitimation of circular business models changed over time?

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Towards a novel ideation tool for circular business model innovation

Jean Mansuy[1,*], Philippe Lebeau[1], Cathy Macharis[1]

[1]Vrije Universiteit Brussel, Business Technology and Operations department

* Jean.Mansuy@vub.be

Abstract

While existing tools can help in identifying circular value opportunities, tools supporting the generation of solutions to transform those value opportunities into value propositions are missing. This paper aims to identify the characteristics such tools should display by using a literature review complemented by semi-structured interviews. Based on these results, we propose a new tool for circular business model ideation.

Keywords

Business model innovation, idea generation, circular economy, stakeholders

INTRODUCTION

The current economic system is associated with growing environmental issues (e.g. climate change (Mardani *et al.*, 2019)). To counter such undesired side effects, companies, as key economic actors, are urged to adopt sustainable business models (Stubbs and Cocklin, 2008). Sustainable business models (SBMs) are *"business models that incorporate pro-active multi-stakeholder management, the creation of monetary and non-monetary value for a broad range of stakeholders, and hold a long-term perspective."* (Geissdoerfer, Vladimirova and Evans, 2018).

Among the different types of SBMs (Ritala *et al.*, 2018), circular business models (CBMs) are expected to provide environmental value by creating value from waste (Bocken *et al.*, 2014), thereby improving resource efficiency. Two main strategies enable environmental value creation by CBMs: "slowing the loop", i.e. extending product lifetime, and "closing the loop", i.e. ensuring that value is recovered at the product's end of life (Bocken *et al.*, 2016; Nußholz, 2017). A third strategy, "narrow the loop", can be added to the two previous ones. This strategy, which aims at reducing material throughput entering production processes, is not circular per se, and will not be considered as such in the present work.

Implementing a CBM requires the development of a business model innovation (BMI) process. In contrast with business model development (Schneider and Spieth, 2013), BMI involves changes to business model elements or their interactions that are designed, novel and nontrivial (Foss and Saebi, 2016). BMI can be performed within or outside corporate boundaries, and can directly address the core business of a company or rather introduce a new business (Geissdoerfer *et al.*, 2020). The current research mostly focuses on CBM diversification, i.e. BMI that is both internal to corporate boundaries and focuses on the creation of a new business.

Different BMI processes have been proposed in the literature (Wirtz and Daiser, 2018). One common step to all BMI processes is ideation (or idea generation). In the business model context, ideation is concerned with the transformation of opportunities into novel and useful business model ideas (Frankenberger *et al.*, 2013).

A tool commonly used for identifying sustainable value opportunities is the Value Mapping Tool (Bocken *et al.*, 2013; Geissdoerfer, Bocken and Hultink, 2016). This tool identifies the value that has not been captured, as well as value opportunities related to this value uncaptured. Yang *et al.* (2017) suggest four types of value uncaptured: value surplus (that exists but is not required), value absence (that does not exist but is required), value missed (that exists, is required, but not exploited), and value destroyed (that has negative consequences). We argue that CBMs, which focus on waste, i.e. on value that exists, are only concerned with value missed; as mentioned earlier, value surplus can be related to the "narrow the loop" strategy, which is not circular per se.

The transformation of identified value opportunities into value propositions ideas is a necessary endeavor in designing any business model. Yet, most tools identified by Pieroni, McAloone and Pigosso (2019) for *"sensing"* sustainable or circular value opportunities focus on *"identifying opportunities"* rather than *"generating new BM ideas"*. In the same vein, no tool identified by Bocken *et al.* (2019) provides support for transforming circular opportunities onto CBM ideas. Existing tools supporting the generation of CBM ideas, such as the Circularity Deck (Konietzko, Bocken and Hultink, 2020a) or Circulator (https://www.circulator.eu/), are mostly inspirational. They help in finding ideas based on what currently exists, but do not guarantee these ideas to be aligned with existing value opportunities.

This calls for the development of tools supporting the generation of circular value propositions from existing value opportunities. The current research aims at summarizing the characteristics that such tools should display. After introducing the method used to identify such characteristics, and following the definition of these characteristics, we further propose a CBM ideation tool.

METHODOLOGY

We reviewed the literature on sustainable and circular BMI to identify relevant approaches for building CBM ideation supporting tools. We complemented this literature review with semi-structured interviews with executives from 11 circular companies (i.e. operating activities reusing, or facilitating reuse of, materials, parts, or products). We selected companies of different sizes and involved in different sectors (mining, manufacturing, electricity production, waste management, construction, retail, telecommunication, finance and culture). Interviews focused on barriers companies faced in innovating their business models and on what they would need (or have needed) to further implement CBMs. The scope of these interviews was not restricted to the ideation stage but the whole BMI process. This dual approach enabled us to verify whether approaches suggested in the literature meet companies' needs and to further consider companies' constraints.

Characteristics of circular business model ideation tools

The literature on SBMs gives great importance to stakeholders (Evans *et al.*, 2017). Stakeholders have been increasingly considered in the front-end of eco-innovation, including in ideation (Tyl *et al.*, 2015). Most initiatives involve stakeholders indirectly. Thereby, they consider value created for stakeholders, but not with stakeholders (Freudenreich, Lüdeke-Freund and Schaltegger, 2020). A value co-creation approach would enable to increase stakeholder commitment (Frow *et al.*, 2015).

Value co-creation involves risks (Chowdhury, Gruber and Zolkiewski, 2016), for example of conflicts regarding how value captured should be shared across the value network. Existing tools address collaboration after a value proposition is identified (Brown *et al.*, 2021). Yet, alignment between value creation and value capture is already needed when defining a value proposition (Sjödin *et al.*, 2020). This calls for a co-ideation process (Russo-Spena and Mele, 2012).

Proposition 1: *A CBM ideation tool should engage stakeholders and embrace a co-ideation perspective.*

There is a large consensus on the need for CBMs to take a systemic perspective rather than an organization-centric one (Geissdoerfer *et al.*, 2020). While SBMs originally focused on value networks (Evans *et al.*, 2017), recent contributions suggest considering a broader ecosystem perspective (Konietzko, Bocken and Hultink, 2020b).

Proposition 2: *A CBM ideation tool should take a systemic perspective by considering actors involved in a value network or an innovation ecosystem.*

Stakeholder engagement and systemic perspectives span organizational boundaries. Boundary objects are needed to create a common language between the different parties involved (Velter *et al.*, 2020). A commonly used boundary object in BMI is the Business Model Canvas (Osterwalder and Pigneur, 2010). Adaptations of this Business Model Canvas have been proposed for CBMs (e.g. Lewandowski, 2016; Nußholz, 2018). Yet, such graphic organizers are not optimal for ideation (Täuscher and Abdelkafi, 2017).

Proposition 3: *A CBM ideation tool should include boundary objects to support ideation and facilitate communication among stakeholders.*

A large consensus has also been reached on the need to extend design thinking (Brown, 2008) to CBM design (Geissdoerfer, Bocken and Hultink, 2016; Guldmann, Bocken and Brezet, 2019). This implies embracing a user-centered mindset.

Proposition 4: *A CBM ideation tool should incorporate a design thinking approach and be user-centered.*

The previous propositions are valid for all SBM innovation tools. Yet, CBMs present additional requirement. First, and as already discussed in the introduction, circular business models are concerned with value missed.

Proposition 5: *A CBM ideation tool should focus on capturing value missed.*

In addition, circular alternatives are prioritized using waste hierarchies (or R strategies) (Kirchherr, Reike and Hekkert, 2017; Reike, Vermeulen and Witjes, 2018). The widely used 3R strategy prioritizes recovery processes in the following order: reduce, reuse, recycle. In Bocken *et al.* (2016) CBM strategies, "narrow the loop" is associated with reduce, "slow the loop" with reuse, and "close the loop" with recycle. Hence, removing value surplus (the focus of "narrow the loop") should be prioritized over the valuation of value missed.

Proposition 6: *Attempts to remove or reduce value surplus should precede CBM ideation.*

A hierarchy of recovery processes can be used to roughly estimate the environmental impact of CBMs. However, it involves a value judgment, which should be deferred to avoid any negative impact on the ideation process (Basadur, Runco and Vegaxy, 2000). Hence, it should be considered only after idea generation, when evaluating and selecting ideas.

Proposition 7: *A waste hierarchy should drive CBM idea evaluation and selection.*

During our interviews, we identified barriers related to the BMI process itself (and not to CBM (expected) outcomes). Several such barriers are reported in the literature (e.g. in Govindan and Hasanagic (2018), Kirchherr *et al.* (2018), or Vermunt *et al.* (2019)) but are never distinguished from outcome-related ones. Process-related barriers mostly concern three activities: identification, development, and evaluation of CBM ideas. Barriers related to the identification of circular value propositions often relate to the requirement for "out of the box" thinking to find alternate functions to co-products or end-of-life products.

Proposition 8: *A CBM ideation tool should facilitate alternate use thinking.*

The complexity of thinking "out of the box" can be linked with silo mentality and can be partly overcome by involving a multi-disciplinary team (which is aligned with design thinking principles).

Proposition 9: *A CBM ideation tool should integrate a multi-disciplinary approach.*

Process-related barriers can be explained by a lack of resources hampering the ability of companies to conduct a BMI process. For example, many companies do not have sufficient knowledge of the circular economy concept internally or within their value chain (Rizos *et al.*, 2016; Guldmann and Huulgaard, 2020).

Proposition 10: *A CBM ideation tool should be easy to use, even without previous knowledge of the circular economy concept.*

SMEs also cannot hire employees to manage BMI activities. To be inclusive, any CBM innovation tool must account for the limited human resources many companies can dedicate to BMI activities.

Proposition 11: *CBM ideation should require a limited time investment.*

In addition to the preceding propositions, a CBM ideation tool, as any other CBM innovation tool, should meet the quality criteria suggested by Bocken *et al.* (2019).

Introducing a circular business model ideation tool

Following the previous development, we suggest a CBM ideation tool centered around a focal value proposition and the value network involved in its creation. The tool consists of a workshop gathering value network partners, and is presented in Figure 4. To support inter- and intra-organizational collaboration (as suggested by Guldmann, Bocken and Brezet (2019)), involved actors can include different business units from the same company.

Before the workshop (Step 0), each participating organization can identify waste streams it produces and prioritize among them. Criteria used to prioritize (e.g. weight produced, management cost, health hazards, etc.) should be aligned with organizational objectives. The organization can further try to evaluate whether some waste streams can be avoided or reduced (i.e. can be considered as value surplus rather than value missed). This step corresponds to the identification of circular opportunities.

At the beginning of the workshop (Step 1), each participating organization selects one or several of its waste streams, and selected waste streams are pooled. Then, two activities are conducted.

The first activity (Step 2) is a “waste speed dating” and uses a nominal group technique (Van de Ven and Delbecq, 1974; Girotra, Terwiesch and Ulrich, 2010). First, each participant thinks individually about how it can reuse waste (products, parts or materials) of other participants. Then, participants are paired and discuss potential solutions to value each other’s waste. This pairing exercise is reproduced until all participants have met each other.

The second activity (Step 3) is a “waste matchmaking” and uses a brainwriting technique (Paulus and Yang, 2000). In this activity, all participants are asked to suggest combinations of a value proposition and a customer segment outside the value network. Random suggestions of industries can be used as prompts.

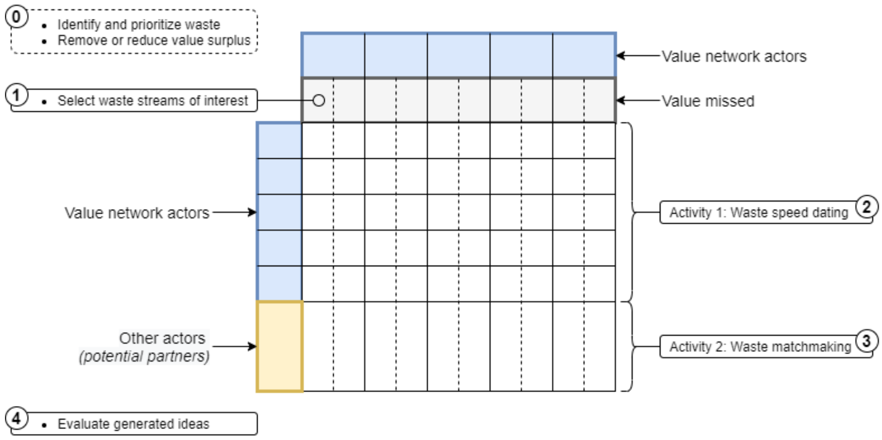

FIGURE 4: STEPS OF THE CIRCULAR BUSINESS MODEL IDEATION WORKSHOP AND ASSOCIATED CIRCULAR IDEATION ARTEFACT

Ideas generated during the workshop are classified using an artefact serving as a boundary object (Figure 4 and Figure 5). The workshop ends with a qualitative evaluation process (Step 4) where participants place post-its on the most novel and useful ideas. A criterion related to the type of operations required to recover value can be added to the previous two criteria. Each organization is associated with a color or a number for participants to see whether potential partners share their interest in an idea.

	Farmer	**Manufacturer**			**Retailer**			**Consumer**	
	Rejected potatoes	**Potatoes peelings**	**Used cooking oil**	**Water + Starch**	**Pallets**	**Cardboards**	**Plastic foil**	**Plastic packaging**	**Used cooking oil**
Farmer	Lifestock feed Fertilizer Compost New potatoes				Direct reuse	Mat to store potatoes	Farming tools Wrap butter		
Manufacturer		Chips		New packaging		Direct reuse		Reusable packaging	
Retailer				Startch-based filling material				Collect when delivering	Collect when delivering
Consumer	Sale as fresh potatoes					Direct reuse			
Other actors	Give *(food banks)* Starch *(various sectors)* Livestock feed *(other farmers)* Fertilizer *(other farmers)*		Biodiesel *(consumers; farmers)* Soap *(consumers)*	New packaging *(manufacturers)*	Furniture *(consumers)*	Direct reuse *(LSPs)*		Sculptures *(consumers; municipalities)* Raw plastic *(packaging manufacturers)*	Diodiesel *(consumers; farmers)* Soap *(consumers)*

FIGURE 5: EXAMPLE OF THE CIRCULAR IDEATION ARTEFACT FILLED WITH IDEAS FROM A WORKSHOP ON A FROZEN FRIES VALUE CHAIN

DISCUSSION AND CONCLUSION

The tool enables the co-creation of circular value propositions, particularly during the “waste speed dating”. Generated value propositions can be seen as complementors to the focal one, inducing an extension of the innovation ecosystem. In addition, the tool is user-centered, in that each value proposition is designed with a customer segment in mind.

The proposed tool meets all quality criteria for CBM innovation tools suggested by Bocken *et al.* (2019), except for those related to validation. It can be applied in any type of industry and to any network of organizations interested in creating value out of waste (for example in industrial symbiosis projects such as eco-industrial parks). While most existing matching tools only assess the direct valuation of waste by other members of a network (Yeo *et al.*, 2019), our tool enables the identification of solutions for indirect valuation.

This tool presents several limitations. It can only manage a limited number of actors, the "waste speed dating" requiring reproduction of paired brainstorming sessions. It also works best with a limited sample of waste streams, as increasing the number of waste streams considered complexifies the visualization provided by the artefact and requires increasing the time to conduct the workshop.

Transforming circular opportunities into successful business models is a complex and uncertain process. Tools are needed to support companies in such an undertaking. The 11 characteristics for CBM ideation tools identified in this paper can support the development of such tools by researchers. The suggested workshop concept, and the related artefact, can be used by practitioners to generate solutions to capture value missed within a value network.

The present work has several limitations. First, not all interviewed actors have been directly involved in CBM ideation exercises, the scope of our interviews being broader than ideation. Solely ideation-centered interviews might lead to additional characteristics. Secondly, our results cannot provide the relative importance of the identified process-related barriers.

Further research is required to test and refine the proposed CBM ideation tool. We suggest implementing a first testing phase using classroom experiments. Such a method offers educational benefits in addition to validation outcomes (Hoveskog, Halila and Danilovic, 2015). It can also allow hypothesis testing using control groups, which is hardly feasible with companies. A role play setting was pre-tested by the authors and was positively received by students. The tool refined with students should further be tested with real business cases. This second testing phase would allow validating the alignment of the tool's design with the issues encountered by companies.

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Embedding Circular Economy and Business Model Innovation into Design Thinking

Development and insights from a serie of online workshops

Tomas Santa-Maria[1,*], Walter J.V. Vermeulen[2], Rupert J. Baumgartner[1,3]

[1]University of Graz, Institute of System Sciences, Innovation and Sustainability Research, Merangasse 18/I, 8010 Graz, Austria; [2]Utrecht University, Copernicus Institute of Sustainable Development, Princetonlaan 8a, 3584 CB Utrecht, The Netherlands; [3]University of Graz, Christian-Doppler-Laboratory for Sustainable Product Management enabling a Circular Economy, Merangasse 18/I, 8010 Graz, Austria

*E-mail of corresponding author: tomas.santamaria@uni-graz.at

INTRODUCTION

The Circular Economy (CE) is commonly promoted as a contributor to Sustainable Development (Schroeder, Anggraeni and Weber, 2019), however, the implementation of Circular Business Models (CBM) in the market has been low (Bocken, Ritala and Huotari, 2017), due in part to the complexity of operationalizing CE-based ideas and the lack of guidelines for firms. Design Thinking (DT) has been identified as an innovative problem-solving approach, capable of addressing complex challenges through multidisciplinary collaboration (Brown, 2008; Carlgren, Rauth and Elmquist, 2016), such as CBM development. Today's business environment is in constant change, where Business Model Innovation (BMI) has become a key source of competitive advantage (Verma and Bashir, 2017) -even a survival capability (Breier et al., 2021)-, and time management is staged at the core of innovation's success (Eisenhardt and Brown, 1998). Furthermore, the COVID-19 pandemic has accelerated organizations digital transformation, pushing them to develop virtual collaboration capabilities (Kudyba, 2020). Accordingly, the present research aims to explore the application of DT to guide a time-efficient early-stage development of CBMs in an online collaboration context. A bespoke three-day workshop and its respective tools have been developed and tested. Strengths and limitations are discussed.

BACKGROUND

DT is a problem-solving approach that "uses designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity" (Brown, 2008, p. 2). DT is characterized by phases of *understanding, ideating* and *testing*, each underpinned by alternative activities that stimulate divergent and convergent thinking (Liedtka, 2015).

Circular Business Model Innovation (CBMI) can be understood as a subtype of Sustainable Business Model Innovation (SBMI) (Guldmann and Huulgaard, 2019), defined as "innovating the business model (BM) (i.e., updating the elements of an existing BM, or establishing a new organization and associated BM) to embed, implement and capitalize on CE practices" (Bocken *et al.*, 2019, p. 3).

Even though applying DT has been found suitable for SBMI processes (Lehmann *et al.*, 2015; Geissdoerfer, Bocken and Hultink, 2016; Baldassarre *et al.*, 2017; He and Ortiz, 2021), DT does not incorporate sustainability concerns unless the user chooses to do so (Garcia and Dacko, 2016; Shapira, Ketchie and Nehe, 2017). Furthermore, both Buhl et al. (2019) and Kagan et al. (2020) discuss how and why DT can foster sustainability-oriented innovation, offering propositions for process improvement.

Additional attempts to integrate DT with CBMI or SBMI can be found in the academic literature, most interestingly Guldmann et al. (2019) *DT framework for CBMI*, which proposes to modify the customer-centric DT focus to a systemic perspective, and adds introduction and realignment spaces in the process; and Shapira et al. (2017) *Integrated sustainable DT process*, which considers 20 add-ins to a conventional DT process. However, their research is described as explorative, encouraging future refinements.

The here proposed framework distinguishes by purposefully considering the following: (i) embedding sustainability and circularity; (ii) addressing the whole DT cycle; (iii) aiming for outputs at the BM level -beyond product/service-; (iv) considering manager's time-constraints; and (v) adapting to an online collaboration context.

METHOD

The framework was developed by iterative phases of literature review, expert practitioner feedback, academic discussion and an action research phase for testing and refinement. The basic structure for which modifications started was a combination of conventional DT frameworks (Liedtka, 2015) and the Design Sprint process (Knapp *et al.*, 2016), which were complemented with selected best practices and tools from BMI (Heikkilä *et al.*, 2016) and SBMI/CBMI literature (Pieroni, McAloone and Pigosso, 2019). The adapted process and tools have been tested and refined in six different scenarios, employing different activity combinations and involving 107 participants. Workshops were conducted as part of the CRESTING[11] project and participants invited via the GreenTechCluster[12]. This includes an internal three-hour pilot test with seven academics, a six-hour workshop with 39 stakeholders from a CRESTING event (working in five parallel groups), two three-hour workshops with master level students (29 and 20 students, working in four and three parallel groups respectively), three half-day workshops with four members of a start-up and three half-day workshops with eight members of a corporate multistakeholder innovation project. Data was collected in the format of feedback surveys, workshop output documentation and researcher/facilitator notes. A thematic analysis of qualitative data was performed and categorical data from closed-ended survey questions were quantitatively analyzed, allowing to refine the framework and its effectiveness.

The final framework proposed, named *Circular Sprint* -or Design Thinking Sprint for Circular Business Model Innovation-, consists of a pre-workshop problem framing session, complemented with background research activities, followed by a CE introduction session and twelve consecutive online exercises, moving through seven distinctive DT phases i.e. inspire, understand, define, ideate, decide, prototype and test (Figure 1). The core workshop is performed in three half-days, and all activities are supported by the online visual collaboration platform Miro[13]

DISCUSSION OF PRELIMINARY RESULTS

Data collected indicates the adapted DT process was effective in achieving workshops goals, thus co-creating a common understanding of an issue from a life cycle perspective, allowing to ideate possible solutions in a constrained time, facilitating the decision-making process, stimulating reflection on sustainability impacts and supporting the design -and future validation- of a novel CBM. However, workshop outcomes must be considered as early-steps in the development of a desirable, feasible, viable and sustainable CBM.

[11] https://cresting.hull.ac.uk/

[12] https://www.greentech.at/

[13] https://miro.com/

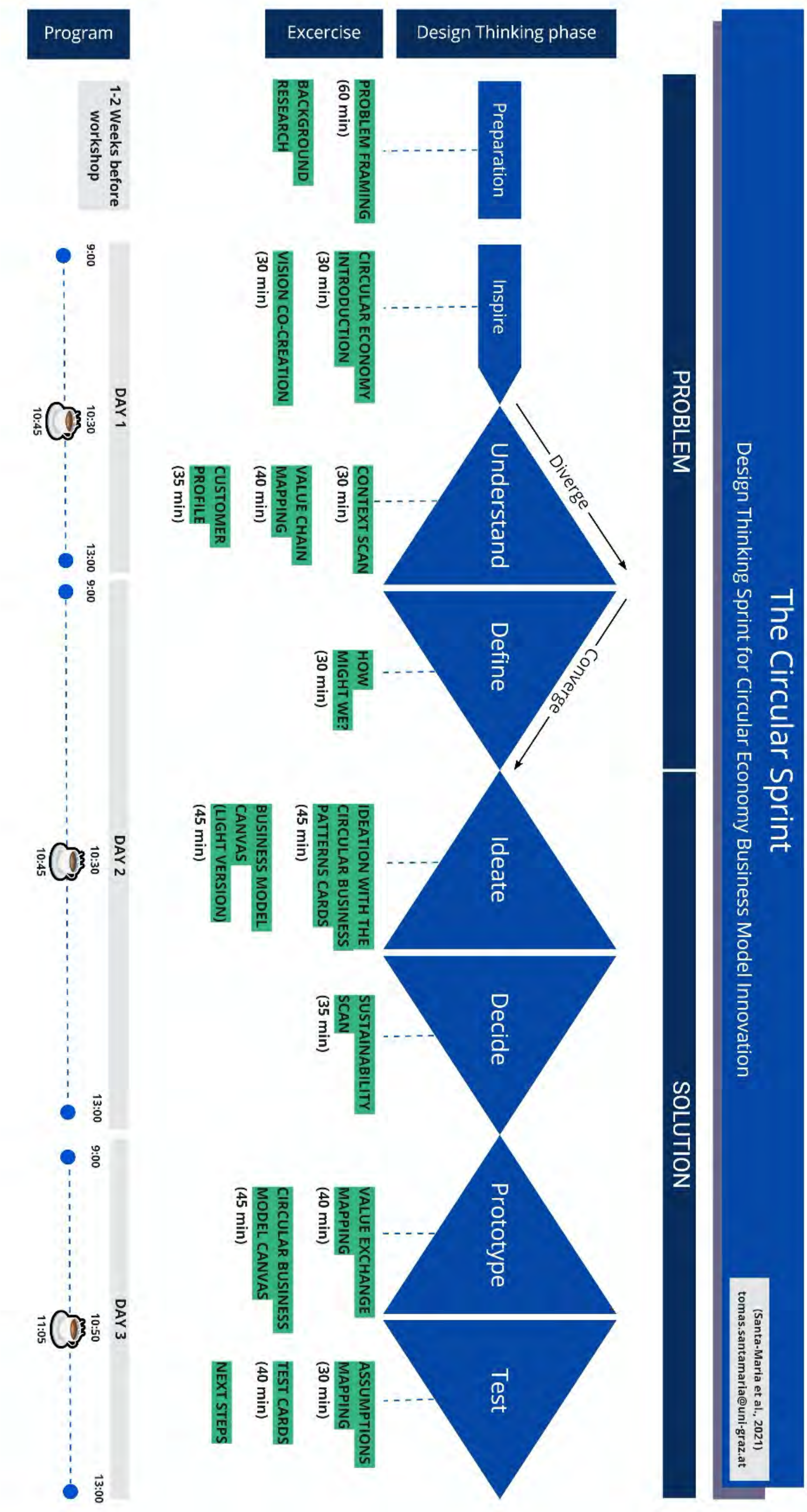

FIGURE 6: OVERVIEW OF THE "CIRCULAR SPRINT" STRUCTURE AND ACTIVITIES IN RELATION TO DESIGN THINKING PHASES

Embedding sustainability and circularity throughout a DT process has proven to be a plausible though challenging aspect. Expert facilitation to break *business-as-usual* thinking and participants profile affected both the level of sustainability/circularity and the feasibility/viability of winning ideas, for example, the academic consortium developed several highly sustainable and ambitious proposal, while the corporate project ideas were focused on higher feasibility and viability. The start-up winning ideas were arguably the more balanced ones between sustainability ambitions and desirability/feasibility/viability, probably related to the diversity of participants profile and their high level of engagement. In particular, moving from a customer-centric focus to a systemic perspective (Guldmann, Bocken and Brezet, 2019) (e.g. by doing a value chain map instead of a customer journey map) supported the goal of embedding sustainability.

Sustainability could be considered as an additional constrain, however, if approached as an opportunity, sustainability can drive innovation by opening up the idea space -during divergent thinking phases-, before sustainability aspects can filter proposed solutions -during convergent thinking phases- (Thompson, Larsson and Broman, 2011; Shapira, Ketchie and Nehe, 2017).

Aiming for outputs at the BM level also proved to be challenging, as DT processes are traditionally more appropriate for product/service innovations (Kagan *et al.*, 2020). “Thinking in BM” does not come naturally to most participants profiles and pushing for it narrows down ideation potential. However, employing a light version of the business model canvas (Gassmann, Frankenberger and Csik, 2014) and a value exchange mapping activity (Pynnonen, Hallikas and Savolainen, 2008), before a full (circular) business model canvas (Osterwalder and Pigneur, 2010; Mentink, 2014) seems to have supported this goal.

Results also suggest the online collaboration format was positive for effective time management and homogenous contribution from participants, though limiting engagement. Individual silent brainstorming, idea clustering and note-and-vote techniques (Knapp *et al.*, 2016; Lewrick, Link and Leifer, 2018), combined with the use of an online timer were particularly useful to deal with challenges of the online context.

CONCLUSION

This research contributes to the integration of design research with sustainability-oriented innovation (Buhl *et al.*, 2019) and with BMI -and emerging SBMI/CBMI- fields, by exploring the needed adaptations of DT to embed sustainability/circularity and aim for outputs at the BM level. It also provides practitioners with an actionable framework to support the complex CBMI process in an online and time-constrained format. However, this research is limited in its generalizability by its limited number of iterations and its explorative nature. Further refinements of the framework and its tools is considered.

Acknowledgements

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Keywords

Circular Economy, Business Model Innovation, Design Thinking, Online workshop, Sustainable Business Model

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Re-Modelling Fashion through Scenario Planning

Conceptual scenarios informing design practices and business models for circularity and sustainability

Laetitia Forst[1*], Doroteya Vladimirova[2], Dilys Williams[1], Stephen Evans [2],

[1]University of the Arts London, [2] University of Cambridge

*l.forst@arts.ac.uk

Abstract

This research explores methodologies for transformation design as a means to extend the value of fashion encompassing social, economic, environmental and cultural dimension. This is realised through ideation, design and business model development for fashion products, services and systems. Foresight and scenario planning are proposed as valuable tools for for imagining models that are relevant in a contemporary context. The initial results of the study presented here is based on a broad review of literature and practice exemplifying plausible trajectories for fashion. This review identified four critical uncertainties as key to co-creating the future of fashion. Using Schwartz's (1991) scenario planning matrix approach, we construct eight scenarios based on these themes. In turn, these scenarios will be used as tools in collaborative workshops involving a range of stakeholders in the field of fashion to imagine and prototype concepts for new fashion practices and business models. This study is part of a wider program: The Business of Fashion, Textiles and Technology (BFTT). It is a five-year UKRI funded, industry-led project, which focusses on delivering sustainable innovation within the entire fashion and textile supply chain. This short paper reports on initial findings specifically from the BFTT Challenge 3: Re-Modelling Fashion: design practices and business models for sustainability bringing together researchers from University of the Arts London's Centre for Sustainable Fashion, and from the Centre for Industrial Sustainability at the Institute for Manufacturing of the University of Cambridge.

Keywords

New business models in fashion, Circular business models, Transformation design, Scenario planning in fashion, Fashion futures.

Main text

INTRODUCTION

This paper reports on initial findings from the Business of Fashion Textiles and Technology (BFTT) Challenge 3: Re-Modelling Fashion: design practices and business models for sustainability.

The BFTT is a five-year, UKRI Creative Clusters funded, industry-led project, which focusses on delivering sustainable innovation within the entire fashion and textile supply chain. Work package 3, one of the seven challenges of the programme, focuses on developing design practices and business models for sustainability. It brings together researchers from University of the Arts London's Centre for Sustainable Fashion, and from the Centre for Industrial Sustainability at the Institute for Manufacturing of the University of Cambridge.

The challenges and opportunities of sustainability have been set as a priority for the fashion agenda. The responsibility of the industry over several key planetary boundaries are clearly highlighted in several recent reports (Ellen MacArthur Foundation, 2017; Global Fashion Agenda, 2017). We acknowledge as a starting point for this research that fashion is a major contributor to the pressure on planetary boundaries, and that a radical change is needed for the positive aspects of fashion to be sustained without contributing to increasing environmental challenges.

The work draws on expertise covering both design and business models and offers the opportunity to deeply influence the development of transformed fashion practices with businesses involved in the project operating at a range of scales. Transformation is described as a process of change-making in the Design Council RED report, 'Because organisations now operate in an environment of constant change, the challenge is not how to design a response to a current issue, but how to design a means of continually responding, adapting and innovating. Transformation design seeks to leave behind not only the shape of a new solution, but the tools, skills and organisational capacity for ongoing change'(Burns *et al.*, 2006:21). The research explores methodologies for transformation design as a means to extend the value of fashion, in this sense it is realised through the development of tools for ideation, design and business model development for fashion products, services and systems. We emphasise the need to consider design concept development simultaneously to the systems and values involved in business models innovation as part of a transformative process. In this sense we suggest that business model development can benefit from a design-led approach for a radical shift to sustainable practices. This paper elaborates on the value of scenario building processes in supporting such transformation.

METHODOLOGY

Foresight and scenario planning are valuable tools in pre-conceptualising transformation and opening a perspective into new paradigms. They are also instrumental in developing concrete strategies for change with higher chances of implementation (Hebinck *et al.*, 2018). Foresight and horizon scanning encompass the process of looking for early signs of change and interpreting their possible development in the future. The method requires a form of openness to weak signals and to challenge accepted ways of ‘searching’ for what is known or wanted (Carney, 2018). The process involves gathering information about emerging trends, exploring how these might evolve and combine and what impact they might have on the future. This relies on multiple sources of information, mixing desk-based research and workshop discussions (Government Office for Science, 2017).

Contemporary scenario-based planning was pioneered by Pierre Wack in Royal Dutch/Shell in the late 1960s and early 1970s in an attempt to forecast the future of the U.S. oil industry amidst several oil crises. The two seminal papers that emerged from this work - Wack (1985a) and Wack (1985b) - were published in the Harvard Business Review and outlined the fundamental principles of scenario planning. The problem, however, was that they offered very little practical advice, and readers had to connect the dots on their own. This was indeed the case until the “Art of the Long View: Planning for the Future in an Uncertain World” was published by Peter Schwartz (1991). The famous scenario planning 2x2 matrix approach for developing foresight could be seen on the back of the book (Figure 1). Schwartz (1991) suggests that the significance of scenario thinking lies in its ability to overcome thinking limitations by developing multiple scenarios for the future. He suggests that broadly scenarios are “stories”, “maps of the future”, “mental maps”, “narratives”, “indicators” or “tools”; and that scenario planning is an art rather than science, whereby “critical uncertainties” are a core component and represent the factors that are most likely to shape future directions (Schwartz, 1991). In recent years with the acceleration of events signalling possibly radical shifts in future trajectories (Forum for the Future, 2020), foresight and scenario planning have been used widely to try and prepare for uncertainty and shift the balance towards regenerative and circular systems (Shallowe *et al.*, 2020). In particular the context of fashion lends itself well to looking far ahead into the future and using a tacit understanding of trend to envision desirable futures (Roubelat *et al.*, 2015). In this work, we use the 2x2 matrix approach to scenario building as a step to developing scenarios with fashion systems stakeholders:

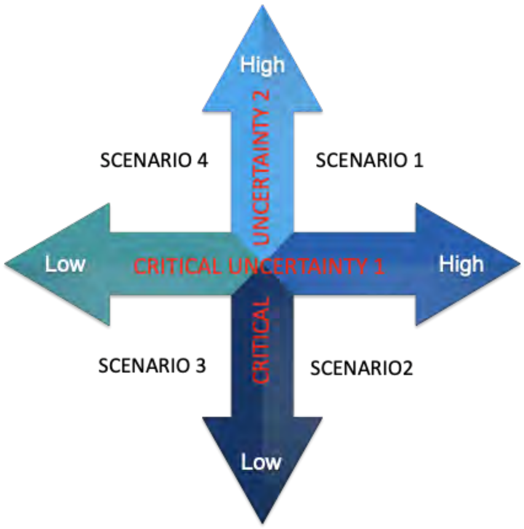

Figure 1 - Scenario Planning 2x2 Matrix

(Schwartz, 1991)

1. Identify evidence-based critical uncertainties based on horizon scanning.
   X = Critical uncertainty 1
   Y = Critical uncertainty 2
2. Identify what "Low" and "High" mean for each critical uncertainty.
   Critical uncertainty 1:
      X Low
      X High
   Critical uncertainty 2:
      Y Low
      Y High
3. Map the critical uncertainties on the X and Y axes of the scenario planning 2X2 matrix
4. Develop 4 scenarios in each quadrant.

Critical Uncertainties

Based on an extensive review of exemplars of key innovation or system changes in the field of fashion, a series of questions relating to the trajectory of the industry were extracted and reviewed in collaborative sessions amongst the research team to yield four key themes, or critical uncertainties, for the future of fashion.

These critical uncertainties form the basis of the scenario building exercise. Each theme is polarised on both ends with a radically different outcome. This can be a high/low contrast such as with the case of regeneration in which we consider either full proactive regenerative practices on one side, and on the other a weaker approach to solving climate issues which might take on more reactive measures to correct damage. In other cases, there is no value judgement between the extremes, as in the case of geographies where global and local systems might represent equal opportunities for positive change. The themes thus emerged from the combination of case study research and conversations carried out following a horizon scanning approach by the research team in the first three months of the project to draw forwards the most promising weak signals.

Critical uncertainty 1: Regeneration

Mang and Reed (2012) define regenerative design as “a system of technologies and strategies, based on an understanding of the inner working of ecosystems that generates designs to regenerate rather than deplete underlying life support systems and resources within socio-ecological wholes.”

In the context of this work, we consider businesses that thrive while contributing to life-affirming futures. The approach to regeneration is inspired by regenerative agricultural practices which leverage the power of natural systems to sustain and repair themselves to support the livelihood of farmers and regain the nutrient density of food (The Sustainable Angle, 2020). Regenerative design as it is understood here, reaches beyond into regenerating other systems - economic, social and cultural. It considers human health and wellbeing as part of holistic practices, and conversely suggests a return to thinking about how health can impact the fashion system.

Critical uncertainty 1 Low: Proactive regeneration

Critical uncertainty 1 High: Damage mitigation

Critical uncertainty 2: Trust

This theme explores cultures and systems of sharing information and goods. We acknowledge that fashion is a set of relationships across scales, from the personal to the organisational, with trust as a part of healthy interactions at all levels. On the one hand we consider openness and full disclosure of information as part of a trust led system. This can be enhanced by the ubiquitous use of transparency tools such as various digital technologies or blockchain, leading to fair and self-regulating systems with multiple points of control and action. These can act as one of many tools for control and engagement by citizens. This vision offers a redress to observed confusion from customers and lack of accountability when sporadic and incomplete information is disclosed in response to minimums set by legislation (The Transparency Pledge, 2020).

Critical uncertainty 2 Low: Trust based system

Critical uncertainty 2 High: Sceptic system

Critical uncertainty 3: Geography

Here we take into account the distribution of fashion systems over the globe, both in terms of physical location and of cultural sense of place. This includes the emergence of new regional identities in response to Western hegemony in modern history. The theme ranges across two extremes: On one side we observe hyper-local, place-based approaches where materials are sourced and used where they grow (Daly, 2020) and people and places are connected in collaborative communities (Real, Earley and Goldsworthy, 2018). Reversely, ultra-global world visions evolve, enabled by cheap and easy travel and online technologies.

Community relations across cultures and borders are enabled by increased digital communications, represented by the formation of influential online communities and movements. These two extremes offer visions that are independent from any value judgement for a sustainable future.

Critical uncertainty 3 Low: Local

Critical uncertainty 3 High: Global

Critical uncertainty 4: Power

Asking where power lies in a given system offers key insights regarding the means to effect change. Distributed power is materialised through equal representation and equity of all stakeholders, including society and nature. In this context we can imagine brands advocating for equal and respectful working conditions. It can also involve the distributed ownership of means of manufacturing and of materials. This may also mean distributed leadership and self-organising teams forming equitable fashion systems where co-design and open-source methods proliferate. This offers a contrast to centralised power where executive decisions are taken by the few for the many. Similarly to the previous theme, the two extremes of this scale in power distribution can be dissociated from a judgement of good or bad approaches when considering the environmental efficacy of either system.

Critical uncertainty 4 Low: Centralised

Critical uncertainty 4 High: Distributed

These four themes represent critical uncertainties with the potential to tilt the future of fashion systems in very different directions. Understanding the nature of the forces which influence decisions today and the resilience of systems in the future is crucial in the context of transformation design practices. These themes are then used in combination to frame plausible futures as contexts for this transformation.

Development of scenarios concepts

As described in the methods, the scenarios are built by combining two axes of uncertainty, creating a cross matrix which defines four areas delineated by the extremes on each axis. These quadrants in the matrix become the canvas for development of new ideas considering the challenges and opportunities within each future scenario.

In this case the four themes were split into two matrices: one which combines Regeneration and Power, and another combining Trust and Geography. The association of the themes into these two duos was based on the most promising and balanced possibilities for the combination of the different themes. While other combinations could have been possible, at the time, these were selected by the researchers as offering an optimal breadth of ideas to explore in the subsequent workshops. These combinations produce 8 distinct plausible futures in which transformative design practices and business models can evolve. They each represent a different set of challenges for stakeholders in this area. The titles and key phrases distributed in the matrix serve as additional support to imagine the future this could be, and facilitate discussion and further co-development of the scenarios with relevant stakeholders. Each scenario contains a range of elements which may be construed as negative and positive, there is no utopian or dystopian scenario, and 'good' will be interpreted in different ways by different audiences.

As can be seen in figure 2, the matrix combining Regeneration and Power shows the interactions between either distributed and localised power systems, and either a proactive approach to regenerating natural and social capital, or an approach which is limited to damage mitigation. For example, combining a proactively regenerative approach with distributed power produces the scenario titled "One for all and all for one" in which we can envisage grass roots movements leading the restoration to healthy land and communities, and expect the use of biofabrication in communities to thrive. In the opposite quadrant reverse extremes combine to form a scenario titled "Good guys win", in which a damage mitigation approach to environmental and social challenges is adopted in a centralised power system. In this case we can imagine strong legislation to prevent harm from chemicals and other toxic compounds, as well as consider a form of protectionisms of endangered assets.

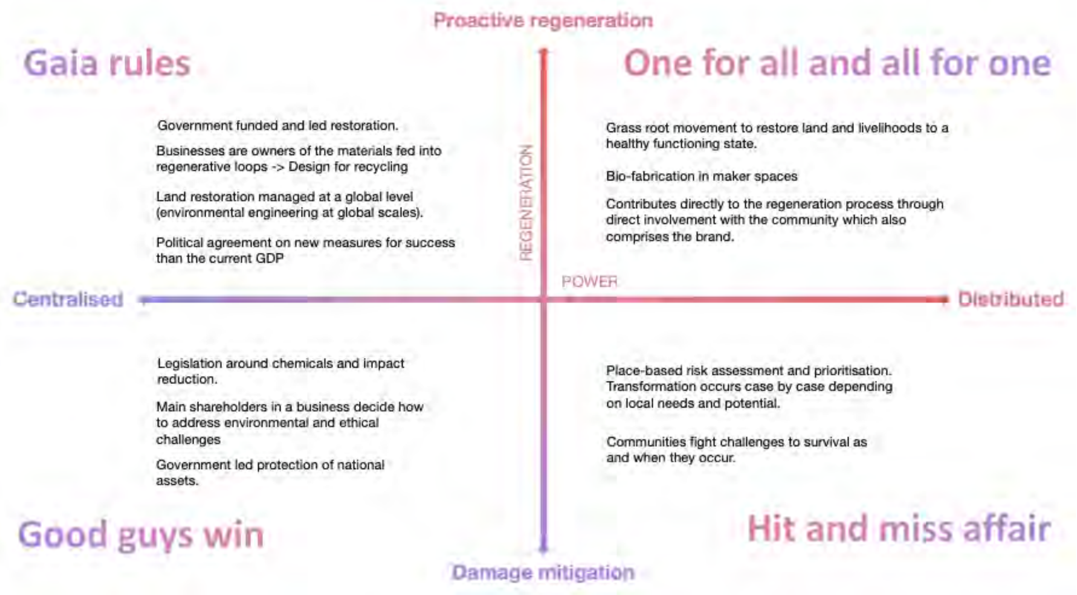

Figure 2. Scenario matrix: Regeneration and Power

Figure 3 shows the combination of uncertainties relating to Trust and to Geographies. In this matrix, the one extreme on the scale of geography is "global", combined with a trust-based system in the scenario titled "Information superhighway". It describes a world in which information is readily available to all across the world in open-source forms or enabled by blockchain technology. In the opposite quadrant, a local sceptic system is titled "Under our eye" to represent a world which could include smaller and more closely surveyed social and professional communities where all action is scrutinised by neighbours and collaborators.

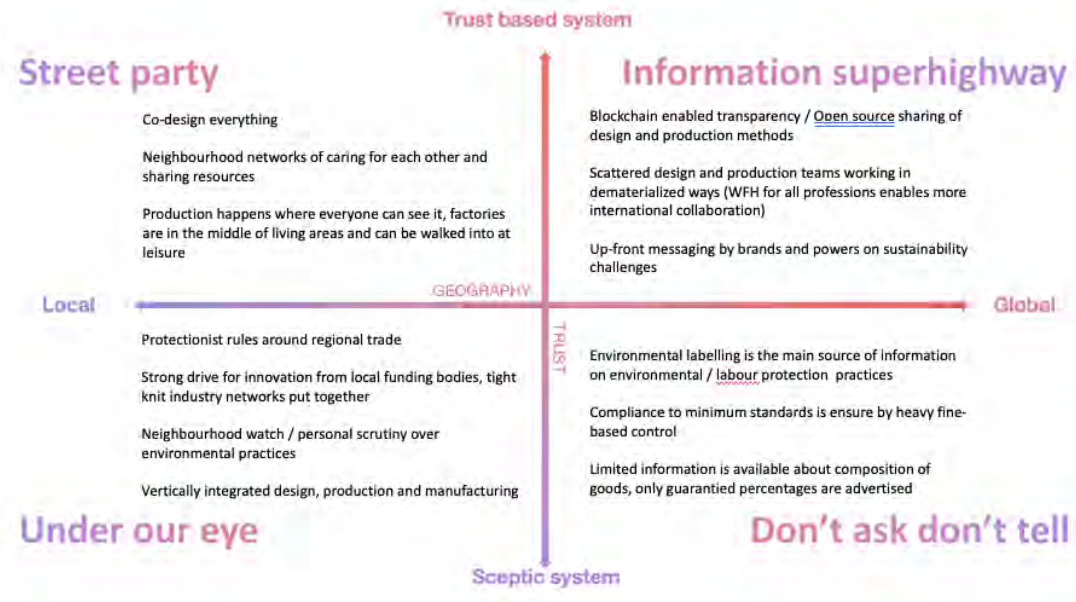

Figure 3. Scenario matrix: Trust and Geography

These scenarios can be used to imagine how multiple variables in fashion systems might evolve and shift under the influence of different futures, and how fashion practices can, in turn, have an active role in shaping these futures. The scenarios are helpful both as a framework for ideation and as a way of checking the resilience of a design or business concept in worlds which are not yet clearly defined. As part of this project, we will use a combination of both these applications of the scenarios. Indeed, the scenario matrices themselves are a means rather than an end. They serve as a canvas to support the innovation process in product, services and business models with the various participants involved in the BFTT project. We follow a tradition of futures thinkers in using the scenario method to bring together the relevant stakeholders and facilitate conversations for transformation (Doughnut Economics Action Lab *et al.*, 2020; Royal Society of Arts, 2020). Moreover, following the co-enquiry approach taken in this research, we expect the framework to evolve under the influence of the stakeholders' thinking. This approach will lead to an iterated vision for the scenarios and their conversion into tools that can be applied with a range of participants.

CONCLUSIONS

This paper lays out the foundations for the development of the transformation design methodology which will be collaboratively developed in the next phases of the research. It shows how the 2 x 2 matrix approach has been adapted to the thinking specific to this study, demonstrating the value of the method to envision future scenarios. The initial findings from the review of key innovation in fashion practices and business models and the collaborative discussion amongst the research team take the form of four critical uncertainties and the eight scenarios which they structure.

As a key proposition of this research, which is due for completion in June 2022, we argue that transformation must occur within businesses in a way that challenges values and systems at their core. We suggest that future thinking using future scenarios, can be a driver in such radical change for sustainability.

In the next phases of the work, the methods produced as a key contribution of this project to the fashion and textiles sector will be co-developed with fashion designers. These participants take on a role more complete than simple case studies as their input helps steer the direction in which the research proceeds. They will bring complementary perspectives to the challenge of transforming the industry, whether this is the speculative vision of emerging designers, studying fashion, that of micro and small businesses or that of designers in multi-national brands.

The scenario matrices will be deployed as part of workshop tools. This will enable a reflective analysis of the effects of future thinking on fashion practices and help to better understand mechanisms for transformation. Few tools are currently available that offer means to assess positive change beyond technical and mainly incremental improvements. This research proposes that a new analysis of products and services designed with transformation in mind can help acknowledge the deeper changes needed for effective transitions to sustainable and circular fashion practices and business models.

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The value co-creation in circular business models: Quadruplex Helix perspective

Inga Uvarova[1,2,*], Ilona Platonova[1], Zane Rascevska[1], Tatjana Volkova[1], Dzintra Atstaja[1]

[1]BA School of Business and Finance, Latvia; [2]ArtSmart ltd.

*inga.uvarova@gmail.com

Abstract

The circular business models (CBMs) are not broadly adopted yet due to the lack of widespread practices of successful combination of environmental and economic values. This paper aims to develop the conceptual framework of the value co-creation as a facilitator of CBMs development based on the Quadruple Helix perspective.

Keywords

Value co-creation, circular business models, value chain.

INTRODUCTION

The purpose of this paper is to develop the conceptual framework of the value co-creation in the circular business models (CBM) based on the Quadruple Helix (QH) perspective.

The circular economy (CE) seeks the solutions of climate change, ecological and environmental challenges fundamentally changing *"ways of producing and consuming goods and services"* (OECD, 2018, p-2). The CE encourages society and business to deliver solutions to increasing resource efficiency, minimization of the waste and the consumption of less valuable and useless products.

Although CBMs are considered as important triggers for the promotion of the CE and the sustainable development in general, they are not broadly adopted yet and require new tools and approaches at the level of interactions between the company and its customer (Bocken et.al., 2019).

The CBMs introduce these pro-environmental principles at a company level, also ensuring important economic benefits such as cost savings, new innovative products, increase of profitability and competitiveness. Some CBMs have proved extremely successful in recent years, but the market share of them is still small in the economy (Fraccascia et.al., 2019). Thus, the CBM requires immense changes in business strategies and business model innovations (Bocken et.al., 2019; Linder &Williander, 2017). These changes are not limited just to the more efficient use of resources or adoption of *3R - reduce, reuse, recycle* principles (Uvarova et.al, 2020) within the production or delivery of services, but require a significant change in the value chain enabling sustainable consumption (Despeisse et.al., 2017).

From the authors point of view, new tools and approaches are needed not only on the level of interactions between company and its customers, but also with much broader stakeholders, including education institutions, research institutions, public authorities and society in large. The cooperation between these actors is essential for creation and delivering CBM. The CBMs require "*rethinking how a company creates, delivers and captures value"* (Bocken et.al, 2019, p-3), aligning this with circular principles. The value is an important concept discussed within previous studies about the sustainable and CBMs, but *"value creation remains a black box in most publications"* (Ludeke-Freund et.al., 2020).

These issues require the attention and actions of various stakeholders enabling systemic and systematic changes at an ecosystem level. Such transition towards the circularity can be achieved by cross-disciplinary collaboration of public, private, and research sectors, and the societal participation multi-dimensionally contributing to the *"ecological, social and economic value"* (Ludeke-Freund et.al., 2020, p-69). The QH model acknowledges the engagement of the four types of actors mentioned previously. The QH perspective has been widespread in the policy documents and announcements, but there is insufficient discourse on the QH adoption in relation to the CBM to foster CE development (Moghalu et.al., 2019, Cai & Etzkowitz, 2020).

METHODOLOGICAL APPROACH

This research focuses on the following research questions: 1) What are characteristics of the value concepts in the CBM; 2) What is a conceptual framework of the value co-creation in CBM, assuming that four types of QH actors are involved?

The research methodology used is a systematic review of literature and analyses of literature content. The clustering method is used to visualize key interrelated concepts and other implicit and explicit determinants found. The expert interviews and focus group discussions to affirm the topicality and research questions, and to deepen the conclusions and approbate the research results obtained. Informants of interviews and focus group discussions are selected based on the purposive sampling to ensure representation of various QH actors and the CBM field-related experts. This technique of selection of interviewees is combined with the snowball sampling method, stimulating the co-creation process during the research. The descriptive analyses will synthesize the most relevant and important key terms and concepts, gaps in research theories and methods, and future perspectives and directions.

KEY INSIGHTS

The QH model concept has been developed from the triple helix associated with the cross sectoral and interdisciplinary innovation and co-evolution of knowledge (Carayannis et.al., 2012, Cai & Etzkowitz, 2020). In the wider perspective, the helix model explains the relationship between business, the government and other actors involved in the change, innovation, and socio-economic development process in the national ecosystem or across these borders (Carayannis et.al.2020). In addition, the industry and practitioners occasionally use the QH model as a flag for innovative incentives that encourage the role of academia within social or business innovations (Cai & Etzkowitz, 2020).

The QH model particularly highlights the engagement of the *"knowledge society and knowledge of democracy"* (Carayannis et.al., 2012, p-1) additionally to the triple helix elements having multi-dimensional and transdisciplinary interrelations (Schutz et.al., 2019).

Carayannis with co-authors (2012) particularly emphasize the importance of co-evolution to ensure sustainable development. There is a high potential in the use of the QH model in the value co-creation within the CBMs. The QH model enables approaching the value from a system perspective rather than a firm centric view. The QH model provides the greater scales-up potential for the value co-creation assuming various societal interests (Schutz et.al., 2019).

This process requires more detailed understanding of various types of actors involved in the QH collaboration, their roles and powers to influence the value co-creation process. Furthermore, multiple stakeholders involved in the collaboration have completely different needs and value perceptions. The change towards the CBM requires an overall change of mindset towards the collaborative behaviours to encourage the value co-creation of all involved partners. The collaboration is a closely related concept with the value co-creation process, interpreted as the internal and external collaboration with formal and informal conditions to "create mutual value" (Bertassini et.al., 2021, p-436).

The value co-creation process, as such, bears uncertainty in the expected results and changing roles of various actors involved. The value creation is demanding, but an important process for companies to meet customer needs and the dynamic market changes (Marco-Stefan Kleber & Volkova, 2017). The creation of the circular value is related to the sustainable transition process requiring the transition thinking (Jonker et.al., 2020). Furthermore, "designing a transition is a 25% technical and 75% socio-organisational and institutional task" (Jonker et.al., 2020, p-7), provided that the helix model can be considered a beneficial framework for clarifying the collaborative systems, tasks, and organizational and individual interrelations. The value co-creation can be considered from the organisational management perspective as a collaboration process between the company and its customers or users to develop products, services, technologies or other innovative ideas (Marco-Stefan Kleber & Volkova, 2017).

Under the QH model the value co-creation meaning must be extended. The authors suggests that value co-creation based on the QH model is a collaboration process between the industry, government, academia, and users/civil society leading to added value to customers and other stakeholders, e.g. development of new or improved value proposition to customers, new or improved technologies or other innovative ideas leading to the new industries development, new markets entry, etc. The added value to customers is additional benefits created to customers above the price paid for the product or service. The added value to other stakeholders is additional benefits those stakeholders receive by delivering the value proposition to customers and based on relationships with other stakeholders. In this study, the value co-creation involves a broader and deeper exploration of the value related concepts such as the value chain, the value creation and value co-creation, delivery, proposition and capturing (Yin et.al., 2020).

In the context of the CBMs, the circular value is distinguished and exposed together with the circular value network (Ketonen- Oksi & Valkokari, 2019; Antikainen & Valkokari, 2016). The circular value network may perform as an enabling platform for the mutual cooperation in the value co-creation process (Marco-Stefan Kleber & Volkova, 2017). Ludeke-Freund with co-authors (2020) defined the structured sustainable value creation framework. Within this framework the authors specified four fundamental questions to be explored: "What is value and what are its sources? For whom is value created? How is value created? Who captures value?" (Ludeke-Freund et.al., 2020, p-65). These questions are relevant for the value co-creation in the CBMs.

The researchers highlight the lack of an active research discussion about the value co-creation process (Ketonen-Oksi & Valkokari, 2019; Jarvi & Kortelainen, 2017). Four value co-creation stages are determined *"co-experience, co-definition, co-evolution, and co-development"* (Jarvi & Kortelainen, 2017, p-4). Researchers distinguish roles of the value facilitator and the value creator or value co-creator as important elements in the collaboration process of the value co-creation (Marco-Stefan Kleber & Volkova, 2017). These roles are particularly important within the QH model and may shift from one stakeholder to another depending on the level of interests, engagement and contribution of each involved actor. This raises further practical and conceptual issues and questions about how to distribute the captured value among the various actors engaged, and whether and when benefits from the value co-creation process should be shared.

The engagement of stakeholders stems from their values and interests in issues or problems addressed through the collaboration and co-creation process, also, "*various forms of value it can create with and for its stakeholders"* (Ludeke-Freund et.al, 2020, p-80). The engagement also can be influenced by the socio-economic and cultural background, strategic experiences, the trust of particular actors, the industry specifics and other factors (Noland & Phillips, 2010). The understanding of these factors is essential before taking any activity to increase the stakeholder engagement. The QH model approach may stimulate better understanding of these factors and, depending on them, facilitate higher engagement of various actors in the value-cocreation of CBMs.

In previous studies the value co-creation encounters two perspectives “the cooperation platform” and “the ecosystem” describing various steps and approaches for the co-creation process (Jarvi & Kortelainen, 2017; Bertassini et.al., 2021). While the ecosystem perspective provides theoretical grounding for the involvement and interaction of actors and artifacts (Granstrand & Holgersson, 2020), there is one remaining question - how to encourage cooperation of less active, but important and necessary stakeholders within such trans-boundary settings? The QH model may provide a new collaboration framework combining both perspectives. The CBM experimentation (Bocken et.al., 2018), design thinking methods (Geissdoerfer et.al., 2016) and the ecosystem pie model (Talmar et.al., 2018) may ensure deeper analyses and tools that promote engagement of all actors of the QH model for the co-creation of most appropriate circular value.

Authors consider that design thinking techniques are an essential tool in the value co-creation of the CBMs. Design thinking can be beneficial in designing new values of the society, not just individuals facilitating creation of a more favourite environment for the adoption of CBMs (Dell'Era et.al., 2020). The nature of design thinking methods requires the collaboration between different parties, as envisaged in the QH model. In addition, design thinking techniques help to ensure that a win-win value proposition is created according to the needs and interests of the various parties that are relevant in the CBM. Design thinking techniques can be used as a tool to promote stakeholder engagement and trust in the circular value co-creation.

Bertassini with co-authors (2021) provides the four-phase model for the mapping of stakeholders and the capturing value. This model allows stakeholder interactions to be analysed and understood and the circular value opportunities which may help in later stage more precisely identify the gained or captured value, existing but not fully exploited or uncaptured values, and further new opportunities for the value creation. This approach is useful when incorporated in the QH model as it allows to keep the focus on the various expected and unexpected outcomes in the circular value co-creation process.

The QH model creates a space for the mutual interaction, exchange of experience and knowledge within different systems, providing that various actors cooperate and participate in the value co-creation outside the formal organizational boundaries. The QH model shall help to acknowledge the issue of different perceptions and expectations of the value by various stakeholders and the necessity to classify three categories of the outcome of the value co-creation process.

KEY FINDINGS AND CONCLUSIONS

The research results will determine the conceptual framework of the current state of play and substantiate the methodology for the future research of the QH model and its application in the value co-creation of CBMs.

The authors suggest that the QH model can be used to build a new management approach which focuses on the broader multi-stakeholder involvement in the circular value co-creation. Such the QH model-based management tool can help to engage additional available external resources and broaden the value co-creation perspective, while not limiting the stakeholders involved, but understanding their types, clarifying functional roles, expected values and patterns of an interaction as well as more precisely leading such collaboration incentives. The QH model-based cooperation can be a good tool for implementing functions with limited funding and resources for the value creation within the CBMs.

This research explores the conceptual responsiveness of various actors towards the value co-creation within the CBMs in the promotion of the CE. This research provide new groundings in the existing discourse about various related concepts such as the CBM innovation and co-innovation and the value innovation, the value co-creation and co-evaluation, the circular value network and the ecosystem.

The article provides more accurate understanding of the stakeholder engagement. This article seeks for possibilities of using the QH model as a tool to estimate the importance and relevance of the engaged actors in the circular value co-creation?

This research has important social implications, as the policy makers, scholars and non-governmental organisations can further exploit the results of this paper for encouraging society to change their consumption patterns by assuming the ecological principles and higher responsibility towards sustainability and circularity by being directly involved in the value co-creation process.

This research has a practical value for business, providing recommendations about the co-creation and capturing higher value to multiple stakeholders, and in new ways better serving their expectations.

The authors believe that further research could explore the legal aspects of the practical use of the QH model in the value co-creation in the CBMs. Also, it is necessary to explore the interdependencies of different activities, actors and artifacts in the “dynamic balancing of value creation through “growing the pie” across complements, complementors, and collaborating competitors” (Granstrand & Holgersson, 2020, p-9), the most significant determinants or factors promoting the value co-creation within CBMs.

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Engaging Consumers in the Circular Transition by Designing Sharing Businesses

A Conjoint Analysis

Marie-Julie De Bruyne[1,*], Katrien Verleye[1]

[1]Center for Service Intelligence – Ghent University, Belgium

*MarieJulie.DeBruyne@UGent.be

Abstract

In the transition to a circular economy, various sectors embrace sharing business models focused on increasing the utilization rate of resources. After identifying the dimensions along which these business models may vary (resource transfer, professional involvement, compensation, digitalization and openness), this paper empirically investigates their influence on consumer engagement in the fashion industry.

Keywords

Sharing economy, Business models, Consumer engagement, Conjoint analysis, Circular economy

Main text

1. INTRODUCTION

The sharing of goods and services between people in – among others – families, tribes and communes is an old custom (Acquier et al., 2017). Globalization and digitalization, however, expanded its scope disproportionately. In this context, sharing business models – which focus on increasing the utilization rate of resources – are emerging in various sectors such as fashion, hospitality and mobility (Cohen & Kietzmann, 2014; Grinevich et al., 2017; Möhlmann, 2015). Researchers, practitioners and policymakers increasingly embrace these business models as they contribute to the transition towards a circular economy by slowing down resource loops and consequently reducing the burden on limited natural resources (Böcker & Meelen, 2017; Fehrer & Wieland, 2020; Frenken & Schor, 2017). Meanwhile, only a few of these businesses – such as Vinted, Couchsurfing and BlaBlaCar – were found to attract millions of consumers (Möhlmann, 2015) while several resources – such as clothes, accommodations and cars – are most of the time left unused (Frenken & Schor, 2017). An insufficient consumer base is thus a major hurdle for sharing businesses to realize their circular potential (Chasin et al., 2018; Cocquyt et al., 2020). To overcome this hurdle, there is need for an in-depth understanding of the determinants of consumer engagement with sharing businesses, that is, the psychological or motivational state of consumers in relation to sharing businesses with behavioral manifestations (e.g. usage intentions) and non-behavioral manifestations (e.g. cognitive and/or emotional manifestations) (Henkens et al., 2020).

Although numerous studies have explored drivers and barriers – such as ease of use, enjoyment, familiarity and utility – of consumer engagement with sharing businesses (e.g., Hamari, Sjöklint, & Ukkonen, 2016; Möhlmann, 2015), extant research remains silent about the way in which dimensions along which sharing businesses may vary affect consumer engagement (Hazée et al., 2020). As a matter of fact, the sharing business literature recognizes that sharing businesses vary between and within sectors (e.g., Boons & Bocken, 2018; Hamari et al., 2016), but an overview of the sharing business dimensions along with their potential to engage consumers is lacking (Cocquyt et al., 2020; Hazée et al., 2020).

Against this background, the present research investigates how sharing business dimensions – that is, characteristics along which sharing businesses may vary – affect consumer engagement with sharing businesses, thereby relying upon a discrete choice conjoint experiment in the fashion industry. As extant research suggests that some consumers are reluctant about sustainable products and services like those stemming from sharing business models that aim to service the circular transition (de Morais et al., 2021; Haws et al., 2014; Jacobs et al., 2018), the present research also investigates whether the impact of sharing business dimensions on consumer engagement with sharing businesses is dependent upon their sustainability orientation.

This research thus enriches existing sharing economy literature by proposing a typology of dimensions along which sharing business models may differ from one another. Additionally, this research bridges the sharing and consumer engagement literature by investigating how sharing business dimensions affect consumer engagement, which responds to calls for research on business model characteristics and design choices in the sharing economy (Hazée et al., 2020). Moreover, this study shows how consumers' sustainability orientation affects their engagement with specific sharing business dimensions. Finally, this research contributes to a better understanding of engagement with circular business models, which is proposed as a key avenue for future research among researchers, practitioners and policymakers (e.g., European Commission, 2019; Khitous, Strozzi, Urbinati, & Alberti, 2020), and facilitates the transition to a circular economy.

The paper adopts the following structure. In the subsequent section, the conceptual background is presented, thereby focusing on business dimensions and consumer engagement in the sharing economy. Subsequently, the paper details the methodology.

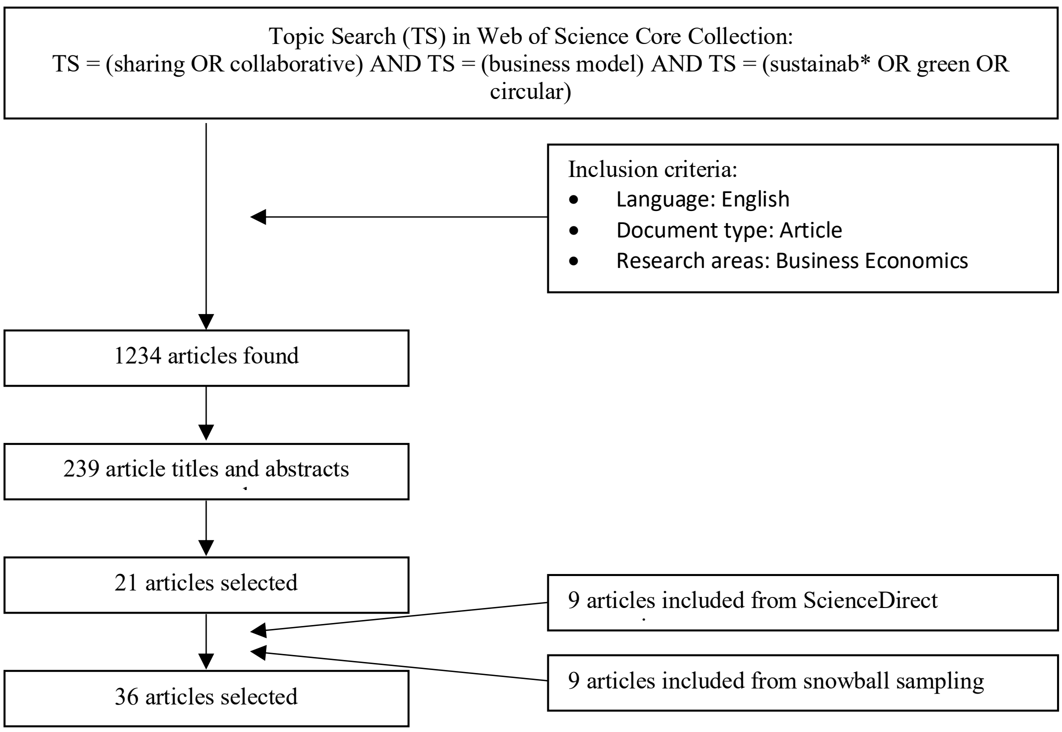
After presenting the results, the paper concludes with theoretical and practical implications along with limitations and future research directions.

2. CONCEPTUAL BACKGROUND

2.1. Sharing economy and sharing business dimensions

The sharing economy refers to a socioeconomic system in which two or more entities collaborate in increasing the utilization rate of resources (e.g., Cohen & Kietzmann, 2014; Grinevich, Huber, Karatas-Özkan, & Yavuz, 2017). This system is associated with slowed-down resource loops and consequently a reduction of the burden on limited natural resources (Acquier et al., 2019; Böcker & Meelen, 2017). To gain more insight into the way in which sharing business models can realize their circular potential, we have engaged in a systematic review of the literature. Figure 1 synthesizes the literature search and selection.

Figure 1: Literature search and selection



Based upon an inductive analysis of the selected articles on sharing (n = 36 articles) – in line with the work of De Keyser et al. (2020)– we have identified the dimensions along which sharing businesses may differ from one another. The results are shown in Table 1.

Table 1: Sharing business dimensions and levels

Sharing business dimension	Description	Levels	Illustrative references

Resource transfer	The extent to which the sharing business allows for possessing offerings	• Access to services • Access to goods • Ownership of goods	Acquier et al. (2019); Böcker & Meelen (2017)
Professional involvement	The extent to which the sharing business involves professional users	• C2C • B2C, C2B, G2C, C2G • B2B, G2G, B2G, G2B	Boons & Bocken (2018); Grinevich et al. (2017)
Compensation	The extent to which providers get a monetary compensation for sharing their offerings	• No compensation • Non-monetary compensation • Monetary compensation	Cohen & Kietzmann (2014); Frenken & Schor (2017)
Digitalization	The extent to which human interaction for sharing is substituted by digital platform technologies	• No digital platform • Digital platform complements human interaction • Digital platform substitutes human interaction	Boons & Bocken (2018); Grinevich et al., (2017)
Openness	The extent to which the sharing business is open to broad communities without geographical boundaries	• Local community • Regional community • Worldwide community	Boons & Bocken (2018); Crucke & Slabbinck (2019)

Note. C2C = Consumer-to-Consumer, B2C = Business-to-Consumer, C2B = Consumer-to-Business, G2C = Government-to-Consumer, C2G = Consumer-to-Government, B2B = Business-to-Business, G2G = Government-to-Government, B2G = Business-to-Government, G2B = Government-to-Business

As demonstrated in Table 1, we have identified five sharing business dimensions: (1) resource transfer, (2) professional involvement, (3) compensation, (4) digitalization and (5) openness. A key question revolves around the influence of these dimensions on consumer engagement with sharing businesses.

2.2. Consumer engagement with sharing businesses

Drawing from the engagement literature, we contend that consumer engagement is a psychological or motivational state reflecting cognitive, affective and behavioral manifestations with sharing businesses (e.g., Brodie, Hollebeek, Jurić, & Ilić, 2011; Henkens et al., 2020; Hollebeek, Glynn, & Brodie, 2014; van Doorn et al., 2010). The engagement literature points out that consumer engagement with business offerings is – in line with Utility Theory and Social Exchange Theory – driven by the expected and/or perceived benefits (e.g., Jung, Yang, & Kim, 2020; Verleye, 2015). In case of sharing businesses, extant research suggests that these benefits stem from the extent to which sharing businesses involve resource transfer, professional involvement, compensation, digitalization, and openness.

First, a number of studies demonstrate that several consumers associate access-based offerings with social, environmental and – most importantly – financial benefits (e.g., Barnes & Mattsson, 2017; Böcker & Meelen, 2017; Hamari et al., 2016; Hawlitschek, Teubner, & Gimpel, 2018; Möhlmann, 2015), which may – in line with Utility Theory and Social Exchange Theory – increase their engagement. Meanwhile, other authors conclude that consumer engagement is decreased when offerings are access-based, as consumers may perceive risks rather than benefits (Armstrong et al., 2015, 2016; Lang, 2018; Tukker, 2004). The aforementioned evidence suggests that the extent to which resources are transferred may affect consumer engagement with sharing businesses in a positive or negative way.

Next, extant research suggests that consumer engagement with sharing businesses is also affected by the extent to which the sharing business involves professional users. Hawlitschek et al. (2018), for instance, discover that peer-to-peer sharing initiatives may generate financial benefits for consumers, which may boost their engagement. Meanwhile, engaging in peer-to-peer initiatives may generate social benefits for consumers, as they can connect with one another (e.g., Barnes & Mattsson, 2017; Hawlitschek et al., 2018; Möhlmann, 2015).

Furthermore, consumers might favor sharing initiatives that make use of a digital platform because digital technologies reduce transaction costs (Frenken & Schor, 2017; Parente et al., 2018; Plewnia & Guenther, 2018). Indeed, "online shopping allows consumers to save money, effort, and time" (Al-Debei et al., 2015, p. 708), which represents benefits with the potential to boost consumer engagement (Verleye, 2015).

Finally, the extent to which the sharing business is open to broad communities – and hence openness – may also effectuate consumer engagement. As a matter of fact, consumers of sharing businesses may favor local initiatives because they respect the local culture and/or want to support the local economy (Özsomer, 2012; Winit et al., 2014).

As the aforementioned evidence suggests that consumer engagement with sharing businesses is dependent upon the extent to which different sharing business dimensions are present, two research questions (RQs) emerge:

> *RQ 1: What preferences do consumers have with regard to the sharing business dimensions (1) resource transfer, (2) professional involvement, (3) compensation, (4) digitalization, and (5) openness?*
>
> *RQ 2: What is the relative importance of these sharing business dimensions for consumer engagement with sharing businesses?*

Meanwhile, extant research suggests that not all benefits are equally important, as not all consumers care about the social and/or environmental benefits that stem from sharing (Akbar & Hoffmann, 2018; Böcker & Meelen, 2017; Maniatis, 2016; Mohd Suki, 2016). Moreover, some consumers may even be reluctant to buying and/or producing sustainable products and services (de Morais et al., 2021; Haws et al., 2014; Jacobs et al., 2018). Building upon the observation that the sustainability orientation – that is, the extent to which consumers value environmental benefits in consumption situations (Haws et al., 2014) –

plays an important role for consumer engagement with specific products and services, a third research question emerges:

> *RQ 3: How does the sustainability orientation of consumers affect (a) their preferences with regard to the sharing business dimensions and (b) the relative importance of these sharing business dimensions for consumer engagement with sharing businesses?*

3. METHODOLOGY

To answer the research questions, we have opted for a discrete choice-based conjoint experiment with a stated preference approach (Hauser et al., 2019). This research design allows to implicitly assess what trade-offs consumers make when choosing between different product or service alternatives (Prell et al., 2020). We investigate these trade-offs in the fashion industry because clothing is massively underutilized while many sharing initiatives like swapping initiatives and second-hand stores are popping-up and gaining popularity (Cocquyt et al., 2020). In the conjoint experiment, participants are introduced to a series of (hypothetical) choice sets, each consisting of two distinct sharing businesses in the fashion industry that vary along the five sharing business dimensions. For each choice set, participants were asked to indicate their preferred sharing business which reflects their cognitive and/or emotional engagement with the sharing businesses (see an example of a choice set in Table 2). At the end, consumers are asked to fill out a survey about their sustainability orientation, thereby relying on the validated multi-item scale by Haws et al. (2014) (Cronbach's alpha was 0.91).

Table 2: Example of a choice set

Which option do you prefer?	
A **local** sharing business that does **not** use a digital platform where **non-professional providers** (peers) get **no compensation** for **lending** their clothing to consumers	A **worldwide** sharing business that uses a **digital platform** to substitute all human interaction where **professional providers** get a **monetary compensation** for **selling** their clothing to consumers

Data was collected in Flanders (Belgium) from the 8th of April 2020 until the 22nd of April, using an online Qualtrics survey (in Dutch). Respondents were approached online via direct messages, e-mails and posts on social media platforms such as Facebook and LinkedIn. Table 3 summarizes the composition of the final sample. Statistical analyses of the questionnaire results (n = 383) were conducted using the statistical programming language R. To analyze the data stemming from the conjoint experiment, logistic regression was applied.

Table 3: Sample composition

	Frequency	Percentage
Gender		
Female	249	65.01%
Male	130	33.94%
Not specified	4	0.01%
Education (highest degree)		
High school graduate or equivalent	37	9.66%
Bachelor's degree or equivalent	136	35.51%
Master's degree or equivalent	193	50.39%
Doctoral degree or equivalent	15	3.92%
None of the above	2	0.52%
Occupation		
Student	137	35.78%
Halftime employed	29	7.57%
Fulltime employed	175	45.69%
Unemployed	16	4.18%
Other	26	6.79%

	Mean	Standard deviation
Age	30.90	15.69
Sustainability orientation	5.01	1.14

4. RESULTS

For the sharing business dimension levels (RQ 1), we find that consumers have a significant preference for ownership of goods over access to goods, monetary compensation over no compensation, substitution of human interaction by a digital platform over no digital platform and local community over worldwide community (see Table 4).

Regarding the influence of consumers' sustainability orientation (RQ 3a), we find that consumers with a low sustainability orientation also prefer to engage with sharing businesses that involve professional providers. For consumers with a high sustainability orientation, the preference for monetary compensation and a digital platform is, however, not detectable (see Table 4).

Table 4: Conjoint analysis results (dimension levels)

Dimension level	Aggregate level	Low sustainability orientation	High sustainability orientation
Ownership of goods	0.48***	0.45***	0.51***
Involvement of professionals	0.04	0.13*	-0.04
Non-monetary compensation	-0.06	-0.06	-0.05
Monetary compensation	0.25***	0.39***	0.12
Substitution of human interaction by digital platform	0.25***	0.39***	0.12
Worldwide community	-0.74***	-0.66***	-0.84***

Note. All three models have a p-value < 0.001 for the Chi-Square test; * refers to a p-value < 0.05; *** refers to a p-value < 0.001

For the sharing business dimensions (RQ 2), we uncover that professional involvement has the least influence on consumer engagement and openness of the community has the most influence on consumer engagement, regardless of consumers' sustainability orientation (RQ 3b) (see Table 5).

Table 5: Conjoint analysis results (dimensions)

Dimension	Aggregate level	Low sustainability orientation	High sustainability orientation
Resource transfer	26.37%	21.47%	32.19%
Professional involvement	2.13%	5.11%	1.80%
Compensation	16.64%	22.36%	8.15%
Digitalization	13.73%	17.51%	7.61%
Openness	41.13%	33.55%	50.25%

5. DISCUSSION AND CONCLUSION

5.1. Theoretical implications

By proposing a typology of sharing business dimensions, this research advances the sharing economy literature from a conceptual point of view (e.g., Plewnia & Guenther, 2018). Moreover, this research empirically substantiates the importance of this typology by demonstrating how these business dimensions affect consumer engagement with sharing businesses. By doing so, this research responds to calls for investigating business model characteristics and design choices in the sharing economy (Cocquyt et al., 2020; Hazée et al., 2020), which advances both the sharing economy and consumer engagement literature. Indeed, multiple studies focus on the drivers of consumer engagement with products and services without providing insight into what trade-offs are being made (e.g., Ul, Rahman, & Hollebeek, 2017; van Doorn et al., 2010). By opting for a discrete choice conjoint experiment, this research unravels consumer trade-offs when being introduced to sharing businesses. Additionally, we relate consumer engagement with sharing businesses that vary along different dimensions to the sustainability orientation of consumers. By showing how the sustainability orientation of consumers affects their engagement with specific sharing business dimension levels, this research generates a better understanding of the interplay between consumer characteristics (here, sustainability orientation) and business model characteristics (here, sharing business dimensions) for engagement with sharing businesses. As such, this research advances the literature on business model innovation, which recognizes that consumers' sustainability orientation is becoming more and more institutionalized (e.g., Fehrer & Wieland, 2020).

5.2. Practical implications

By pointing out how consumers make trade-offs between sharing businesses, this research suggests that practitioners can optimize their sharing businesses by combining the dimension levels that most positively influence consumer engagement (here, ownership of goods, monetary compensation, substitution of human interaction by a digital platform and local community). In other words, business practitioners can improve existing sharing businesses by altering dimensions that may negatively affect consumer engagement and/or introduce new types of sharing businesses based upon the dimension levels that are most appealing to consumers. Policymakers, in turn, can support businesses practitioners by educating them about the importance of sharing business model dimensions and levels for engaging consumers and guiding them to reconfigure their business models. Furthermore, policymakers can bolster sharing businesses by introducing regulations and measures that facilitate the deployment of the most desired dimension levels, such as tax reductions for consumers who engage with sharing businesses in which ownership is transferred, or help overcome barriers with regard to less desired dimension levels, such as reimbursement of registration expenses for car-sharing. Overall, our insights give evidence-based directions to both practitioners and policymakers for attracting consumers and eliciting consumer engagement in the fashion sharing economy, which ultimately contributes to slowing down the resource loops in this sector.

5.3. Limitations and future research

First, this research relies on a choice-based conjoint experiment with a stated preference approach. Consumers' stated preferences, however, may differ from actual behaviors, which is known as the attitude-behavior gap (Cocquyt et al., 2020). Therefore, future research might complement this research endeavor by gathering behavioral data. Second, this research focuses on sharing businesses in the fashion industry and the data about consumer engagement with sharing businesses in the fashion industry stem from Belgian consumers, which may limit the generalizability of this research. Therefore, future research may focus on repeating this study among consumers in different countries and different industries (e.g., Böcker & Meelen, 2017; Cocquyt et al., 2020; Möhlmann, 2015). Finally, future research can generate a better understanding of consumer engagement with sharing businesses that vary along different dimensions by considering how not only consumers' sustainability orientation but also other consumer characteristics like socio-demographic variables affect this relationship (e.g., Böcker & Meelen, 2017).

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Pricing and Revenue Models in the Sharing Economy

Steven Kane Curtis[1,*]

[1] The International Institute for Industrial Environmental Economics (IIIEE), Lund University | Lund, Sweden

* steven.curtis@iiiee.lu.se; stevenkanecurtis@gmail.com

Abstract

Research on pricing and revenue models in the sharing economy remains scant. The aim of this research is to describe revenue streams, and related business model attributes, observed within the sharing economy to support sharing platforms to remain economically-viable. Using web analysis, I developed an initial design construct, which describes five revenue model attributes and fifty configuration options observed across sixty-three sharing platforms.

Keywords

sharing economy, revenue models, revenue streams, sustainable business models, business model experimentation

INTRODUCTION

One truth of sustainable business models is they must be financially viable, given the context they are embedded within. Without radical changes to how we internalize environmental and social externalities, new business models face the same market pressure to create, deliver, and capture economic value. With this in mind, I see academia has a role to support new business models to be competitive and remain viable.

One area where we have seen immense growth of new business ventures is in the circular and sharing economy. These initiatives may contribute to sustainable consumption and production (Gupta and Chauhan, 2021; Junnila et al., 2018), but only if they are able to remain economically viable (Acquier et al., 2017). As such, there is a need to elaborate on the relevant pricing and revenue models to support successful design and implementation of these potentially-sustainable business models. The focus of this conference paper will be on new business models within the sharing economy. I position the sharing economy as part of the circular economy, as it slows resource loops by increasing intensity of use and extending product lifetimes.

The sharing economy is said to facilitate temporary *access* to idling goods and services (Belk, 2014). The business models operating within the sharing economy – i.e. sharing economy business models (SEBMs) – generally create a two- or multi-sided market, utilizing technology to reduce transaction costs associated with accessing the market and mediating an exchange (Curtis and Mont, 2020). Furthermore, the use of technology to connect users in this way supports sharing platforms to be economically viable, by leveraging economies of scale (de Rivera et al., 2017).

However, according to Ritter & Schanz (2019), literature remains scant describing revenue models in the sharing economy. Instead, the focus of research has primarily been on the financial relationship and monetary flow between users involved in sharing (Ritter and Schanz, 2019). Therefore, the aim of this research is to support sharing platforms to achieve economic viability or remain economically-viable, especially throughout the COVID–19 pandemic, by describing to the greatest extent possible the revenue streams, and related business model attributes, observed within the sharing economy. As such, I ask the following research questions – *how are revenue models configured within the sharing economy; and, how may design choices (e.g. platform type, shared practice) influence the implementation of revenue models in the sharing economy?*

To answer these questions, I engaged in descriptive and design-oriented research, using multi-methods including web analysis and literature review, to explore and explain pricing and revenue models in the sharing economy. This research seeks to contribute to literature and practice, by developing a design theory to support academics and practitioners to design and implement pricing and revenue models in the sharing economy.

BACKGROUND LITERATURE

The business model and the revenue model concepts are distinct but complementary (Amit and Zott, 2001). Whereas the business model describes how companies create, deliver, and capture value for their customers (Osterwalder and Pigneur, 2010), the revenue model "… is primarily concerned with value appropriation" (Amit and Zott, 2001, p. 515). In other words, the revenue model focuses on how value is captured. One could think of the revenue model as part of value capture, nested within the larger business model (Berger, 2018).

Of course, the specific definition of a *revenue model* varies across literature and disciplines. I suggest this is, in part, due to a change in terminology in the business model canvas framework proposed by Osterwalder et al. (2005; 2010). Their earlier work used the terminology "revenue model" to describe "… the way a company makes money through a variety of revenue flows" (Osterwalder et al., 2005, p. 10). In their follow-up work, this formulation was replaced by "revenue stream" to describe "… the cash a company generates from each customer segment" (Osterwalder and Pigneur, 2010, p. 30). For the purpose of this conference paper, I suggest a revenue model:

> *"… refers to the specific modes in which a business model enables revenue generation"* (Amit and Zott, 2001, p. 515).

This definition does not specify the type of value (e.g. economic, environmental, social, societal/public value); however, I only focus on economic value in this conference paper. The revenue model includes all relevant business model attributes relating to pricing and revenue, which support the business to cover costs and create profit (Hummel et al., 2005; Wirtz, 2001). Furthermore, I think it is important to distinguish between the revenue model and the revenue stream. I suggest the revenue stream only includes the financial flow captured by the company, whereas the revenue model describes the larger pricing strategy, including business model attributes *price discovery*, *pricing mechanism*, *price discrimination*, *revenue stream*, and *revenue source*.

Ng (2010) proposes four aspects that will radically transform pricing and revenue models in the coming years: *access over ownership*, *value co-creation*, *complexity*, and *context*. While sharing economy business models certainly exhibit *complexity* (e.g. business model attributes, interactions with users) and *context* (e.g. *how*, *when*, *where* users abstract value), I will focus on access over ownership and value co-creation further.

Firstly, the sharing economy is said to facilitate *access over ownership* (Harmaala, 2015; Light and Miskelly, 2015; Martin, 2016; Milanova and Maas, 2017). With this, the relationship between the consumer and the product changes, where a payment provides access rights instead of exchange of ownership. With increasing environmental impact as a result of household consumption (Ivanova et al., 2016), new business models that facilitate access will help to reduce net consumption and improve material efficiency (Belk, 2014; Seegebarth et al., 2016). However, in a different way from ownership, access necessitates changes to a company's revenue model, which is responsive to stock, market demand, and users' willingness to pay (Ng, 2010). This is resulting in advancements in revenue management models, utilising technology to effectively manage pricing in a complex and dynamic market (e.g. Uber's dynamic pricing model).

The second aspect driving change in future pricing and revenue modes is *value co-creation*. Broadly, value co-creation describes the processes and practices that a company and their customers engage in collaboratively to create value (Prahalad and Ramaswamy, 2004). In the sharing economy, the business model merely facilitates value co-creation between users (e.g. resource owner, resource user) (Curtis and Mont, 2020). The users themselves must engage in key activities in order co-create value, with the platform mediating the interaction and/or exchange (Buhalis et al., 2020; Curtis and Mont, 2020; Ferrell et al., 2017). Therefore, the time and attention of users involved in the exchange is important to ensure quality experience, and future pricing and revenue models must be responsive to this change (Ng, 2010)

METHOD

In previous research, I developed a sharing economy business modelling tool, which describes three value dimensions, sixteen business model attributes, and sixty-seven business model choices (Curtis and Mont, 2020). This previous research identified several relevant business model attributes descriptive of the revenue model: *price discovery, revenue stream, revenue source, pricing mechanism,* and *price discrimination* (Curtis and Mont, 2020). It is these revenue model attributes and initial configuration options that serve as the starting point for analysis. These attributes describe those business model attributes relevant to the pricing and revenue model, and configuration options describe the different choices available for each attribute.

To investigate each sharing economy business model, I engaged in web analysis. Content analysis of web data has emerged as a primary method for data collection and analysis since the advent of the Internet in the early 1990s (Herring, 2010). Building on the methodological work of McMillan (2000) and Herring (2010), I conducted a four-step web analysis: 1) formulate a research objective; 2) select a sample; 3) code data qualitatively; and 4) analyse and interpret coding results to develop descriptive categories.

The unit of analysis was the sharing economy business model. I investigated a sample of sixty-three existing SEBMs (Appendix A) representing diverse geographies (e.g. local, national, international), platform types (e.g. peer-to-peer, business-to-consumer, crowd cooperative), and shared practices (e.g. shared space, shared mobility, shared goods). Data was collected from their websites, including homepage, about us, frequently asked questions, terms of service, privacy statement, blogposts, among other relevant pages. Additionally, social media posts from the platforms were collected, especially when website data was limited. This was often the case for niche platforms, which used social media instead of their website to communicate directly with their users. I leveraged the NCapture web browser plug-in to import webpages and social media posts as data into NVivo. NVivo is a computer-assisted qualitative data analysis software (CAQDAS), developed by QSR International, to manage, structure, and analyse qualitative data.

I initially coded the data based on the categories presented in the *Sharing Economy Business Modelling Tool* developed in previous research (Curtis and Mont, 2020); however, I was open to new configuration options as they emerged from the data. The qualitative analysis of empirical web data resulted in categories corresponding to each configuration option. Then, for each platform, the qualitative data was translated into quantitative data. Using Microsoft Excel, for each platform, I used binary coding to record a 1 for the presence of a configuration option and a 0 for its absence as part of the revenue model (Tangour et al., 2019). The qualitative dataset supports the elaboration of each configuration option with examples from existing SEBMs; the quantitative dataset allows for future statistical analysis to support the design and implementation of revenue model attributes in particular contexts.

PRICING AND REVENUE MODEL IN THE SHARING ECONOMY

The outcome of this research is a design artefact (Figure 7), which captures the diverse revenue model attributes in the sharing economy, with a full description of each configuration option included in the Appendix B. This initial construct describes five revenue model attributes and fifty configuration options observed across sixty-three sharing platforms.

FIGURE 7. PRICING AND REVENUE MODEL IN THE SHARING ECONOMY

Price Discovery	Free	Pay What You Can	Negotiation / Bargaining	Auction	Bartering	Set by Resource User	Set by Resource Owner	Set by Platform	
Revenue Streams	None	Transaction Fee	Commission	Subscription Fee	Membership	Advertisements	Data Mining	Sponsorship	Donations
	Public Project Funding	Private Project Funding	Fines or Fees	Lead Generation	Usage Rates	Convenience Fee	Promotions	Buy-Out	
	Credits, Tokens, or Digital Currency	Additional Services	Service Retainer	Verification	Franchise	Revenue Sharing	Ownership Share	Registration Fee	
Revenue Source	None	Volunteer	Other	Resource Owner	Resource User	3rd-Party			
Pricing Mechanisms	None	Static Pricing	Dynamic Pricing	Differential Pricing					
Price Discrimination	None	Feature-Based	Location-Based	Quantity-Based	User-Based	Access-Based	Market share-Based		

Price Discovery – describes the mechanism by which the price in a market is determined (Bakos, 1998). For example, as the sharing economy often operates as a two-sided market, the platform may not set the price, instead the price is set by the resource owner or resource user (Curtis and Mont, 2020).

Revenue Stream – describes the financial flow that allows the platform to capture economic value as a result of delivering its value proposition.

Revenue Source – describes the source (e.g. resource owner, resource user) of the financial flow to the platform. Specifically, this places emphasis on the financial relationship between users and the platform, instead of between users (Curtis and Mont, 2020). For example, while a resource user may pay a resource owner to access a shared asset, it may be a membership fee paid by the resource owner that is the financial flow to the platform.

Pricing Mechanism – describes the influence of the market, and elasticity of demand, on the price of shared assets.

Price Discrimination – describes changes in the price based on characteristics of the product, user, or market.

NEXT STEPS

In the coming months, I will triangulate these empirically-derived configuration options with literature. For example, I will conduct a Scopus database search of all documents in English using the query ["sharing economy" AND ("revenue streams" OR "revenue model" or "pricing model")]. To capture all relevant literature, other synonyms may be considered. I will examine the title, abstract, and keywords to assess relevance, and review references to capture other relevant business model literature. The final sample will be imported into NVivo and analysed abductively. First, I will inductively code all distinct revenue streams and related attributes described in literature. Then, I will deductively code all identified configuration options presented in the above model. Next, I will triangulate the coding results in order to merge configuration options, identify new configuration options, and define all configuration options. Finally, I will provide an example for each configuration option, based on the empirically-observed SEBMs or literature.

Beyond this descriptive analysis, I intend to compare the empirically-observed configuration options based on *platform type* (e.g. peer-to-peer, business-to-consumer), *shared practice* (e.g. shared mobility, shared goods), *geographical scale* (e.g international, local), and *value orientation* (e.g. commercial, environmental). If possible, using statistical software, by looking at "real-world" occurrences, this comparison may establish patterns between revenue models based on context. Furthermore, I will aim to capture qualitative insights across those sharing platforms investigated to explore which revenue models lead to greater value co-creation and stakeholder engagement.

Ideally, this research will result in a peer-reviewed journal article contributing to literature on the sharing economy and sustainable business models. Furthermore, the resulting design theory may be translated into knowledge and tools to support sharing platforms design and implement economically-viable business models.

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Appendix A. Sharing Platforms

Airbnb

Bike Share Toronto

BikeSurf

BKSY

BlaBlaCar

Bunz

Communauto

Connectcar

Couchsurfing

de Windcentrale

Djeepo

DropBike

FaceDrive

FlipKey

Freedom Boat Club

FreshRents

GoBoat

GreenWheels

HeelNederlandDeelt

HiRide

HomeExchange

ImpactHub

International Home Exchange Network

JustPark

Kangaride

Karma

Lena Library

LoveHomeSwap

Lyft

Mobike

MyWheels

Not Far from the Tree

Peerby

Planned

Poparide

Privateshare

reheart

Rent Frock Repeat

Rover Parking

SailTime

Seats2Meet

ShareNow

Sjipit

SmartCommute

SnappCar

Spacefy

Spaceishare

Spaces

Stashii

SwapSity

Swimply

Toronto Seed Library

Toronto Tool Library

Turo

Uber

Urbee

Vandebron

VRBO

WarmShowers

Wework

Woningruil

Zimride

Zipcar

Appendix B. Description of Attributes and Configuration Options

Price Discovery	Free	Allow users free access to the platform and its primary offering, using additional sources to generate revenue (e.g. donation, crowdsourcing, advertising)
	Pay What You Can	The resource user offers to pay to access an asset provided by the resource owner.
	Negotiation / Bargaining	The price may be negotiated and agreed upon between the resource owner and resource user, which may or may not involve the platform.
	Auction	Resource users bid to access a shared asset, with the highest bid winning.
	Bartering	Allow users to exchange non-monetary compensation for a product or service
	Set by Resource User	In a multi-sided market, the resource user set the price of the exchange
	Set by Resource Owner	In a multi-sided market, the resource owner set the price of the exchange
	Set by Platform	The price is set by the platform.
Revenue Stream	None	Sharing platform is volunteer-run with no sources of revenue
	Transaction Fee	One-time charge to users each time the good or service is accessed
	Commission	A percentage fee charged to either side of the market, similar to a service fee (e.g. 15% of the price)
	Subscription Fee	Recurring cost to users for access to goods or services
	Membership	Recurring cost to users for access to the platform
	Advertisements	hosting advertisements on your website or targeting users with paid advertisements (e.g. google ads)
	Data Mining	using or selling user data to target additional advertisements/sales
	Sponsorship	external individuals or businesses providing financial resources in exchange for advertisements or naming rights
	Donations	external individuals or businesses providing financial resources for nothing in exchange (maybe with the exception of a pen, t-shirt, mention in newsletter, etc.)
	Public Project Funding	grant money received as a result of a successful funding proposal
	Private Project Funding	Venture capital, private investment, equity, etc.
	Fines or Fees	for example, fines for damage or late fees
	Lead Generation	users are steered towards other services, which provide additional revenue. This may include services offered by the platform (e.g. buying a product, with mark-up), or additional services offered by another entity, which pays the sharing platform a small fee for leads generated

	Usage Rates	variable fee per transaction, based on duration and frequency of access to the shared resource (e.g. €5 / day or €7 / 2 days, access to shared resource 4 times in a month)
	Convenience Fee	a percentage fee, to cover operating costs associated with managing the platform (e.g. 1.5% of the price)
	Promotions	a service or shared resource beyond the traditional offering, which is available for a limited time, designed to grow the number of users on the platform
	Buy-Out	revenue generated from the sale of shared resources (e.g. a dress that a user purchases after renting the dress and liking it)
	Credits, Tokens, or Digital Currency	revenue generated from users purchasing credits, tokens, or some other digital currency, which can only be used on their platform to access shared resources
	Additional Services	Platform offers extra or additional services beyond their primary offering, typically for a higher margin, for example, user alerts when resource becomes available, consulting with business or government, among others
	Service Retainer	Users or organisational partners pay a fee to provide a service, often to an existing community (e.g. university or corporate partners pay to make available a carsharing service to their community).
	Verification	Charge a fee to verify a user's identity, thus increasing trust on the platform.
	Franchise	Allow franchisees to licence the business concept – including training, branding, technical infrastructure – for a recurring fee and/or revenue sharing.
	Revenue Sharing	When operating as nodes or franchisees, revenue is shared with the central organisation and/or each other to support operating costs.
	Ownership Share	Users pay a fee, in return gaining access to a share of a collective good (e.g. renewable energy infrastructure).
	Registration Fee	A fee charged to users only once, to register on the platform and gain access to its offerings.
Revenue Source	None	The platform does not collect any revenues.
	Volunteer	The platform relies on the time of volunteers to support their operations.
	Other	The platform receives donations from the broader community, for example, via crowdfunding.
	Resource Owner	The platform charges a fee to the resource owner, on the supply-side of the market
	Resource User	The platform charges a fee to the resource user, on the demand-side of the market
	3rd-Party	The platform receives revenue from actors outside of the exchange, for example, advertisers, buyers of data, sponsors, or funding bodies.
Pricing Mechanism	None	No revenue streams influenced by the market.
	Static Pricing	Describes the process of a platform setting a fixed price based on market conditions, which change infrequently and in a stepwise manner.

	Dynamic Pricing	Describes real-time data on supply and demand to adjust the price (e.g. surge pricing).
	Differential Pricing	Describes offering the same product to users at different prices, based on the market and user characteristics or behaviour
Price Discrimination	None	The platform does not influence the price based on characteristics of the product or market.
	Feature-Based	Describes price differences due to features of the platform or features of the product. Some users may pay to access certain aspects of the platform (e.g. user forum or training), and some users may pay to access products with better features (e.g. professional version).
	Location-Based	Describes price differences due to the location of the product or market. The product may be geographically distant, which may increase the price. Moreover, features of the market location (e.g. San Francisco) may demand higher prices.
	Quantity-Based	Describe pricing differences based on the number of goods a resource owner has available on a platform or the number of items a resource user is accessing at any given time.
	User-Based	Describes price differences based on characteristics of the user using the product that influences its cost (e.g. age)
	Access-Based	Describes changes in the price of the product or service based on the duration of use, for example, a carsharing platform offering a variable price per hour, not exceeding a flat price per day.
	Market Share-Based	Describes variable pricing based on the number of customers the platform services.

Value co-creation through actors engagement for the implementation of circular economy solutions in the chemical sector

D. Xevgenos[1, 2*], Sandra Meca[3], K. Panteleaki Tourkodimitri[1], Wytze van der Gaast[4], Miguel Cano[5]

[1]SEALEAU BV, The Netherlands; [2]Applied Sciences Faculty, TU Delft, The Netherlands; [3]EURECAT, Barcelona, Spain; [4]Joint Implementation Network, The Netherlands; [5]IQE, Zaragoza, Spain

*d.xevgenos@sealeau.com / d.xevgenos@tudelft.nl

In the literature on Circular Economy Business Modelling (CEBM) and Sustainable Business Model Innovation (SBMI), a gap is observed between the design and the market implementation of circular economy solutions proposed by scholars or/and practitioners (Bocken et al., 2019; Breuer et al., 2018; Geissdoerfer et al., 2017). To gain a fuller understanding of why industries and market actors are reluctant or fail to adopt circular economy solutions, in-depth qualitative research is required.

The aim of this research work was to develop a framework for the co-design of circular economy business models in multi-stakeholder innovation projects, whereby key relevant actors are effectively engaged to design and develop a solution reflecting their interests; thus enabling its further market implementation. The authors investigate and validate the proposed framework through a practical case study in which the end-user (industry) is in need to adopt a circular economy solution to meet the anticipated drastic market demand growth. This work relates to the ZERO BRINE project, and specifically to the demonstration of an innovative circular economy solution in a chemical factory in Zaragoza, Spain, that is active on the precipitated silica sector.

The precipitated silica sector is anticipating a drastic market demand increase in the coming years, especially because of the rise of the green tires market. In Europe, there are 11 precipitated silica manufacturing sites owned by six manufacturers, many out of which are unable to meet the anticipated market demands due to local regulatory restrictions that forbid the discharge of more wastewater effluent to the surface water bodies. This is limiting their business growth. To be able to grasp this business opportunity, the precipitated silica manufacturers require research into suitable wastewater treatment solutions that will also be in line with the current policy requirements around circular economy, decarbonization strategies, as well as zero pollution initiatives that are being adopted in Europe, but also at a global scale.

The development of the framework follows a Design Science Research (DSR) approach (Adner & Kapoor, 2010; Dresch et al., 2015; Gregor & Hevner, 2013; Peffers et al., 2007), as depicted in Figure 8 and further explained in the paragraphs below. The last 15 years has seen a surge of interest in Design Science Research (DSR) in information and software systems engineering, which was originally introduced by Hevner et al. (2004). In our work, DSR methodology is used to design artifacts within a context, as suggested by Wieringa (2014) through the marriage of design and empirical research. Artifacts incorporate tools to deal with organizational and innovation challenges; thus, this method is suitable for our research. We further adapt this framework by incorporating the concept of "Community of Practice", or CoP in short, with the view to deal with the "design-implementation gap" that is targeted in the research problem that we want to address. CoPs can be defined as " social learning systems that bring together people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Fulgenzi et al., 2020; Wenger-Trayne & Wenger-Trayne, 2015). Therefore, CoPs bring together relevant stakeholders to develop a common understanding of a certain topic, to arrive at solutions that are co-developed, supported, and finally accepted by all involved parties. This way, we aim to keep the key relevant actors, and their goals, values, expectations in the picture and **engaged** throughout the design process for the solution to be implemented. The incorporation of the CoP in the total framework is further discussed in the paragraphs below by phase of the design cycle followed in our work.

Phase 1**:** Background studies. Within this phase, we performed a literature review regarding the case study, i.e., the precipitated silica industry. During business modelling, it is important to invest time and effort in 'market literacy' i.e., to characterize the market environment in which you want to operate and identify barriers and blockages, as well as enabling factors. Further to that, a review on the technical aspects related to wastewater characterization & its treatment using conventional and innovative technologies was carried out, as well as relevant to policy developments related to this particular sector. A document that includes key information for the sector and has been studied and used extensively in our work was the Best Available Technique Reference document that has been developed by the European Commission for this sector (European Commission, 2007). All information is collected to support the design of the artifact (Phase 3). In order to present the collected information in a concise and easily understood fashion, a market map (see Figure 9) is formulated with a detailed description and analysis of the (i) the market value chain, i.e. the actors that add economic value to the product, (ii) the enabling business environment, i.e. policies, trends etc. that influence the market environment, which also includes the service providers, i.e. business or extension services that support market operations are illustrated in line with the market system mapping conceptual framework (Albu & Griffith, 2005; Nikas et al., 2017). The market system map is a useful tool to provide insights also for which stakeholders are needed to be included in the CoP, from the "social context" perspective (mostly market actors, policy-makers, industry associations etc) of our framework. These stakeholders were included in the "peripheral section" of our CoP group of stakeholders (see also Figure 8).

In ***Phase 2***, ***Phase 3***, and ***Phase 4*** the core team of the CoP is identifying, co-designing and validating the artifact respectively. The artifact is the "***circular business model*** *for the value creation, capture & delivery from the wastewater generated by the precipitated silica sector*".

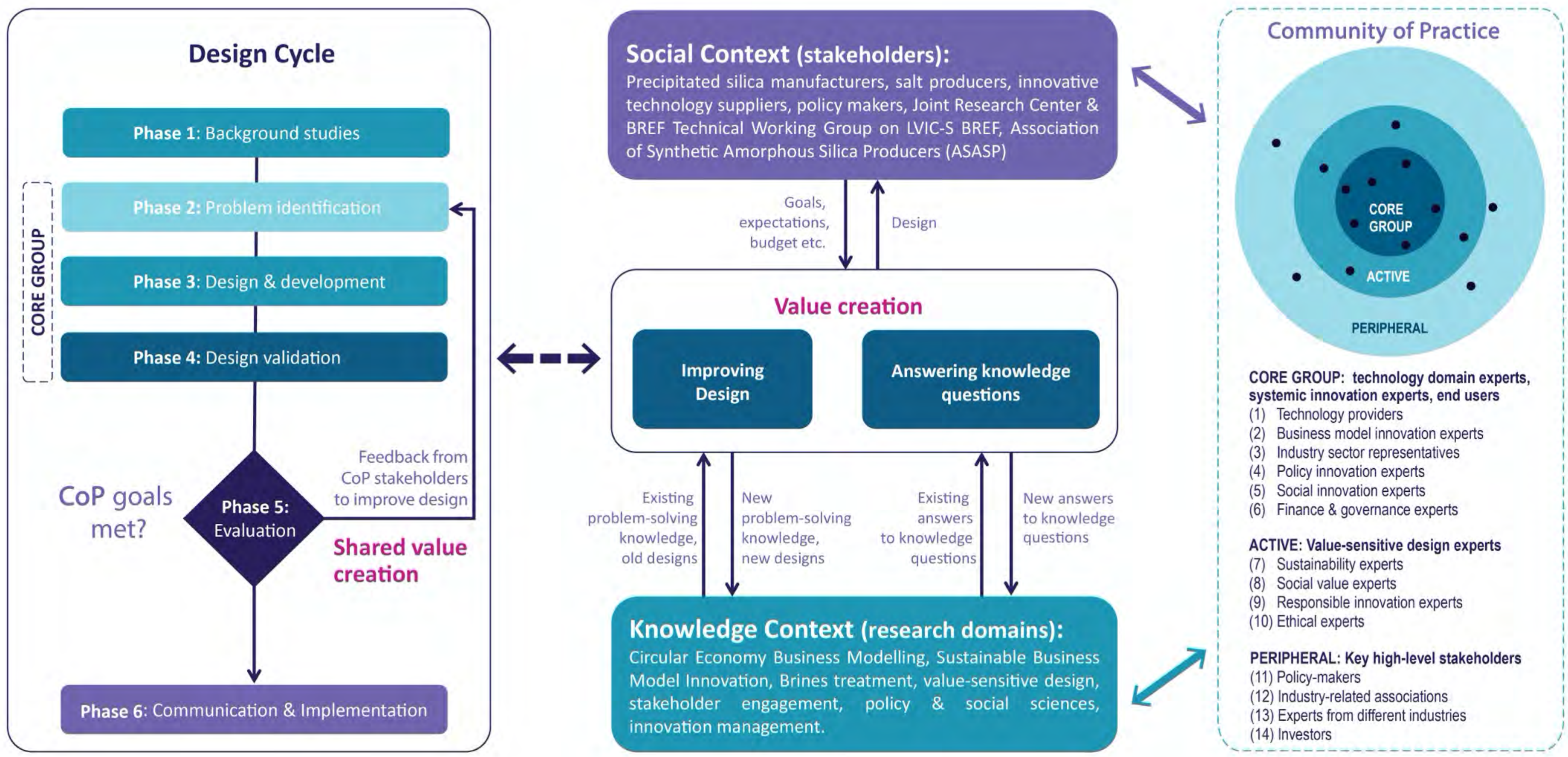

Figure 8. Proposed value co-creation framework for developing and successfully implementing CEBMs, based on the DSR approach in our research

In recognition of the complexity of the nature of Circular Economy solutions, for successful market implementation a systems-wide perspective is needed, based on challenge-driven and solution-oriented innovation strategy. For this systemic innovation skills are required to be brought into the CoP discussions, including experts from business model, regulatory and social innovation, apart from technical innovation experts. In order to design this artifact in a context, the core group is formed in a way to include representatives from the industry sector, these are the end-users ("problem owners"). The systemic innovation experts and the end-user comprise the core team of the Community of Practice. The authors of this work comprise the core team of the CoP that was developed to design the CEBM for the precipitated silica case of the ZERO BRINE project. The core team meets on a regular basis (biweekly) in a group setting during the established CoP Meetings. When specific expertise is needed or/and missing, this is sought within the ZERO BRINE project from the broader "Active group" that has the resources and is sufficiently engaged for active interaction. The whole process is moderated by the Innovation Manager of the project (lead author of this paper) and is facilitated by the person in charge of the technical demonstration, having also the possibility and communicate/interact with local, regional and national (Spanish) stakeholders (2nd author of this paper). In all meetings, the representative from the industry for which the solution is being designed is always present (final author of this paper), ensuring that the artifact and the findings are valid and relevant.

In ***Phase 5****: Evaluation.* After validating the design of the circular business model (artifact), the findings are being evaluated by the core group, but also by a wider set of key high-level stakeholders, named as "peripheral group" in our framework (see also Figure 8). After the findings have been evaluated, iterations from Phase 2 to Phase 5 are carried out, so that the proposed CEBM for the target sector is refined to the point that the CoP goals are met and thus market implementation can be enabled. So far, the first results of the application of the proposed framework to the precipitated silica market have been presented to experts from (i) the Joint Research Center team that developed the BREF document for the sector, (ii) the Association for Synthetic Amorphous Silica Producers (ASASP) and (iii) experts from different industries that participated in the EU Industry Days 2021 conference organized by the European Commission (see here).

Our contribution to the CEBM and SBMI fields is twofold. First, we contribute to addressing the "design-implementation gap" by enabling the uptake of a circular economy solution in the chemical industry (i.e. precipitated silica sector). We identify the most significant factors that can enable or/and hinder the implementation of a circular economy solution for the target sector, through interviews and focus group discussions, organized in what we called "Community of Practice" or CoP in short. Technical innovation relies on the implementation of innovative membranes technology that enable high water recovery factors (approx. 85%) and water recycling, as well as innovative crystallization (Eutectic Freeze Crystallization) technologies that enable recovery of secondary materials, more particularly sodium sulfate (Xevgenos et al, 2019). This work investigated the significant economic benefits that circular economy can bring to the chemical sector (precipitated silica sector), as part of the ZERO BRINE project. Other sectors investigated within ZERO BRINE have been reported elsewhere (Xevgenos et al, 2020). The economic actors across the market chain, as well as their linkages, are identified. Furthermore, the trends that affect the market-chain along with the powers and interest that drive change are revealed.

From this qualitative research based on this case study, we then take a more theoretical orientation by developing a framework that can be used by scholars and practitioners of the field to design circular economy solutions that reflect the needs of the targeted stakeholders. Focusing on the case of the European precipitated silica market can help develop more robust theories, as well as potentially informing future policy objectives, and most importantly policy-makers that are currently revising the Best Available Techniques for this sector. Addressing this problem will create practical benefits for the precipitated silica sector and the chemical sector at large, and contribute to an understanding of the wider design-implementation gap.

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Keywords

Circular Economy Business Modelling, Sustainable Business Model Innovation, Circular Economy, Communities of Practice, Value Creation.

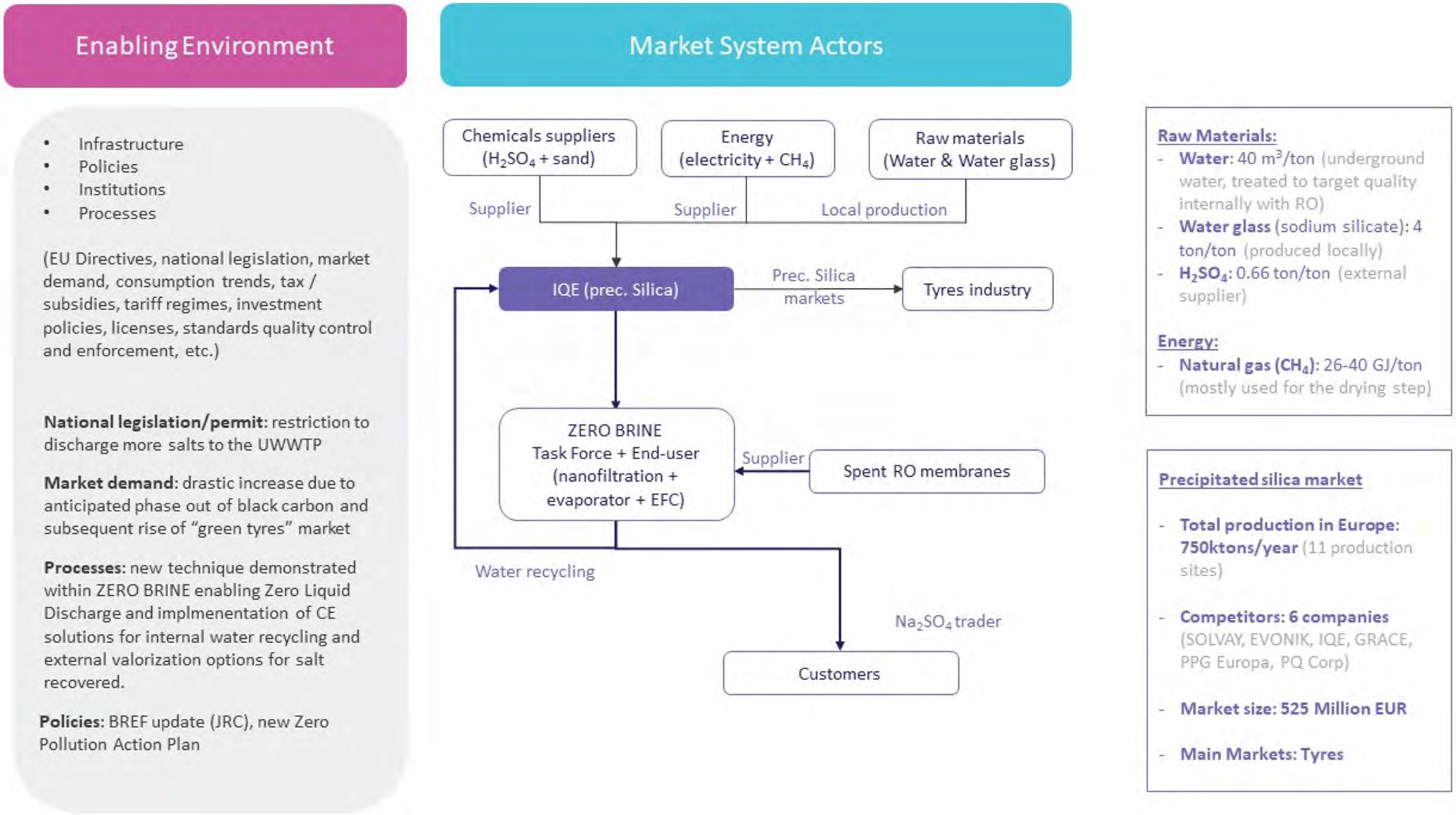

FIGURE 9. MARKET SYSTEM MAP (OUTCOME OF PHASE 1 OF THE DESIGN CYCLE RESEARCH METHODOLOGY FOLLOWED)

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Track 2.3.

Entrepreneurship and Sustainable Business Models

Track 2.3. Entrepreneurship and Sustainable Business Models

Track chair: Jonas Gabrielsson
Halmstad University, Sweden

This track seeks to advance research on sustainable business model by exploring its connection to the scholarly field of entrepreneurship. The track addresses this connection by linking the concept of sustainable business models to issues such as entrepreneurial cognition, opportunity creation/discovery/development, and new venture outcomes such as survival and growth.

Going Circular: Novel Business Model Design for Start-ups in the Dutch Plastics Economy

Fernando Caasi Lit[1],*, Josephina Cornelia Catharina Maria Huijben[1], Myriam Maria Anna Helena Cloodt[1], Erik Paredis[2]

1 Department of Industrial Engineering and Innovation Sciences, Eindhoven University of Technology, Eindhoven, The Netherlands; 2 Centre for Sustainable Development, Ghent University, Ghent, Belgium

* f.c.lit@tue.nl

Abstract

Plastics are an integral material to the European economy, but they remain embedded in a system that produces waste by design. The circular plastics economy has been envisioned as an alternative that will preserve the value of plastics while also reducing their negative impacts. In the transition towards such a system, the development of innovative circular business models (CBMs) plays a vital role.

CBMs in the circular plastics economy remain highly centered around recycling, a widespread strategy that does not require a shift in the core business model. While undoubtedly beneficial, incremental progress is not enough to enact a circular transition. Thus, this paper explores the business models of circular start-ups (CSUs) as they are expected to adopt more disruptive CBM approaches that might accelerate the circular plastics transition. The method combines a literature review and multiple case study. Research-based CBM design principles are derived from a systematic review of the literature on CBMs and their barriers/drivers. These are then validated through semi-structured interviews of Dutch start-ups in the circular plastics economy, while simultaneously revealing new insights from practice. The synthesis of both academic and practitioner knowledge results in robust recommendations for future entrepreneurs in designing circularity into their business models.

Upon completion, the study will have mapped CBMs in the Dutch circular plastics economy, created a deeper understanding of barriers and drivers influencing CBM in this context, and distilled a set of recommendations for entities in the plastics economy aiming to design new circular business models.

Keywords

Circular plastics, circular business models, circular start-ups, barriers and drivers, business model design

Modelling Shared Value Creation: Multinationals in the field of the Bottom of the Pyramid

Rick Hoogeveen[1] and Bartjan Pennink[2]

[1]. Master student International Business and Management, University of Groningen, The Netherlands

p.h.hoogeveen@student.rug.nl

[2]. Assistant Professor, Faculty of Economics and Business, University of Groningen, The Netherlands

b.j.w.pennink@rug.nl

Abstract

Research aim: This research aims to contribute to the theoretical development of Shared Value Creation by further developing the causal model of Gerrits & Pennink (2021) for explaining relevant factors influencing the process of shared value creation. By applying the causal model to the context of the Bottom of the Pyramid on both the micro- and meso-level, we want to further generalize the usage of it.

Design: This research will be executed by conducting 10 case studies (companies) in which we will interview stakeholders with a different position in the value changes of these companies. Examples are managers of MNEs operating at the BoP, independent BoP experts and Representatives of Government organization with a focus on development economics (like in the Netherland; FMO).

Findings: Looking at potential results, we expect to find differences in the role of the institutional context. As the government role is less prominent in a BoP context, we expect the institutional context to have a different effect on shared value creation. The institutional context will most likely have less stimulating factors for shared value creation, which forces a multinational to focus on other factors when creating shared value. Besides the expectations related to the institutional context variable, we expect the relation between the independent and dependent variable (shared value) to be weaker. In the setting of cooperatives it is more common to discuss on the values that are central compared to settings in which the added value is more focused on profit.

Limitations: The current study is still in a preliminary stage. More research is needed to further develop the concept.

Contributions: This study uniquely contributes to the knowledge of the concept of Shared Value Creation by further developing a causal model that can be applicable to multinationals at the Bottom of the Pyramid as well.

Extended Abstract

After the first publication of Porter & Kramer (2011), the concept of CSV has gained a lot of attention by practitioners and has been implemented in many prominent multinationals. Further research has been started about the specific values that are being created and shared, the actors that are involved in the CSV process, the relationships between the actors involved, and how these relationships evolve over time. However, a large part of the concept is still in an early stage, with very little theoretical understanding about the overall impact and consequences of CSV. This has led to a demand for a comprehensive causal framework that further explains the conditions for- and success factors of shared value creation (Austin & Seitanidi, 2012; Von Liel, 2016; Husted & Allen, 2007).

Gerrits and Pennink (2021) have made a start in developing a causal framework that analyses the dynamics and relationships between values and actors in a CSV context. By analysing Dutch and Belgium cooperatives in the energy sector, they distinguished that the *professionalization* of companies, the *number of actors*, the *variety of values*, the *amount of cooperation*, and the *institutional context* are all factors that have an influence on the CSV creation.

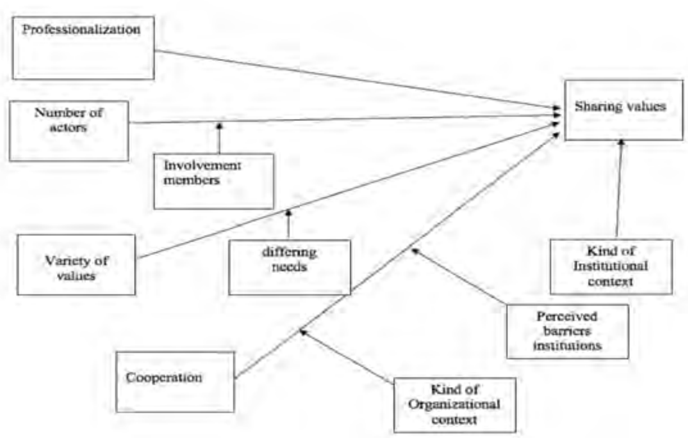

Figure 1. Causal model explaining shared value creation (Gerrits and Pennink, 2021)

The causal model (see figure 1) has its value in gaining more insights in the factors stimulating shared value creation, but still has its limitations as well. The current model is based on case studies from cooperatives only. This can be seen at one of the moderating values, *involvement of members*, which is less present in companies who have an organisational structure other than a cooperative.

To increase the generalisability and validity of the causal model, this research will explore the dynamics in a different context. We want to see what happens if we apply the model in situations where Multinationals are doing busines in the context of the Bottom of the Pyramid, and distinguish which factors are still relevant indicators for explaining shared value creation. By further developing the model (Gerrits & Pennink, 2021) we will make a first step in the generalization of the conceptual causal model to a broader context, and further improve the validity of the content. In this way, we can thoroughly understand factors that play a role in improving or constraining shared value creation. With this knowledge, multinationals can still truly benefit from the economic opportunities at the BoP, while *simultaneously* creating added value for people involved in the BoP.

This research will contribute to the literature by focussing on shared value creation at the BoP on 2 levels; the micro- and meso-level. The micro-level of shared value creation focusses on the processes that happen *within an MNE* to create shared values at the BoP. Important questions at the micro-level are about how individuals within MNEs interact with one another and align on the importance of the different values created. How do these conversations look like, and what is the process behind created common values.

Consequently, the meso-level zooms out to the *organisational* level of shared value creation. Now the interactions *between* different actors, organisations or institutions becomes important. So how do important actors as MNE's, NGO's, local communities and governments agree on the shared values created, what is the process behind this, and how do they cooperate with one another? Lastly, this research will examine the interdependencies between the two levels, and show in which way interactions at one level influence shared value creation at the other level.

Important to recognize is that the independent variables of the causal conceptual model of Gerrits & Pennink (2021) partly cover micro-level factors, partly focus on a meso-level analysis, and partly encompass both levels of analysis. Whereas the variable *professionalization* is focussed on processes within companies (micro), the *kind of institutional context* covers meso-level factors. The other factors *cooperation, variety of values,* and *number of actors* are applicable to both the micro- and meso-level of shared value creation. By analysing shared value creation at the BoP from both a *micro- and a meso-perspective*, this research aims to distinguish which factors of the causal conceptual model of Pennink & Gerrits (2021) are relevant indicators of the amount of shared value creation. The goal is to distinguish which variables play a role on each level (micro, meso, combination), and to which extend the factors can be used as significant indicators of sharing values. Next to that, this research will explore whether shared value creation at the BoP constitutes other factors that should be incorporated in the causal conceptual model as well.

This thesis utilizes a qualitative, multiple case-study research design to find answers to the open research question. The concept of CSV at the BoP can be perceived as a nascent theory, with limited theoretical understanding about the concept. This makes it suitable to use an exploratory qualitative research design with an open research question, as it allows for inductive theory building (Doz, 2011). With case studies of MNEs operating at the BoP, the causal model of Gerrits and Pennink (2021) will be further developed to gain more insights in the factors explaining shared value creation. This will be done by interviewing experts from different backgrounds, to get various perspectives on the topic. Criteria's for selecting proper case studies are (1) the involvement of an MNE in the shared value creation process, (2) the focus on both economic and social/ecological values, (3) the focus on customer groups with a daily spending of no more than US$4.79, which is in line with the BoP definition of Subhan and Khattak (2017), and (4) a form of cooperation between MNEs and other actors operating at the BoP (e.g. NGO's, local communities, partnerships with local companies, governmental agencies, etc.).

The perspective of the multinational will be covered by interviewing managers at MNEs that are directly involved in the company's activities in the BoP. To cover the local stakeholder perspective, two types of case studies will be done. First, NGO's who are active at the BoP and represent the rights of local inhabitants will be interviewed. Secondly, interviews with the FMO will be conducted. The FMO is the Dutch entrepreneurial development bank who helps local entrepreneurs to aim for sustainable growth. Through its activities, the FMO has gained a lot of knowledge about shared value creation at the BoP. Lastly, independent experts with in-depth knowledge of the BoP will be interviewed to get a holistic and unbiased view on the matter.

Looking at potential results, we expect to find differences in the role of the institutional context. As the government role is less prominent in a BoP context, we expect the institutional context to have a different effect on shared value creation. The institutional context will most likely have less stimulating factors for shared value creation, which forces a multinational to focus on other factors when creating shared value. Besides the expectations related to the institutional context variable, we expect the relation between the independent and dependent variable (shared value) to be weaker. In the setting of cooperatives it is more common to discuss on the values that are central compared to settings in which the added value is more focused on one main value: profit.

Keywords

Creation Shared Value (CSV), Bottom of the Pyramid (BoP), Multinational Enterprises (MNE), Causal model

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Sustainable Seed

Theoretical Framework and Research Design to Explore Green Business Development in Start-Ups

Antoine Manès[1, *], Rita Adomaityte[2], Sukanthan Sureshkumar[3], Sofoklis Kyriazakos[4],

[1,2,3,4]Aarhus University;

*manesantoine@gmail.com

Abstract

While the green economy and investments are growing stronger, the latest generation of entrepreneurs holds important sustainability values and try to incorporate them to their business models. Therefore, green business development can hold a direct influence on the share value of start-ups and impact the core motivation of the founders thus, its ability to succeed. Share value and motivation are socially negotiated dimensions and the value of green business model is a multi-factorial social phenomenon. In this paper we aim at presenting a theoretical framework and research design to explore green business development in start-ups by addressing four research questions. How to identify the greenness of a startup? How green business models impact the appeal and share value of start-ups? What motivates founders to pursue green business development? How investors and founders interact when facing potential green business developments? We introduce our future research as part of large Scandinavian project aiming to help start-ups, to reduce the company's total energy consumption and / or convert to more renewable energy (green energy). The research aims at testing new green business models, methods and measurement technologies for analysis, development and documentation of companies' conversion to green business models. This paper will enrich our further research related to the motivation of the founders to implement green business models in their start-ups and examine how green business development influence start-ups attractiveness for the investors. We believe this paper is the commencing of new understanding of value creation in start-ups as a multi-factorial social phenomenon.

Keywords

Entrepreneurship, Green Business Models, Sustainability, Value, Motivation

Introduction

A start-up differentiates itself from a classic SME by two main factors: its potential for strong growth and its massive need for funding (Chevigny, 2015). These characteristics generate strategic cycles that are determined by funding stages between which the founders and existing investors try to maximize the share value of the company to achieve the primary of objective of the start-up: to grow.

While economic growth is the 8th Sustainable Development Goals, it is often perceived that there is a need of a tradeoff between economic growth and strong sustainable development with an increasing number of 'degrowth' advocates. Meanwhile, the green economy is growing larger, and the EU released a new Taxonomy to encourage sustainable investment which, in the context of green start-ups could mean a greater number of potential investors as startups are one of the core players for sustainable development (Hellström, 2007; Schaltegger, 2017). So, how green business models impact the appeal and share value of start-ups?

Additionally, the latest generation of entrepreneurs holds important sustainability values and try often to incorporate them to their business models. Pursuing green business models could reinforce the founders' engagement and belief in the project (Tiba, 2020).

Growth is a multifactorial phenomenon that can be studied through global explanatory models in which the founders and their motivations play a central role (Lasch, 2005). The founders' motivation for growth is determined by their abilities, needs, and the opportunities they perceive as presenting themselves to their company in terms of growth (Wiklund, 2006). Motivation itself is therefore not only determined by objective elements but also by the founders' perceptions and representations, particularly in terms of the expected consequences of growth. So, what motivates founders to pursue green business development?

Moreover, the strategies in start-ups are set up by the founders but are also influenced by the interactions between the founders and the governance mechanisms at work in the company (Bertoni, 2005). The various levels of governance systems (coercive or cognitive) shape the latitude and influence strategic choices (Writz, 2011). Moreover, startups who wish to deliver on their sustainable goals, have to leverage the collaborations that often occur in spontaneous entrepreneurial and innovation ecosystems (Leitafa,2013). Thus, there is a need to study the motivation behind the pursue of a new business development beyond the single financial value it brings.

The present papers aim at developing a theoretical framework and research design to explore the four research questions:

- How to identify the greenness of a startup?
- How green business models impact the appeal and share value of start-ups?
- What motivates founders to pursue green business development?

- How investors and founders interact and is there tension/divergence when facing potential green business developments?

As the boundaries between growth, motivation and green business model's development are not clearly evident we will use multiple sources of evidence to account for the evolving and complex nature of this social phenomenon. We will motivate the present methodology to conduct a qualitative research based on interviews and observations of start-ups in Denmark, Norway, and Sweden over one year. We will study start-ups at different funding stages and in different industries to cover a larger panel of variables.

The theoretical framework and research design presented in this paper will be the base for an international research collaboration aiming at improving the knowledge about the relationship between green entrepreneurial development and growth. By understanding those mechanisms, we hope to strengthen the impact realized by green business models.

How do we identify the greenness of the business?

Interest in the research field of sustainable business has been growing in the last two decades. Consequently, awareness in green business model research increased in the academic literature (Sommer 2012, Abuzeinab and Arif 2014, Nair and Paulose 2014). However, how do we know that business is green?

There have been few attempts in academic literature to define what the green business model is. One of the earliest definitions proposed by Sommer (2012) states, that the green business model "represents a significant improvement (discontinuous leap) in overall environmental performance relating to its entire value chain system vis-à-vis that of conventional business model". Abuzeinab and Arif (2014) highlighted two main pillars of the green business model: environmental improvement and economic benefits. Some authors highlighted innovation, flexibility, and sustainability as basic enablers in seeking a description of the green business model (Nair and Paulose 2014), when others stated that radical innovation can be brought through the improved environmental performance of the business (Pigosso, Schmiegelow et al. 2018). Despite these attempts, definitions do not provide a detailed description of what the green business model is.

Building on the definition of green business model and focusing on environmental and economic value, Sommer (2012) propose 12 types of green potential business models: (1) low pollution, (2) low waste, (3) dematerialization, (4) smart, (5) servicising (product-to-service), (6) performance contracting, (7)renewable, (8) eco consulting, (9) base-of-the-pyramid, (10) do-good, (11) health, and (12) green meta models. Despite generic green business taxonomy which could be applied in various business fields, these examples are not necessarily related to the discontinuous improvement or strong sustainability type, which characterize green business models (Sommer 2012).

Taking a look at the sustainable business model typologies could be another way to identify if the business model is green. There can be found some publications where authors attempt to generalize sustainable business models. However, Bocken, Short et al. (2014) derived mostly recognized classification of the sustainable business model archetypes built on the literature review and empirical pieces of evidence. Established on the value proposition, value creation and delivery, and value capture, eight sustainable business model archetypes are: (1) maximise material and energy efficiency, (2) create value from waste, (3) substitute with renewables and natural processes, (4) deliver functionality rather than ownership, (5) adopt a stewardship role, (6) encourage sufficiency, (7) repurpose for society/environment, (8) develop scale up solutions. This taxonomy includes a grouping of technological, social, and organizational business models, a wide range of business models examples for each of the archetypes, and can be observed as the tool for the identification of environmentally accountable business models.

Besides, some authors applied sustainable business archetypes constructed by Bocken´s et al. (2014) in more narrow fields: e-learning (Calvo and Villarreal 2018), banking (Yip and Bocken 2018), innovation in agri-food production (Ulvenblad, Ulvenblad et al. 2019), circular bioeconomy (D'Amato, Veijonaho et al. 2020), electric vehicle battery second use industry (Reinhardt, Christodoulou et al. 2020), etc. This demonstrates that these archetypes can be widely applicable in the investigation of various business fields and the identification of sustainable business models.

Furthermore, the existing green business literature offers publications based on the analysis of the different business model dimensions. These are green products and services (Baumann, Boons et al. 2002, Gliedt and Parker 2007, Sommer 2012, Abuzeinab and Arif 2014), green production (Zhang, Ouyang et al. 2020, Trapp and Kanbach 2021) green finances (Chevallier, Goutte et al. 2021), green jobs (Yi 2013), green technology (Sommer 2012, Darko and Chan 2017, Trapp and Kanbach 2021), green logistics (Karagülle 2012), green energy (Wüstenhagen, Wolsink et al. 2007, Yi 2013, Nair and Paulose 2014, Yi 2014), green fuels (Al-Saleh 2015), green infrastructure (Ferranti and Jaluzot 2020), green policies (Karagülle 2012), green management / organizational culture (Duarte and Cruz-Machado 2013), green supply chain (Coetzee and Bean 2016).

It is evident, that green business-related topics cover the overall business model and are not limited only to value proposition for the customer, waste management, and usage of renewable fuels and energy. This arises the need for evaluation of all business model dimensions in order to identify if the business is green.

How green business models impact the appeal and share value of start-ups?

Estimating the impact of green business models in startups is not straightforward. An attempt is made in this paper to evaluate the potential impact, based on a desktop research study. The major challenge is that the valuation of startups that apply green business models, is possible, nevertheless it is challenging to estimate their valuation if they were not applying such models, in a “what-if” approach. Consequently, the methodology applied in this paper, is to evaluate the impact of firms in the green economy domain and not specifically the application of green business models.

According to FTSE Russell, (2018), green economy accounts for at least 6% of the globally listed equity market, and was worth as much as the fossil fuel sector in 2018.

In another study Porter and van der Linde, (1995) argue that the early-mover clean companies can gain a lasting competitive edge.

Ambec and Lanoie, (2008) distinguish the cost and the revenue channels, by developing new, cleaner products in response to changing customer preferences and capturing market share. These channels provide evidence that environmental innovation can impact firms' environmental and economic performance.

Kruse, (2020) discusses in a working paper that there is evidence that orienting production towards green economy simultaneously enhances firms' economic performance, assessing how diversifying production into the green economy is a good investment that pays off for firms, or is rewarded or punished by investors. To perform this assessment, key characteristics and financial indicators are matched to the green revenue data, using a dataset from FTSE Russell. The dataset provides comprehensive and detailed information into the environment-focused commercial activities of publicly listed firms, tracking the share of revenues generated through green goods and services over time, including information on over 16,000 global publicly listed firms across 48 countries operating from 2009 to 2016 in a wide range of industries. This dataset is further combined with Thomson Reuters Worldscope, resulting in a panel of approximately 16,500 firms that is the basis to verify whether changes to the share of green revenues affect the financial and market performance of firms. The general finding is that firms may obtain higher operating profit margins in the green economy market, with some exceptions, such as the automobile sector, as manufacturing of hybrid- and electric vehicles is associated with lower operating profit margins. Firms' decisions to move into the green economy is valued on the stock market, only in the utilities sector. For all other sectors, despite higher operating profit margins, investors do not value the diversification into green markets. Frontier firms moving into the production of green goods and services may also be driven by other factors, such as compliance with environmental regulations (e.g. emission standards for vehicles) or because they expect green markets to grow in the future.

What motivates founders to pursue green business development?

Many variables are used to explain the impact of the entrepreneur's characteristics and profile on the survival and growth of their business. The success of new firms is, in many studies, linked primarily to the entrepreneur's own personality (R Bellu, 1993). The relationship between motivation and the success of new firms has thus been widely demonstrated in the literature: those who are successful are those who believe it most intensely and the longest (Per Davidsson, Delmar, and Wiklund, 2006).

Three types of success factors exist (Janssen, 2011): factors related to the economic environment, the organizational characteristics of the start-up and the personal characteristics of the leader. However, the place of the latter and its motivations remains central in explaining the success trajectories of start-ups (Cliff, 1998). Some factors like support by an incubator or the level of training of the leader clearly has a positive influence while the influence of other factors is more uncertain (such as the age of the leader or obtaining public aid). The literature shows that it is important to simultaneously consider the influence of all these factors rather than to study their impact separately (Daval, Deschamps, and Geindre, 2002). It is necessary to have "an integrative reading of the different categories of factors, considering that it is their interaction which grounds the growth" (Chanut-Guieu, Tannery, et al., 2009).

PEL Davidsson (1991) proposes a global model of understanding the decision-making process behind the pursue of a particular business development route, which has since been repeated and supplemented by several studies (Per Davidsson, Delmar, and Wiklund, 2006).

His work is based in particular on the theory of expectations (Vroom, 1964) and places the notion of expected consequences of the business development strategy at the heart of the reflection. The leader's desire to pursue a specific route for his business would therefore be related to the consequences he attributes to that development.

Thus, the leader's motivation to pursue green business development is determined by his abilities, needs, and the opportunities he perceives as presenting themselves to his company. Motivation itself is therefore not only determined by objective elements but also by the leader's perceptions and representations, particularly in terms of the expected consequences of green business development. The notion of opportunity is very close to the success factors related to the characteristics of the economic environment in which the company is developing. As Lange et al. (2017) state, some work has already acknowledged that national policy relating to social and/or environmental initiatives influence firm decisions to engage in CSR (Orlitzky et al., 2015; Spence, 2007) and that various dimensions of national context consequential for influencing the national variation in the extent to which firms engage in socially responsible business behavior (Jamali & Neville 2011; Skouloudis, Isaac, and Evaggelinos, 2016).

The ability of the firm to pursue green business development is strongly linked to the potential support the company might receive from investors as they have a major impact on the resource available as discussed in the section of the present paper about the relationship investors have with sustainable businesses.

Finally, the need to pursue green business development is also multi-factorial. Galpin et al. (2015) show that there is evidence to support how the clear articulation of sustainability as part of the firm's mission, values, goals, and strategy are key factors in fostering organizational sustainability practices and that a firm's mission defines and establishes the priorities of the organization (Jacopin and Fontrodona, 2009). Considerable research has shown that a well-articulated mission statement provides critical signals to organizational stakeholders regarding the aims of the organization and can ultimately lead to positive outcomes that benefit the entire firm (Desmidt et al., 2011).

The study of growth factors thus confirms the manager's central role in understanding the sustainable trajectories of his company, despite the need to take into account other variables related to the characteristics of the company and its environment. Therefore, "it is essential to emphasize that the profile of the leader, the particularities in his personality, is the essence of what will be the business strategy" (Jaouen, 2008).

How investors and founders interact and is there tension/divergence when facing potential green business developments?

In start-ups, the notion of governance is essential. The managers of these companies have different profiles and specific attitudes towards growth, which leads to the establishment of different governance structures. Billard, Boissin, and Berangere Deschamps (2003) explains "some leaders, including ambitious adventurers or maximisers, are entrepreneurs close to the Anglo-Saxon culture developing management around the objectives of the shareholder. [...] At the other extreme, the satisfied technician rejects the objectives of the shareholder and refers to those of the customer. Admitting control over his management, he nevertheless prefers spontaneous mechanisms (reputation with customers and suppliers) over intentional mechanisms (actions of the board of directors) ".

Beyond the profile of the leader himself, there is a strong relationship between growth and the governance structure set up within the company (Mayer, 2004). In these companies, growth is therefore often accompanied by a rise in power of different stakeholders, including capital investors (Depret, Hamdouch, et al., 2004). The notion of governance, defined as the organizational mechanisms that have the effect of delimiting the powers and influencing the decisions of the leaders, governs their conduct. Governance allows better understanding these relationships and thus better understanding the sustainable trajectories of start-ups.

There are two main views of governance that echo changes in the firm's theories (Wirtz, 2011). Schematically, the governance of a start-up can be located along a continuum: from a purely coercive vision centered on the notion of control to a purely cognitive vision centered on the contribution of resources.

In the coercive vision based on the firm's contractual theories and in particular the agency theory, the governance structure of a company is only for the shareholders a means of control over the actions of opportunist leaders (Talaulicar, Grundei, and Werder, 2005). The theory of agency and incentives was largely developed during the 1970s, thanks to the work of Jensen and Meckling (1976)). They are interested in the agency relationship that is established between a principal (Shareholders) and an agent (Founders). This theory covers in fact any "contractual" (including implicit) relationship between two parties, such that the situation of one depends on an action on the other: the acting party is the agent; the affected party is the principal. The authors of this coercive trend "emphasize the disciplinary role of the governance system, whose main function would be to manage conflicts of interest in organizations marked by a strong separation between control and ownership" (Wirtz et al., 2008).

In a purely coercive vision of governance, the function of governance is to limit the manager's discretionary space. This is all the more important in start-ups where "innovation is inherently associated with unpredictable contingencies" (Hege, 2001) and where the presence of venture capitalists or business angels is often synonymous with major agency conflicts resulting in situations such as the continuation bias of managers or the difficulty of assessing the value of a future project (Pouget and Stephany, 2002). The venture capitalists and business angels, when they have entered a company, aim to get out of it in the short or medium term by realizing the maximum added value. For this, they will tend to favour an exit strategy and even, if they can, favour an IPO. On the contrary, the managers, who often wish to remain independent, prefer to do everything to ensure the survival of the company and especially their maintenance at its head. Thus, they will tend to favour by all means the continuation of the company. (Hege, 2001).

In order to simultaneously take into account these two visions of governance, Wirtz (2011) proposes a theoretical meta-model of governance. "Based on the characteristics of the leader who are the basis of his strategic vision, the model involves the system of governance and its various levels (coercive and cognitive) to shape the latitude and influence of strategic choices" (Charreaux, 1997). In this model, business development route is set up by the manager but is also influenced by the interactions between the manager and the governance mechanisms at work in the company.

Tarillon (2017), who based her research on Wirtz's model, identifies four profiles of leaders on the basis of their perception of governance and the expected consequences of growth and, thus, the motivation for growth. The first class is relying the most on shareholders decision and the class 4 the least.

Class 1: The leaders of the first class have a predominantly cognitive view of governance. According to them, the shareholders mainly have an enabling role. At first, they expect the latter to advise them both in determining strategic objectives and also in operational actions that could be implemented to achieve these objectives. Shareholders must also bring their expertise to the company, whether in economic, managerial, technical or legal terms. They must then make the company benefit from their network and participate in the improvement of its image. These leaders really envision the shareholders as "coaches" who must provide support to help them manage their company.

Class 2: Those are leaders who believe that shareholders must play an important role in their business and be present in many areas. Their role remains rather coercive without preventing a cognitive vision. Shareholders play a leading role in the organization and management of the company. In particular, they help the manager to search for and appoint directors and key members of the management team. They control both the strategic orientations of the company but also the operational actions implemented to achieve the objectives set.

Class 3: The leaders of this third class have a particularly coercive representation of governance around performance and consider that the role of shareholders is not to provide their expertise, their network or coach the leader. According to them, the shareholders must only control the performance of the company as well as their own performance. It is here a rather Anglo-Saxon vision of governance in which the shareholders have the sole role of ensuring that the leaders act in their own interest.

Class 4: The leaders of this class grant the shareholders only a negligible role in the management of their business. For them, they must not play a cognitive role, nor play a role of leadership and management, let alone have any coercive power. These managers are very autonomous and do not want to be influenced by potential shareholders in order not to lose power within their company, either by delegating the recruitment of key people or by accepting an interference in strategic decision-making.

Thus, the type of relationship founders and investors have, varies greatly and, consequently, the impact on the motivation of the founders to pursue sustainable development.

RESEARCH DESIGN

Start-up Greenness assessment framework development and testing

Literature overview identified that there are only a few attempts in the academic literature to define what the green business model is. Furthermore, existing definitions are brief and do not specify explicit characteristics of how the green business model could be recognized. Classifications of green business models proposed by Sommer (2012) and sustainable business model archetypes by Bocken et al. (2014), are the tools that can be used to identify if the business model is green. However, our consideration is, that the perception of the green business model can vary among business practitioners and academics.

In order to investigate what is the common understanding of green business models, qualitative research will be performed as we will gain an understanding of where knowledge of the green business models originates from, and how respondents distinguish green business models and other related terms as circular economy, sustainability, etc.

Moreover, the green values created by start-ups have an impact on their green business model, and at the same time help to increase investors' incentive to invest in green start-ups.

One of the key drivers for sustainable development and radical change is start-ups. Start-ups are able to develop green business models that can create new sustainable products and services that solve environmental problems and market failures. These businesses are more likely to engage in sustainable entrepreneurship compared to the incumbents as they have a greater degree of flexibility in changing a particular mindset as well as a higher degree of willingness to try innovative approaches. These start-ups are also characterized as green start-ups, which is a generic term for start-ups that contribute to the goals of a greener economy. Green start-ups focus not only on economic value creation, but also on environmental and social value creation. E.g. uses the technologies that use fewer resources and emit less pollution (Pakura, 2020).

Green start-ups require a viable business model to scale up and create an impact on a large scale. The business model should therefore consider a wide range of stakeholders while considering the above three value creations: (1) economic, (2) environmental and (3) social. Green start-ups should also be able to measure their economic, environmental, and social impact. E.g. customers can demand information about the environmental and social impacts of products and services in order to make purchasing decisions. At the same time, businesses can also get can get “green” labels that can increase customer awareness (Bergmann and Utikal, 2021).

At the same time, green business models aim to create value by offering high-value products and services, while reducing costs and reducing environmental impacts. To take advantage of the value cable reading, start-ups also require identifying potential markets for their new green solutions, as the absence of markets can create an obstacle to value creation and delivery (Trapp and Kanbach, 2021).

Politicians, large companies and strategic investors also see the benefits of investing in start-ups that build their business based on green business models. Some of the reasons for this are that green start-ups help to improve the environment, conserve natural resources and create the source of the increase in employment. This increases investors' incentives to invest in innovative and green start-ups (Zhilkina, Trachenko and Kozhanova, 2020).

Finally, founder’s motivation and the relationship they entertain with their investors in the development process of new green business model are very complex social phenomena that calls for a qualitative longitudinal study of the evolution of these phenomena. The longitudinal study is particularly relevant to study the evolution of motivation and influence as “the ups and downs of the everyday experience of managing change will be available for study and are less likely to be artificially smoothed out by a retrospective rationalization” (Langley & Stensaker, 2012). The challenges associated with a longitudinal study are the ambiguity and sensitivity (Langley & Stensaker, 2012) as we must negotiate the access to a domain that constitutes the core competitive advantage of a start-up for which we need to promise input and advice as a form of compensation thus risking being dragged into internal politicking as well as altering by subject/object of observation (Langley & Stensaker, 2012).

We will conduct our research as part of a large Scandinavian project aiming to help start-ups, to reduce the company's total energy consumption and / or convert to more renewable energy (green energy). The research aims at testing new green business models, methods and measurement technologies for analysis, development and documentation of companies' conversion to green business models.

An important aspect of that project is the participation to “Green Business Model Development” workshops held at several steps of the green business development which comprise of an evaluation of the green state of the company, the development and implementation of new green business models and the evaluation of the new state of the company.

The project will take place in Denmark, Norway and Sweden and will be carried over a period of two years.

The empirical data will comprise of the observation of those workshop in which the observer will not be the animator and qualitative interviews as ‘pipeline for transmitting knowledge’ (Holstein and Gubrium, 1997 cited in Duberley, 2012) with the start-up founders and investors, to be able to apprehend the facts ‘out there’ and identify which business model characteristics in each country are considered as the indicators of green thus adopting a neo-positivist stance (Duberley, 2012). We will attempt to remove ourselves from the process and present an objective picture of green business development (Duberley, 2012).

The first interviews will be conducted as long, in-depth, semi-structured interviews. We will first ask about the broader ambitions for the company and how they plan on organizing to realize that ambition allowing the participants to express freely thus letting new ideas and insights to emerge from their narratives (Alvesson, 2011). As we will advance further in the interviews, we will explore more in detail certain statements and ideas. We will also interview the same people at several occasions to look for consistencies to strengthen the credibility (Alvesson and Sveningsson, 2003) thus identifying variations in the discourse and rhetoric of green business model to try identifying the ’real’ origin of the green business knowledge. The main challenge with interviewing founders and investors will be to deal with the concept of moral storytelling and promotional activity, in which people tend to create a positive impression of themselves and groups they represent (Alvesson, 2011), as they may alter the description of their own activity to fit their own promotion”. Moreover, we are a group from various nationalities interviewing Swedes, Danes and Norwegian, for the most part, in English and should be particularly careful as not to take language for granted as an objective mirror for understanding (Alvesson & Sköldberg, 2018). Language is constructed, holds multiple functions, and has multiple consequences (Potter & Wetherell, 1987, in Alvesson & Sköldberg, 2009). There will be variations between the way interviewees describe their green business model, their motivation behind it and the value it creates, and we will not be able to distinguish between literal and rhetorical, or accurate and incorrect variations (Potter & Wetherell, 1987, in Alvesson & Sköldberg, 2009). Even if discourse analysis is not our main focus, we need to keep in mind these limitations and will submit the insights gained in interviews to stronger analytical scrutiny, reflexivity and skepticism (Alvesson & Sköldberg, 2009).

Conclusion

We have presented a strong and extensive theoretical framework and propose a promising research design to answer the four research questions we introduced. We believe this paper is the commencing of new understanding of value creation in start-ups as a multi-factorial social phenomenon.

Having a genuine understanding of the green business in each country, will enrich our further research related to the motivation of the founders to implement environmentally accountable business models in their start-ups, and examine how green business development influence start-ups attractiveness for the investors.

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Diving into blue entrepreneurship

Exploring drivers, barriers and value creation by marine plastic startups

Hanna Dijkstra[1*]

[1]Institute for Environmental Studies – VU Amsterdam

*hanna.dijkstra@vu.nl

Extended abstract

The term Blue Economy[14] emerged in 2012 at the United Nations Convention on Sustainable Development and is now widely applied in marine policy and governance. Though competing definitions exist, most refer to the dual importance of the ocean. First, as a critical ecosystem deserving conservation and protection, and second as a source of livelihoods and opportunity to be capitalized upon (Voyer *et al.*, 2018). Stimulating the Blue Economy is often discussed in terms of development of new technologies, for example ocean renewable energy, and creative business models, such as new product applications from algae and seaweed (Soma *et al.*, 2018; Wenhai *et al.*, 2019). Entrepreneurship for the Blue Economy, hereafter called blue entrepreneurship, has grown in recent years, which can be seen by a growth of accelerators, innovation prizes and impact investment firms focused on supporting ocean-focused businesses and startups. Blue entrepreneurship is the process of creating a new, economically viable business model by catering to marine environmental challenges, and thus supporting the Blue Economy (Dean and McMullen, 2007; Schlange, 2014; Haldar, 2019).

In this study, we utilize conceptual framings from sustainable entrepreneurship and business model literature to study blue entrepreneurs working on marine plastic management. The goal of this analysis is to understand how value is being delivered and captured by these companies (i.e. their business models) and to assess if this group of startups face similar challenges or opportunities and share entrepreneurial motivations and goals (Schaltegger, Lüdeke-Freund and Hansen, 2016). The research questions answered in this study are: What business models are deployed by blue entrepreneurs working on marine plastic management? What drivers and barriers are experienced by these blue

[14] 'The Blue Economy' was also introduced by Gunter Pauli in 2009 to describe an economy where humanity is in symbiosis with nature and resources and the environment are preserved. The term has since been adopted by many institutions to specifically focus on the marine environment.

entrepreneurs? To address these questions, the study adopts two complementary methodologies.

The first stage of the study is a business model analysis for a database of 100+ startups and young businesses (see Dijkstra, van Beukering and Brouwer, 2021 for more details on the companies). The analysis involves describing the economic and environmental value capture and delivery mechanisms and identifying the stakeholders involved in these processes (Rosca, Arnold and Bendul, 2017; Dembek, York and Singh, 2018). Results suggest that four main business models are used by marine plastic entrepreneurs, differentiated by environmental and economic value delivery and stakeholder arrangements, these four categories are listed on the vertical axis in Figure 1, while the horizontal axis represents the type of marine litter management activity the companies focus on.

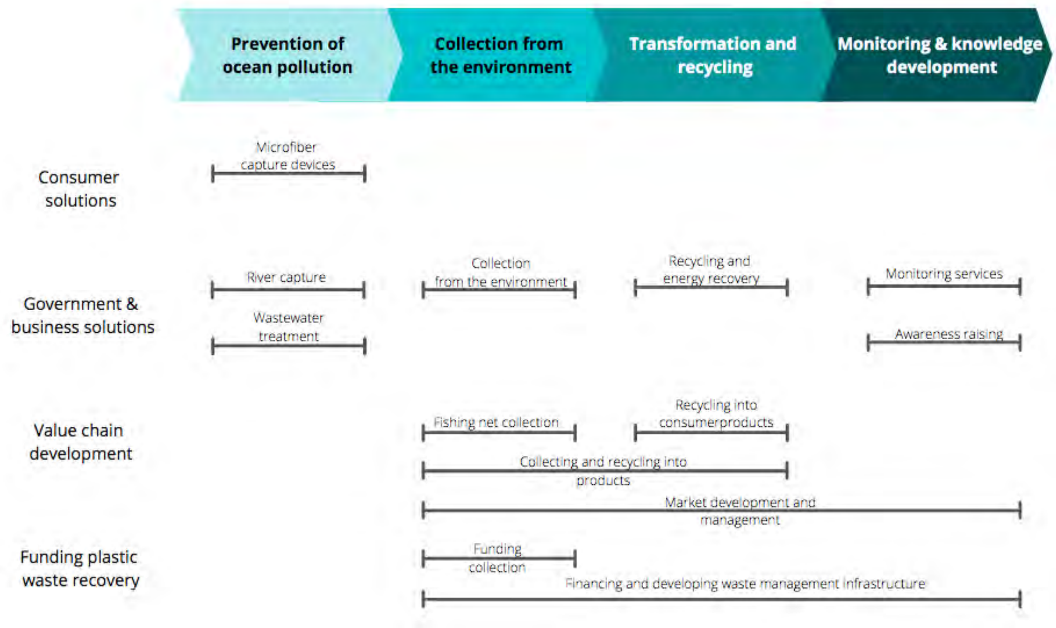

Figure 10 Visualization of the identified business model categories

The second stage of the research involves semi-structured interviews with 25 entrepreneurs and experts to gain insight into the drivers and barriers experienced during business development, and see if there are trends or unique challenges for the different business model categories.

The first business model group identified are for consumer solutions, where the consumer is responsible for delivering environmental value. Consider a microplastic filter that a consumer must install and maintain on their home washing machine to prevent microplastic pollution. The second group of companies are developing technologies and solutions for municipalities and industry to better manage marine litter. The third group involves businesses engaged in developing the value chain for recycled ocean plastics. These companies are reliant on the success of the value chain to deliver both economic and environmental benefits, and are therefore engaged in upstream and downstream partnerships. The final set of startups are focused on implementing innovative financing mechanisms in order to fund marine waste management initiatives. An example of this model includes plastic offset startups: companies who sell plastic credits to compensate consumers or businesses for their plastic usage, and then redirect the profits to support plastic collection carried out by third party partners.

The interview results confirm that entrepreneurs working on the Blue Economy do in fact face unique challenges and opportunities. We categorized the drivers and barriers into five factors based on a literature review: entrepreneurial, technological, economic, institutional and socio-cultural (De Jesus and Mendonça, 2017; Gast, Gundolf and Cesinger, 2017). Initial results suggest that motivations behind starting a blue entrepreneurial venture go beyond accessing profits, and these entrepreneurs have a personal sustainability motivation. Further, the availability of technical and scientific support, as well as strong showing of support from green consumers were drivers of business success. Challenges include difficulties with plastic material itself, such as contamination and limits to recycling. Frequently mentioned were bureaucratic hurdles, for example applying for patents and shipping collected plastic, which is regulated as a hazardous material. The interviews are ongoing and will continue until theoretical saturation has been reached, whereby no new insights are added in further interviews. The paper adds to the literature by recognizing a subset of sustainable entrepreneurs working on the Blue Economy, and defining their business models in terms of environmental and economic value creation and delivery. Furthermore, the interviews add deeper insight to the unique experiences of these blue entrepreneurs**.**

Keywords

sustainable entrepreneurship, sustainable business models, marine plastic, value creation

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Track 2.4.

New Business Models in Times of Crisis

Track 2.4. New Business Models in Times of Crisis

Track chairs: Jaione Ganzarain Epelde[1], Urtzi Uribetxebarria Andres[2], Ion Iriarte Azpiazu[3]

[1]MGEP, Spain; [2]Mondragon Unibertsitatea, Spain; [3]Mondragon Unibertsitatea, Spain

Crises are source of profound human loss, tragedy and agony and as such they give rise to events that pose threats to organizations (Seeger, Sellnow, & Ulmer, 2003). At the same time, as Ritter & Pedersen (2020) emphasize, a crisis often triggers the enactment of new business models entangling new capabilities, value constellations to meet new stakeholder needs. In that sense, "a crisis is a terrible thing to waste".

In 2020 the global spread of the COVID19 virus triggered a major crisis. In this context, resilient structures (sectoral, organizational, group) based on new frameworks, fostering multi-stakeholder cooperation (Barasa, Mbau, & Gilson, 2018) and innovative new business models, might enable businesses to respond to the crisis in a way that would allow them to survive and flourish over time, thus giving them a sustainable competitive advantage. Since business models are viewed as a tool to address change and innovation capacity in a company (Demil & Lecocq, 2010), they are instrumental in times of crises. In addition, crisis has important implications for business model innovation, an aspect largely neglected in existing literature (Ritter et al., 2020). Therefore, it is important to foster research on the interrelationship between new business models and catastrophic events as well as different approaches to address crisis through business model innovation for sustainability.

Thus, this track aims to foster research on the interrelationship between new business models and catastrophic events, and welcomes studies on new business models and sustainable business practices in time of crisis which reveal different practices to ensure resilience on multiple levels and contexts (Liu, Cooper, & Tarba, 2019).

Theoretical and conceptual contributions as well as empirical insights from various contexts are welcome. Additionally, descriptive as well as explanatory contributions from different disciplines that specifically, but not exclusively, deal with the following topics are invited:

- How do businesses enact new opportunities, save and even grow existing organizations during crises and what is the role of new business models in that process?
- What are the barriers and enablers of resilient structures that allow / foster a successful implementation of new business models?
- How do businesses in different sectors understand and measure their capacity to adapt and create new business models in time of crisis?

- What is the influence of new business models on individual and organizational outcomes (employee wellbeing, team-level innovation absorption capacity, firm-level financial performance, organizational resilience) in times of crisis?
- How may human aspects such as emotions influence efforts to adapt business models in a response to a crisis?
- How decisions about the business models made during the crisis affect the businesses post-crisis performance?
- In what way and how much businesses shall incorporate crisis preparedness in their new business models?

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Circular business model frontrunners

Current actions and future perspectives towards sustainability

Johanna Suikkanen,*,1,2, Iina Saarinen[1,2], Annukka Näyhä[2],

[1]Finnish Environment Institute; [2]Jyväskylä University School of Business and Economics

*Johanna.m.suikkanen@student.jyu.fi

Extended abstract

INTRODUCTION

In recent years there has been a tremendous interest among academia, industry and the wider society on the transition to circular economy (Geissdoerfer, *et al.* 2017) to counter the unsustainable consumption and production patters, that are causing massive stress on the environment. There has been an increasing flow of materials in society, causing more waste, as a result of a steady decrease in product life spans (Bakker, *et al.* 2014). It has been suggested that circular business models, which build on product-life extension, closed-loops and resource efficiency, provide an economically viable alternative to the traditional "linear" business model (Bocken, *et al.* 2016). There is some evidence that crisis times, such as the COVID-19, encourage sustainable consumption (Severo E.,A., *et al.*, 2020) and can be seen as a unique opportunity to improve sustainability (Palahí, *et al.*, 2020). On the other hand, during the challenging times many actors face struggles in economic terms, which can mean decreasing resources for environmental and social sustainability activities. To this end, this paper presents the findings from a survey carried out during the COVID-19 pandemic, targeting Finnish frontrunners in circular business models.

Purpose of research

The main research question addressed in this study is: Which actions promoting circularity and sustainability do circular economy frontrunner companies[15] prioritize in their businesses? We also address the perspectives of the frontrunner companies with regards

[15] The concept of circular front runners is explained under the section "purpose of research"

to future challenges and plans as well as the role of ecolabels in advancing their sustainability goals.

The questionnaire of the study was targeted to forerunner companies, selected from two publicly available Finnish lists addressing forerunners in sustainability and circular economy, compiled by experts. The lists "*The most interesting companies in the circular economy*" (Sitra, 2019) or on the "*Sustainable textile industry trailblazers*" (Finix, 2020), which were considered to represent companies that are based their businesses on sustainable circular economy business models

METHODS

The research relies on a mix of quantitative and qualitative methods. This present paper focuses on discussing a part of the quantitative results. The data collection method was a questionnaire with 39 questions addressing the themes of sustainable development (8 questions), circular economy (8 questions), ecolabels (13), and the relationship between circular economy and ecolabels (8 questions). A total of 10 questions were open-ended. The survey's questions and answer options were developed based on the literature on circular economy (Bocken *et al.*, 2016; Ellen MacArthur Foundation, 2013; Sitra, 2019), corporate sustainability (Baumgartner & Rauter, 2017; Dyllick & Hockerts, 2002; Murray *et al*., 2017), and ecolabels (Bratt *et al.*, 2011; Ecolabel Index; Lozano *et al.*, 2010). The survey was tested by around 20 people with diverse backgrounds and different levels of understanding on the survey topics. Data was collected in February-March 2021 through Webropol

The survey link was sent to 214 companies. The overall response rate of 16%. The data will be further elaborated through a second survey and interviews given the low response rate of this survey. The results of the survey were analysed by statistical methods using SPSS. Given that the number of open-ended answers was limited they were analysed manually.

Preliminary Results and Discussion

This study addresses circularity and sustainability actions prioritized by circular economy frontrunner companies. We also present results regarding the future challenges and plans of these forerunner companies. Sustainability and circular economy were shown by the survey's open answers to be inherent in companies that are basing their business model on a sustainable/circular economy business model. This finding is in line with previous studies (Salo *et al.* 2020).

The results show that most respondents based their business model on product life extension and were producing long lasting products. This approach directly addresses one major sustainability challenge, i.e. increased material throughput in society due to decreasing life cycles of products (Bakker *et al.* 2014). Further analysis needs to be made to understand how effective the actions of the companies are in improving life-time performance.

Overall, using or requiring ecolabels from the suppliers is not prevalent among the respondents. The challenges of the respondents relate to sustainable sourcing, improving recyclability as well as customer and partner awareness of environmental issues. Interviews conducted as part of this ongoing research will further shed light on the impact of the crisis on the supply chain and customer demand for products by companies with a sustainable/circular business model.

While the preliminary analysis of the results prior to the closing of the survey indicate interesting trends among the frontrunner companies, a full analysis will be able to better categorise the priority activities of companies with sustainable/circular business models. In addition, although the survey results can provide interesting insight and indications regarding the actions of the frontrunner companies, the rather low response rate (16%) poses limitations for statistical inference and drawing related conclusions.

Keywords

Circular Economy, Sustainable Business models, Life time extension, Ecolabels, SMEs

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Rethinking Business Model Innovations in Small-Scale Seed Agribusinesses in Malawi And Zambia

Dr. Golden Mahove, DBA[1,*], Willie B. Bedell, MS[2]

[1]Founder & Chief Executive Officer, Ndarama Works (Pty) Ltd.

[*]golden@ndaramaworks.co.za

[2]Research Associate, Ndarama Works (Pty) Ltd

Abstract

Purpose - Adopting agricultural technologies is still a pressing challenge for agricultural technological initiatives in Sub-Saharan Africa, counting the nations of Malawi and Zambia. Our research questions the ability of seed companies to innovate to penetrate the smallholder farmers market with modern seed varieties. It is estimated that 80 to 90 percent of the smallholder farmers' seed market segment is lost due to the low market penetration.

Design/methodology/approach - This research investigates the relationship between business model innovation strategies of agribusiness seed companies, their impact on their market growth in the smallholders' seed markets, and how actors in the market, including agro-dealers, seed growers, and seed users perceive innovation. Using data from Malawi and Zambia, we tested whether business model innovation determines agribusiness seed company market share growth in smallholders' market. Empirically, we used an instrumental variable estimation with dichotomous outcomes to predict the relationship between growth and business model innovation.

Findings - This paper hypothesizes that the relationship between business model innovations and the market growth of smallholder seed companies is crucial to shaping market penetration and diffusion of improved seed varieties. The estimates from the dichotomous two-stage instrumental model, using market shares as outcomes, were not statistically significant. The models, both the first and second stages, produced no statistical importance at the 5% significance level. At this stage, we cannot say whether there is a likelihood that business model innovations presented in the model, namely value proposition to the market, and the customer valuation would increase or decrease market shares to influence the actions of seed companies to penetrate the market.

Practical Implications - The research purpose was to determine the impact of seed companies' business model innovations on their market share in the smallholders' market segment working with seed growers and agrodealers to enhance the seed companies value propositions. An immediate management implication to policymakers and development programs is determining which directional focus their support activities to seed companies should take. Policymakers and development practitioners should reflect on whether support to seed companies on seed varieties development needs to shift to other seed companies' value propositions such as decentralized seed production and distribution models coupled with enhancing smallholder farmers' value appropriation support activities.

Originality/value - This paper broadens the notion of value creation and value appropriation in smallholders' seed markets served by small-scale seed companies and questions the directional focus of external support to enhance the adoption of improved seed technologies for food and income security.

Keywords

Value creation, value appropriation, smallholders, seed growers, seed users, agrodealers.

1.BACKGROUND

Adopting agricultural technologies can present unpromising challenges to innovative programs in Sub-Sahara Africa. The World Bank Group, Challenge Advisory, and FAO are a few of the leading institutions that are vested in addressing the reluctance of farmers to adopt agricultural technologies (FAO, 2009). Grievously, the seed market is not excused from this agricultural encumbrance. The global seed market, valued annually at US$54 billion, is sectored into the formal and informal segments, with the latter making up US$15 billion or 27 percent of the global market (Bonny, 2014; Fischer, 2015). Within the formal seed system, the modus operandi is that agribusiness seed companies breed, multiply and sell seeds to farmers, whereas the informal seed system sees processing, retaining, or exchanging seeds carried out by the farm households (Fischer, 2015).

In the spirit of promoting technology to meet agricultural and development demands, seed companies and international research organizations alike have invested in plant breeding to provide new seed varieties (Fisher, 2015; Abate *et al*., 2015). Through such research and development investments, agribusiness seed companies and related research centers in Africa have cultivated more than 160 drought-tolerant maize varieties between 2007 and 2013 (ibid). However, these efforts do not rewardingly translate into corresponding technology adoption. Considering the seed market, adoption can be measured by market penetration of seed companies and the choosing and planting of modern varieties by farmers. Significant efforts have been made and referenced by the Alliance for a Green Revolution in Africa's Programme (AGRA) for Africa's Seed Systems (PASS), with as many as

132 small-scale seed companies supported to increase market penetration in 16 countries (Vuna, 2016). Still, market penetration has not been a relatively easy effort. Studies have shown that improved maize varieties have recorded the highest level of seed market penetration by small-scale agribusiness seed companies, while penetration for other seeds has remained moderately low (Glover & Andersson, 2016)

The latest assessment covering the adoption of modern seed varieties indicates a low 35 percent adoption rate on all total cultivated areas in Sub-Saharan Africa (DIIVA, 2016). The market penetration with adoption rates of modern varieties of maize fluctuates between 47 percent in Malawi and 97 percent in Zimbabwe (DIIVA). Adoption rates are significantly lower for sorghum (27.4 percent), pearl millet (18.1 percent), groundnuts (29.2 percent), beans (29 percent), and cowpeas (27.2 percent), (DIIVA, 2016).

On account of the lack of market penetration of modern seed varieties, 80 to 90 percent of the millions of smallholder farmers in Eastern and Southern Africa plant low-quality recycled seeds. This pattern of low technology adoption implies a loss of business opportunity to seed companies and smallholder farmers alike (McGuire & Sperling, 2016; AGRA, 2016). The below-average uptake can be attributed to low seed technology turnover, seed unavailability, inadequate information, high seed prices, and the lack of economic incentives (Gisselquist *et al*., 2013; FAO, 2009). Furthermore, studies show it might take an average of 14 years for seed varieties to be substituted with modern high-yielding varieties (DIIVA, 2016).

At this stage, we constructed our fundamental questions on understanding how small-scale seed companies are innovating to penetrate the smallholder market with modern seed varieties and whether they have the suitable modern seed varieties to meet the market needs. Recognizing the leaders in the small-scale agribusiness seed industry in Southern Africa, it is evident that seed companies are unsuccessful in closing the innovation gap using their agribusiness seed business models (Sjodin *et al*., 2016). For this reason, small-scale seed companies are missing 80 to 90 percent of the smallholder farmers' seed market segment (McGuire & Sperling, 2016; AGRA, 2016). The general business problem is small-scale seed company leaders are ineffectual to project the impact of business model innovation benefits on their company market growth in the smallholder markets. The specific business problem is there is no significant predictive model for understanding the relationship between business model innovation benefits and seed company market growth in smallholder markets.

2.THE ADOPTION AND BUSINESS MODEL INNOVATIONS LITERATURE

Farmers adopting modern seed varieties in Africa

This paper concentrates on two lines of literature to address the issue of seed adoption in Southern Africa. On the first front, we studied that the adoption of modern seed varieties is tied to farmers' approval. Diffusion can be instant when the impact on farmers is substantial (Dalrymple). Dalrymple argues that diffusion of improved varieties might be huge when the croplands are irrigated or could be poor when the croplands are in a rainfed environment.

Fuglie & Marder (2015) attempted to estimate the productivity impact from adopting 21 improved varieties of food crops across Africa. To understand the impact, the authors built a logistic diffusion model under the assumption that adoption functions like an epidemic among farmers. Farmers are likely to adopt a technology when they have interacted with other farmers who have encountered success from adopting an improved seed (Rogers, 2003). Besides, Fuglie & Marder suggest that other factors might be influencing adoption, including the confidence of seed advantages, access to the technology, complimentary services that facilitate profitability, and assuming stability to risks. Spending resources for managerial practices to match modern seed varieties and waiting to have positive production yields from the adoption process might also promote the adoption of the technology.

Findings from Fuglie & Marder's logistics model showed that diffusion in Sub-Sahara Africa is low at 11 percent, outside of the confidence range of 20 to 80 percent diffusion rate. Their recursive system of equations, controlling for endogeneity to understand the impact of improved seed, showed a positive and significant result. Improved seed varieties, on average, increase crop yields by 47 percent. Overall, the authors supported the argument that adopting seed technologies is slow in Africa. Factors such as low selling prices for their surplus produce, acquiring consistent quantities of the quality seeds, and ecological factors might fuel the slow diffusion rate among farmers in Sub-Sahara Africa.

Researching beans in Rwanda, Katungi *et al*. (2016) used an endogeneity switching regression model to study the impact of adopting improved varieties of climbing beans in Rwanda. In contrast with relying on field trial data, Katungi *et al*. obtained their data from a nationally representative household survey conducted in 2011. Like Fuglie & Marder (2015), Katungi *et al*. (2016) find the adoption of modern varieties of climbing beans increases beans productivity in Rwanda. The impact would be 48 percent if farmers switched to the modern variety of climbing beans. Notwithstanding, Katungi *et al*. (2016) show that adoption is affected by determinants such as drought lands, population pressure, climate variability, and poor soil characteristics. When farmers are hesitant to cultivate an improved seed variety, it is due to underutilization of inputs, poor access to quality seed stack, and high opportunity cost associate with the adoption process.

Results from studying the adoption of improved seed varieties have been consistent across Africa. Between 2010 to 2013, DIIVA also corroborated these results through their expert elicitation while studying improved varieties, ranging from maize to pigeon peas. The project's findings proved the argument that the adoption rate is low among farmers in Sub-Saharan Africa, including Southern Africa. Adoption rates among sub-Saharan usually fall below 35 percent (Walker and Alwang, 2015). Studying the case of technology adoption in vegetables in East Africa, Ochieng *et al*. (2019) find adoption could be recorded at a higher percentage at a national level but could be realized below 35 percent at the regional level. It might also be difficult to captured gender differences among farmers when considering adoption. Theriault & Haider, (2016) results, using a likelihood estimator, show no difference in the probability of adoption by gender. Differences can be significantly estimated when covariates like plot manager, sociocultural farming, and economic attributes are controlled for.

The need to promote business model innovations in the seed market

Another major front for understanding the adoption of modern seed varieties and related agricultural technologies can be ascribed to market penetration as determined by seed companies' business model innovations (Mahove, 2019). For that reason, business model innovation is a strategic action applied by a company to disrupt the usual way of doing business. In consideration, companies would have enough reach and scale and to profitably capture market shares (Taran *et al.*, 2016).

Business model innovation does not happen in a vacuum. Sanchez & Ricart (2010) studied factors that influence business model innovation in developing countries. Their paper covered seven (7) business ventures, including the agricultural markets, and emphasized that companies should execute strategic innovations through value creation for stakeholders in the market (Zoh & Amit, 2001). Using qualitative method and case study, Sanchez & Ricart (2010) pitched the importance of using interactive business models over isolated business models.

Isolated models use exploitation strategy to seek efficiency in the market, whereas interactive models use exploration strategy and utilize external resources. Sanchez & Ricart showed that an isolated business model could hurt innovations because in these innovations companies are focused on interdependencies from their competitors. Hence, competitors become the main determinant in the configuration of innovations and market decisions. Unlike isolated models, interactive business models could prove positive because these innovations use local and borderline customers to drive their decision-making process. Local actors shape the model, as they are crucial for dynamism. With an interactive business model, the market could be penetrated through value creation. Herein, innovations must positively correlate with the willingness to pay for new seed varieties. A value should be created for seed users, growers, and agrodealers, and the mentioned stakeholders must have the ability to pay.

Bocken *et al*. (2014) also argued that the business model should focus on changing the value proposition for the customers. Small-seed companies in Southern Africa should not only change seed varieties for the market but also transform by their business innovations the way regular business is done in the seed market. Mahove (2019) argued that 'business leaders and operations managers can develop and deploy innovation strategies that successfully close innovation gaps in smallholder's markets' (p.161). Seed companies should be prepared to go beyond process and products (Amit & Zott, 2012) toward creating new systems and value-network perspectives (Johnson & Suskewicz, 2009).

Although the search for a comprehensive market-based solution to deliver a green revolution through local enterprises is still alive, increased agricultural production in Africa has not been promoted by improved seed varieties. Rather, by expanding agricultural lands (Scoones & Thompson, 2011). Scoones & Thompson support developing the smallholder seed market to kickstart and sustain agricultural growth in Africa. This approach would be one of the alternative pathways to agricultural revolution on the continent. Scoones & Thompson (2011) advised that the future of the seed system in Africa should not rely strictly on technological factors. Adopting and transforming the latest technologies must not be ignored; the market-led technology must be knotted with the political-economic system and the politics of innovation. Also, a caveat, when adopting a specific technology that works, such a model might have constraints and should not be deemed necessary for other seed systems. For instance, the maize model, central to approaches use by AGRA, the Millennium Villages, Monsanto, Pioneer, and other multinational seed suppliers, cannot be duplicated to stakeholders across other seed systems and markets.

The limitations of business model innovations for seed adoption in Sub-Sahara Africa can be further attributed to other impediments in the commercial seed market. Tripp & Rohrbach (2001) argue Sub-Sahara Africa has a shallow focus regarding the development of the seed market, seeing market performances from Kenya, Malawi, Zambia, and Zimbabwe (Tripp, 2000). The readiness of seed companies to invest in robust business innovations is also constrained by regulations, including rules covering variety release, multiplication, and trade in the name of promoting the welfare of farmers. To date, the harmonization of regulation policies has been undertaken to facilitate the trade of seeds in many African countries amid inefficient public seed production companies. These conditions also discourage business model innovations among private seed companies.

Moreover, the ability of small-scale seed companies to penetrate the market is restricted by the distribution of free seeds, causing severe constraints to business model innovations, including the integrity of improved seed varieties. These relief operations are justified by disturbances brought upon by drought or other natural phenomena associated with the agricultural sector. Tripp & Rohrbach (2001) argued that failure in innovation models is caused also by the high risks and uncertainties of seed demand in the agricultural markets in Africa. Nevertheless, success stories of high demand, rewarding business model innovations, and adopting modern seeds are common to the maize market (CIMMYT, 1999). Typically, in other seed markets, sales and innovations can be very discouraging because farmers are unwilling to purchase improved seeds at higher prices.

Contributing to the empirical problem of measuring adoption

Glover *et al*. (2016) laid a claim to employ strong empirical research to understand adoption. Without an empirical framework, the authors argued that the literature and research around the adoption concept would be weak and misleading. Understanding adoption is essential to understanding technological change in African agriculture (Sunding & Zilberman, 2001). Glover *et al*. point out the basic questions in the adoption literature: (1) Has the new technology been adopted, and (2) what have been the effects of adoption? Glover *et al*. signaled that studies should present data from surveys, experiments, expert opinion, and build econometric modeling to explain the extent, rate, dynamics, and effects of adoption; and the personal, contextual, policy, and other factors that explain adoption. DIIVA Project shows the ongoing drive to use estimates of adoption to understand the extent of technological change and to support the case for continued investment in technology development (Walker *et al*., 2014).

An empirical and evidence-based model is needed to understand adoption because policymakers, agricultural development partners, and private investors rely on the evidence to make investment decisions for smallholders (Glover *et al*., 2016). To understand adoption and its impacts, researchers have turned in the direction of impact assessment and randomized control trials (RCTs) to quantify the basic research questions (Duflo *et al*., 2008). According to Glover *et al*., when we address the adoption problem, we should design a specification that incorporates farms and technological change as interlocking systems, tackles the change process over time, or capture the change process that is partial or adaptive. The empirical process should also handle technologies of different complexity, show multiple levels at which technologies operate, or provide the basis for robust and cost-effective estimates.

The literature on seed adoption measures the adoption of technology (diffusion by farmers) separately from business model innovation (market penetration by seed companies). Our study offers new insight into attempting to show the relationship between adoption and market penetration. We primarily examine how the relationship between innovation strategies from agribusiness seed companies impacts growth in the smallholders' seed markets, and how actors in the market, including agrodealers, seed growers, and seed users perceive innovation.

3.THEORETICAL MODEL: MARKET GROWTH AND MODEL INNOVATIONS

Seed company business model innovation should close the innovation gap and determine the performance of small-scale agribusiness companies in the seed market in Southern Africa. If small-scale agribusiness seed company leaders in Southern Africa fail to close the innovation gap through their agribusiness seed business models, they might not be motivated to adopt the technology. Hence, we hypothesize:

H_0: Business model innovations do not determine the market share growth of seed business companies in smallholder markets.

H_a: Business model innovations do determine the market share growth of seed business companies in smallholder markets.

Small-scale agribusiness seed companies increase market growth, G, from their structural characteristics, S, and their business model innovations, B, which create values via extensions and complimentary services to meet the needs of the markets. Access to investment capital, I, which positions companies to engage the production and management of improved varieties, C, the regulations, constraints, and risk factors, and whether the firm is producing improved varieties, V, are also factors that determine seed companies market growth.

$$G = f(S, B, I, C, V) \qquad (1)$$

The motivation behind farmers adopting modern seed varieties is assembled in the linear function:

$$D = f(H, A, E, B, P) \qquad (2)$$

Where, D, is the diffusion of improved seeds (adoption of technology by farmers), depends on, H, the set of household characteristics and structural attributes of the crop and farmland, A, the agroecological and geographic conditions that affect the farmland, E, the set of variables explaining whether farmers have encountered full or partial adoption of improved seed varieties or have gotten information from other farmers, and, B, the set of variables that explains complementary and value creation services linked to improves seed varieties, including availability to credits and inputs. P denotes variables that control for the sociological constraints and risks to profitability.

Assuming innovation in the small-seed companies' market is an interactive approach, the effectiveness of business model innovation is predetermined by farmers' attributes and the complementary and extension services needed by farmers.

$$B = f(H, A, E, P) \qquad (3)$$

Finally, we posit, a significant increase in the market shares, G, of small seed companies through business model innovations, B, will drive seed companies to act deliberately to penetrate the seed market. Hence, promoting seed adoption. We assume this position because of the power of absorptive capability. Cohen & Levinthal (1990) showed absorptive capacity is a driving force for the adoption, growth, and sustainability of innovations. Accordingly, absorptive capacity provides positive absorption incentives and brings technical development and market growth. Cohen & Levinthal further discussed that incentives from innovations, for example, seed companies' model innovations adding values to the key market players in the upstream seed industry, will influence the absorptive capacity of seed companies to promote the adoption of improved seed varieties.

Assuming business market innovations positively influence market growth, for sustainability to occur, the knowledge domain of the incentives from innovations should be aligned with the knowledge base to promote seed adoption in the short run. Flatten *et al.* (2015) also argued that for the absorptive capacity of seed companies to thrive in a market, relating to the small-scale seed industry, the capacity should be aligned with and lying in the right leadership, managerial policy, and business environment.

4.DATA: COLLECTION, CONSTRUCTION, AND ANALYSIS

From December 2017 to February 2018, the lead author of this paper contracted two organizations to conduct a detailed survey covering Malawi and Zambia, ranging from the rural farm households to the market level. Hence, the data used in this study to address our research objectives are based on two parallel surveys conducted in Malawi and Zambia, namely the Malawi Smallholder Farmers and Agro-dealers Survey (MASFAS) and the Zambia Smallholder Farmers and Agro-dealers Survey (ZASFAS).

The MASFAS, conducted in 2018, was managed by Clement Stephen Mtengula. The total sample sizes of MASFAS featured 150 smallholder farmers who were seed users, 50 seed grower farmers, seven agro-dealers, three seed companies, and four focus group discussions involving at least 40 farmers from Mangochi, Machinga, and Zomba Districts. The survey collected detailed information about farmers, growers, agro-dealers, and seed companies, encompassing vectors of household characteristics, revenue streams, cultivational practices, business model innovations, and other crop-related and constraint factors. The data for MASFAS was captured using the Census and Survey Processing System (CSPro), a public domain data processing software package developed by the U.S. Census Bureau and ICF International. The extraction, cleaning, and initial analysis of this dataset were performed using STATA and SPSS software.

ZASFAS was also implemented in 2018 by the Alliance of Youth Entrepreneurs (AYE). The survey covered Kabwe, Chongwe, Chisamba, and Chibombo Districts. Corresponding with MASFAS, the ZASFAS collected data from 150 farmer seed users, 50 seed growers, eight agrodealers, and two seed companies. AYE applied the Computer-Assisted Personal Interviewing (CAPI) survey software to collect and preprocess the data.

We merged the parallel data from MASFAS and ZASFAS to construct four distinct datasets. The seed-users data include 300 observations; the seed-growers data include 100 observations; the agrodealer data include 15 observations, and the seed company data include five observations. Although the dataset at any of these levels consisted of more than 200 variables, we cleaned and restricted the data to a few variables of interest to fit our theoretical and empirical models.

Table 1.

Summary statistics of continuous variables of seed companies.

Variables	Obs.	Mean	Std. Dev.	Min	Max

Seed market supply gap (metric tons)	5	910.60	676.17	280	2020
Seed supply potential (metric tons)	5	811.80	762.71	18.0	1600
Net Market Potential (metric tons)	5	-98.80	1171.98	-2002	1098
Total Staff (full and part-time)	5	105.80	27.04	62.0	132
Para-seed inspectors	5	2.80	1.10	1.0	4.0
Total grants received (USD)	5	291145.20	209137.20	150000.0	650000.0
Total of physical assets	5	11.00	6.04	4.0	17.0
Sales from cash (%)	4	28.75	21.75	10.0	60.0
Sales from credit (%)	3	3.33	2.89	0.0	5.0
Sales from consignment credit (%)	4	24.50	34.22	0.0	75.0
Sales from credit to FISP (%)	4	60.50	20.27	32.0	75.0
Sales by NGO (%)	3	3.33	5.77	0.10	10.0

Table (1) gives the summary statistic of the continuous variables at the smallholder seed company level. It captures the growth factors such as the companies' supply gap, market potential, and net market gap. This table also reports information about the structural attributes of seed companies such as the number of total staff, para-inspectors, and the total of physical assets owned by smallholder seed companies. The sales and breakeven variables give information on the revenue factors. Approximately, 67 percent of the variables at the seed company level are dichotomous. Market shares are presented as a dummy to also control for seed company growth factor, our main dependent variable of interest. Dichotomous variables such as the seed company and country fixed effects and the agrodealers network contribute to explain the structural attributes of these smallholder companies. The company's value proposition, extension services, knowledge of customer needs and challenges, and variables such as demo plots, field days, and agri-shows are presented to explain the seed companies' business model innovations, our independent variables of interest.

Table 2.

Summary statistics of the continuous variables of Agrodealers.

Variables	Obs.	Mean	Std. Dev.	Min	Max

Age of Agro-dealer business (years)	15	11	5.92	3	24
Total Staff (full and part-time)	15	9.80	7.94	2	25
Ago-dealer outlets	15	4.13	1.88	1.0	7.0
Linked seed companies	15	4.0	1.93	1	7
Total of physical assets	15	11.00	6.04	4.0	17.0
Total Sales (USD)	15	35791.20	32839.59	904	122378
Non-seed Total Sales (USD)	15	11619.60	14938.15	0	47008
Total Sales from seeds (USD)	15	24171.60	27228.87	904	85932
Farmers asking for credit (%)	15	20.67	22.32	0	70

Table (2) provides the continuous variables of agrodealers. The agrodealers dataset are instrumental factors influencing seed companies' market growth. About 38 percent of the agro-dealer data are continuous variables, while 62 percent are presented as dichotomous variables. Together, variables such as the agrodealer fixed effect and the age of the dealership's business capture the structural attributes of agrodealers; variables such as total sales and sales from credits are included to control for revenue and growth factors; variables such as agrodealers outlets, linked seed companies, farmers asking for credit, and challenges from seed companies give information about the innovation and constraint factors associated with agro-dealers.

Table 3.

Summary statistics of the continuous variables of seed growers.

Variables	Obs.	Mean	Std. Dev.	Min	Max
Farming experience (years)	100	10.41	8.68	4	60
Household size	100	7.14	3.08	2	23
Total children	100	7.23	3.51	2	30
Total cropland (acres)	100	17.47	38.27	0.5	256.99
Total physical assets	100	15.52	12.03	0	81.00
Annual average income (USD)	100	161215.95	555758.68	300	5149999.50
Total livestock	100	35.16	61.91	0	448

Table 4.

Summary statistics of the continuous variables of seed users.

Variables	Obs.	Mean	Std. Dev.	Min	Max
Farming experience (years)	300	16.56	11.49	2	60
Household size	300	6.42	2.98	1	27
Total children	300	6.42	2.98	1	28
Age of household head	300	49.15	13.59	22	99
Total cropland (acres)	300	5.75	35.87	0	619
Total physical assets	300	6.46	6.62	0	74
Annual average income (USD)	300	44372.11	108403.39	0	1350000
Total livestock	300	38.64	358.31	0	6164

24 percent of the seed growers' dataset and 42 percent of the seed users' dataset are continuous variables, as presented respectively in *Tables (3)* and *(4)*. The seed growers' and seed users' datasets are instrumental in controlling for predetermined factors that might impact business model innovations and growth at the seed company level. These data include farmers' and growers' household and structural characteristics, production and revenue information, and other variables explaining growers and the users' relationships with the seed companies or agrodealers.

After merging MASFAS and ZASFAS datasets at the same market level, seed companies, agro-dealers, seed growers, and seed users' levels, we constructed a new merger of three distinct datasets to test our hypothesis. First, we bind seed companies to seed users. This merger generated a sample of 750 observations of five seed companies intermingling with 300 seed users. Second, we constructed a seed-company agrodealer level dataset, using five seed companies and eight agrodealers. This data generated a sample of 37 observations. In the third and final dataset, we connected the five seed companies to the 50 seed growers, generating a new sample of 250 observations.

Figure (1)

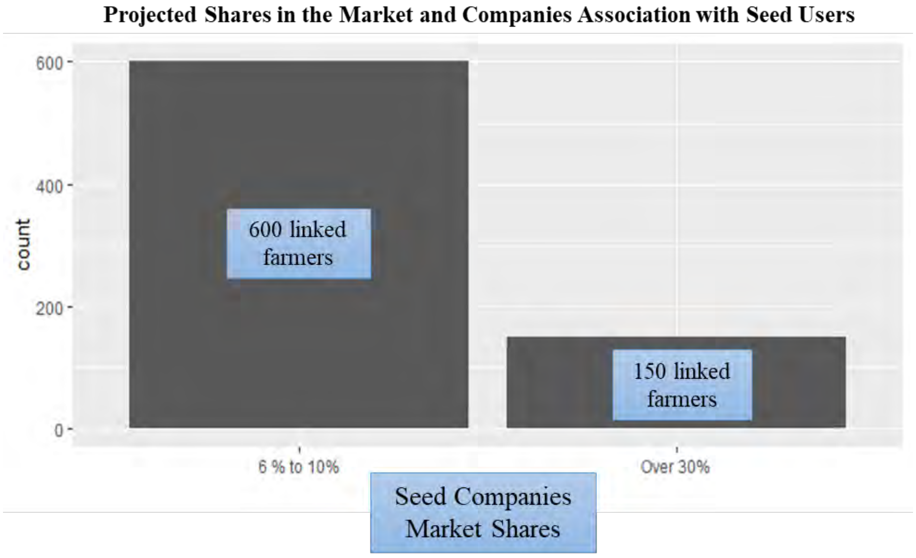

Figure (1) shows the frequency of the market growth indicator, market shares, for seed companies given their association with smallholder's seed users in the sample.

Figure (2)

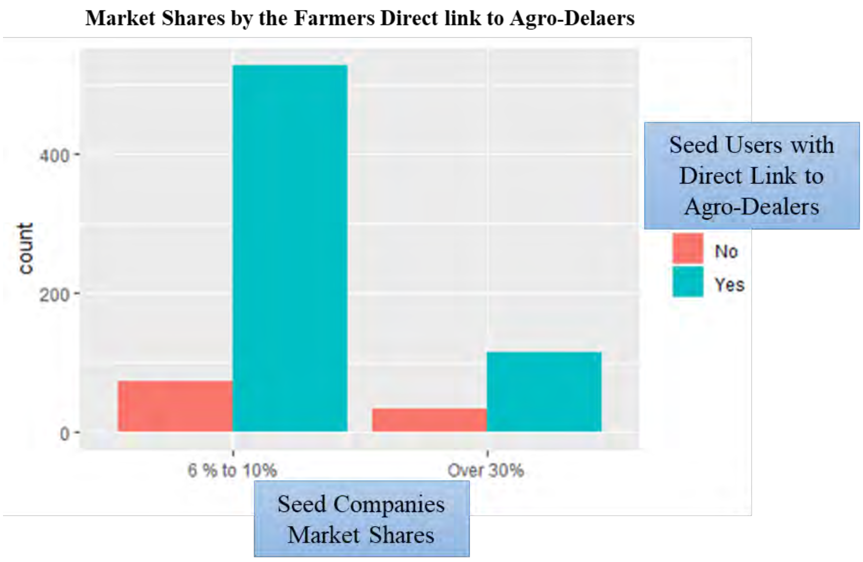

Figure (3)

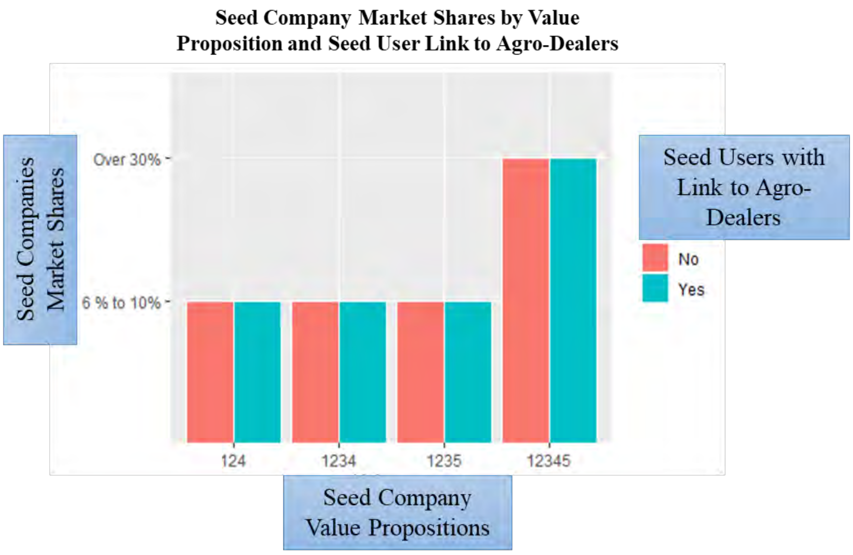

Figure (2) shows the frequency of seed companies' market growth indicators, market shares, and seed users linked to agrodealer networks. *Figure (3)* shows the frequency of seed companies' market growth indicators, market shares, grouped by the companies' value propositions, and smallholders seed users linked to agrodealer networks. Considering the value proposition variables, (1) indicates supplying improved seed; (2) stimulating increased adoption of improved technology; (3) promoting new agronomic practices and good agricultural practices; (4) selling small pack sizes, and (5) indicates decentralizing production and distribution of seed.

5.METHODOLOGY (EMPIRICAL SPECIFICATION)

If the adoption of improved seed varieties is to be achieved, business model innovations must positively impact the growth of seed companies. We employ a binomial logistics function to evaluate growth in the seed market. Our dependent variable of interest is the dichotomous variable of market shares of seed companies in the interval of 6 to 10 percent or more than 30 percent,

$$G_{it} = \frac{1}{1 + e^{-[\beta_0 + \beta_1 S + \beta_2 B + \beta_3 I + \beta_4 C + \beta_5 V]}} \qquad (4)$$

The logistics curve in *Equation (4)* says, in seed company *i* at time *t*, market growth, G, influencing the decisions and actions of company to penetrate the market with improved seed varieties, is proportional to the vectors of the structural characteristics of the firm, S, their business model innovations, B, creating added values via extension and complimentary services to meet the needs of farmers, access to investment capital and production resources, I, positioning the companies to engage the breeding and management of improved varieties, the regulations, constraints, and risk factors, C, and whether or not the firm is producing improved varieties, V.

The influence of business model innovations on market growth might be endogenous and could be rigged with unmeasured confounders. Engagements from key actors, such as the gender of farmers, cultivation lands, where farmers spend most of their incomes, and the revenues and agrodealer outlets are instruments that could influence the growth of seed companies. To control for this statistical problem of endogeneity, or identification specification, we subject and transform *Equation (4)*, the logit function, to a two-stage logistic model estimation, as advised by, Grondijs & Cessie (2015) and Katungi *et al*. (2016).

Figure (4) **Association of Instruments and Causal Path**

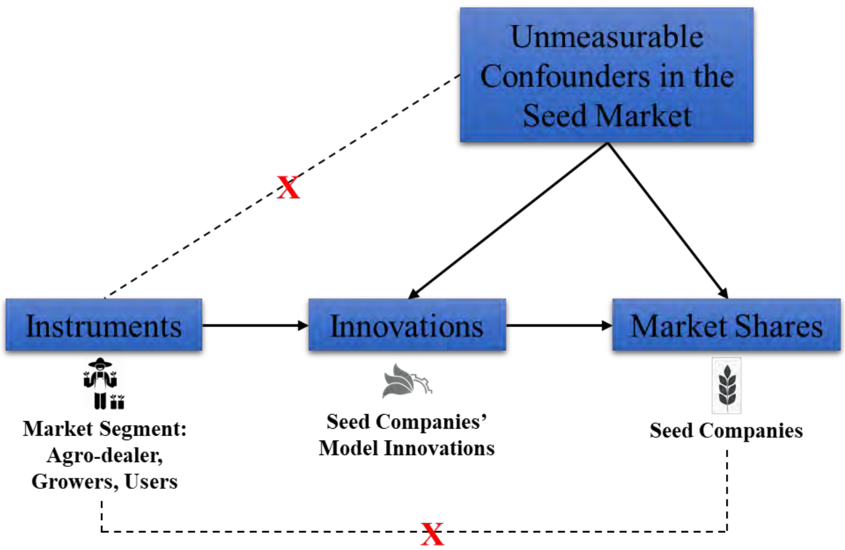

Figure (4) shows the allowable association and non-causal path assumed by the dichotomous instrumental models presented in *Equations (5)* and *(6)*. The first stage, *Equation (5),* parsimoniously predicts the reduced forms of the business model innovations on instruments from the respective seed-user, seed-growers, and agro-dealers market segments using the maximum likelihood estimation technique.

$$P[B = 1|Z,U] = F\left(\frac{1}{1 + e^{-[\alpha_0+\alpha_1 H+\alpha_2 A+\alpha_3 E+\alpha_4 P]}}\right) \qquad (5)$$

$$P[G = 1|B,U] = F\left(\frac{1}{1 + e^{-[\beta_0+\beta_1 S+\beta_2 B+\beta_3 I+\beta_4 C+\beta_5 V]}}\right) \qquad (6)$$

From *Equation (5)*, generating the second stage, market growth is regressed on the reduced forms predicted business model innovations and the seed company's exogenous variables (instrumenting themselves). This two-stage logistics regressions specification will estimate the odds ratios of innovations at each market level. We also used seed companies' net seed supply market potential as an outcome variable to further discuss the relationship between business model innovations and the market growth of seed companies.

Checking the Model's Assumptions

A maximum likelihood technique should be applied on large samples, preferably more than 500 samples (Studenmund, 2017). Even though our data has 700 samples in the seed companies-seed users' dataset, 250 at the seed companies-seed users' level, and 37 observations at the agro-dealer-seed companies' level, our main dataset has five (5) samples. If our estimates related to the market growth are significant, we warn the results may not be consistent and asymptotically efficient, as announced by Stdenmund (2017). We cleaned our model for possible multicollinearity. After the multicollinearity treatment, we applied the AIC (Akaike's Information Criteria) statistic to select the most parsimonious model. The encompassed models we chose had the smallest AICs value of 8.05. Considering the multicollinearity and AICs treatments, and the size of the sample of the seed company data, the seed company's agrodealer network, value propositions, and customer valuation were the variables accepted by the model as variables of business model innovations influencing market shares. Total staff and para-seed inspectors were the exogenous variables for seed companies in the model.

Given the dichotomous nature of the data in *Equation (6)*, we were unable to prove the validity of the instruments at any market segment level. Specification tests for instrumental variables are accustomed to continuous variables and linear functional forms. However, it is plausible that the instruments used are not weak because the first-order condition was met. $Z > B$ ($Z = 8; B = 3$) at the seed user-seed company level; $Z > B$ ($Z = 21; B = 3$) at the seed grower-seed company level, and $Z > B$ ($Z = 6; B = 3$) at the seed user-seed company level. In the model where the net seed supply market potential is used as the outcome variable, the F-statistics was greater than 10, and the p-value was 0.00, thus rejecting the null hypothesis that all our instruments are weak. These assumptions were the same and were satisfied at each segment of our analysis. Again, it was impossible to check for endogeneity and overidentifying restrictions, given the dichotomous nature of the model.

6.RESULTS AND DISCUSSION

This paper hypothesizes that the relationship between business model innovations and the market growth of smallholder seed companies is crucial to shaping market penetration and diffusion of improved seed varieties. The estimates from the dichotomous two-stage instrumental model, using market shares as outcomes, were not statistically significant. The models, both the first and second stages, produced no statistical importance at the 5% significance level. The standard errors were in the extremes and the p-values generated were closer to 1, see Table (5). At this stage, we cannot say whether there is a likelihood that the business model innovations we controlled for in the model, namely value propositions, customer valuations, and agrodealer networks, would increase or decrease market shares to influence the actions of seed companies to penetrate the market. Given, we could not report the log odds of the probability for our outcome or the log of odds ratios between our variables.

Table 5.

Results of the dichotomous two-stage instrumental model. The outcome is market shares. Note, estimates are not converted to odds ratios.

	Dependent Variable		
	Seed Companies Market Shares		
	Seed User	Seed Grower	Agrodealer
Independent Variables	Market Segment (2SLogReg)	Market Segment (2SLogReg)	Market Segment (2SLogReg)
Constant	106.34	-187.93	-187.93
	(1.641e+15)	(318106)	(832172)
Agrodealer networks	19.99	-74.78	-74.78
	(5.286e+14)	(179749)	(461706)
Value propositions	28.06	62.97	62.97
	(1.947e+14)	(50674)	(132086)
Customer valuations	-61.02	-23.61	-23.61
	(2.087e+14)	(85439)	(221094)
Total staff	-0.53	1.97	1.97
	(1.391e+13)	(3731)	(9654)
Para-inspectors	-22.44	-	-
	(1.252e+14)		
Observations	750	250	37

Note: Although there were 750, 250, and 37 observations from the respective models (i.e., binding the seed companies to the linked seed market segments), the main dataset of interest, the seed company dataset contains 5 samples. The variables are statistically significant at *p<0.1; **p<0.05; and ***p<0.01.

Estimating the predicted business model innovations on a linear model, where the outcome variable is the net seed supply market potential of seed companies in metric tons, we find the results statistically significant ($p<0.05$) and consistent in each market segment. *Table (6)* shows a very small standard error for these estimates, but we would be careful in trusting or reporting the magnitude of the results because of the very small samples we are using at the seed company level. There is a likelihood that increasing staff (part timers and full timers) would positively influence the market potential of seed companies. We find that the fitted and combined effects of agrodealership networks will negatively influence the net supply potential of these companies. The findings also predict that the fitted and combined effects of the companies' position in the market, through their value-added propositions, would increase their net market potential, and the combined and fitted effects covering how the firm is valued or perceived by its customers in the market will decrease their net seed supplies.

Table 6.

Results of the linear two-stage instrumental model. The outcome is the net market potential of improved seeds. Note, the first stage was predicted in a logit model.

	Dependent Variable Seed Companies Net Potential Gap (metric tons)		
Independent Variables	Seed User Market Segment (2SLS)	Seed Grower Market Segment (2SLS)	Agrodealer Market Segment (2SLS)
Constant	-3,171.30***	3,171.30***	-3,171.30***
	(0.0000)	(0.00)	(0.0000)
Agrodealer networks	-6,075.26***	6,075.26***	-6,075.26***
	(0.0000)	(0.00)	(0.0000)
Value propositions	3.48***	3.48***	3.48***
	(0.00)	(0.00)	(0.0000)
Customer valuations	-588.56***	-588.56***	-588.56***
	(0.00)	(0.00)	(0.00)
Total staff	78.30***	78.30***	78.30***
	(0.00)	(0.00)	(0.00)
Para-inspectors	-	-	-
Observations	750	250	37

Note: Although there were 750, 250, and 37 observations from the respective models (i.e., binding the seed companies to the linked seed market segments), the main dataset of interest, the seed company dataset contains 5 samples. The variables are statistically significant at *p<0.1; **p<0.05; and ***p<0.01.

Although the instruments, at the model level, were not statistically significant when predicting the first stage, yet the test of coefficients showed some of the instruments are meaningful at a 5% significance level to influence the vector of innovation variables in our model. For example, crop farming, farm-building expense, number of years of farming experience, and the average incomes of farmers are positively correlated with our innovation variables of agrodealership networks, value propositions, and customer valuations. Conversely, instruments such as livestock farming, buying farming inputs, purchasing food, and the direct access of rural farm households to agrodealers are negatively correlated with seed companies' innovations.

7.MANAGING IMPLICATIONS

The research purpose was to determine the impact of seed companies' business model innovations on their market share in the smallholders' market segment working with seed growers and agrodealers to enhance the seed companies value propositions. The data indicated that, on average, seed companies enjoyed six to ten percent market share in smallholders market segments indicating low value appropriation for the seed companies. The data is not conclusive as to whether seed companies should be encouraged to enhance their value propositions to increase their market share, and if they do, which particular value propositions have a direct impact on increasing their market shares. Indications are that seed companies that have decentralized seed production and distribution models have higher market shares in the smallholders' market segments in addition to their other value propositions offered by seed companies with less than ten percent market share.

An immediate management implication to policymakers and development programs is determining which directional focus their support activities to seed companies should take. There have been concerted efforts to support the development of new seed varieties hoping that seed companies with improved seed technologies will induce the adoption of improved seed technologies by smallholder farmers. However, even with more improved seed varieties on offer, seed companies have not significantly increased seed adoption. The question policymakers and development practitioners should consider is whether support to seed companies on seed varieties development needs to shift to other seed companies' value propositions such as decentralized seed production and distribution models coupled with enhancing smallholder farmers' value appropriation support activities. For instance, in the absence of functional commodity markets, smallholder farmers' incentives to adopt new technologies are limited since seed has derived demand from commodity markets.

An additional area of interest from this research is that of agro-dealers development. There has been a flurry of activity to develop agrodealers as the last mile distribution model for agricultural inputs and related services. Our research has proved that seed users linked to agrodealers have better adopted improved seed technologies than those that are not linked to agrodealers. While this picture may point to the need for seed companies to work with agrodealers, caution must be exercised in terms of what elements of that relationship matter in the value proposition equation. Further research is required to determine what value proposition elements of the agro dealer distribution model are key to enhancing smallholder farmers' seed adoption and seed companies' value appropriation before throwing money at the agro dealer initiatives as the panacea to the seed adoption conundrum.

An interesting emerging value proposition of working with smallholder seed growers as a mechanism for lowering seed production costs and enhancing innovation diffusion has emerged from this work. Policymakers need to pay attention to how support to seed companies' can embrace the smallholder farmers as seed growers and as an extension of the seed companies' business models in smallholders' markets.

8.CONCLUSION

The seed companies’ business models have various dimensions. The focus of this paper was on how seed companies’ business influences their market share in smallholders' markets. The results point towards the importance of particular value proposition elements such as decentralized seed production and distribution and availability of improved seed varieties. Several external factors not covered in this research influence smallholder farmers' adoption of improved seed varieties, such as commodity markets functionality and government input subsidy schemes. Further research is required to determine which seed company value propositions would enhance seed user technology adoption and ultimately increase seed companies and smallholder farmers' value appropriation. The focus on seed companies' value proposition appears to be an incomplete value equation in the smallholder farmers' market segment. An additional area of inquiry that merits further research is determining what elements of the value proposition matter in working with agrodealers and what support seed companies need to render to agrodealers that constitute their distribution network.

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Sustainable Business Models in the Service Sector: An Analysis of Value Creation in a Stakeholder Network

Devika Hirsch[1,*], Dietfried Globocnik[2], Romana Rauter[1]

[1]University of Graz, Institute of Systems Sciences, Innovation and Sustainability Research; [2]Alpen-Adria Universitaet Klagenfurt, Department of Innovation Management and Entrepreneurship

*devika.hirsch@edu.uni-graz.at

The importance of environmental and social aspects in business practices have recently been emphasized by literature (Høgevold, Svensson and Padin, 2015). It is widely acknowledged that corporate sustainability through sustainable development is of importance to overcome substantial social, ecological and economic challenges. Because environmental and social challenges gained more attention, sustainable business models have become more important as they represent the value creation logic of a firm and thus embrace a business' core activities. Sustainable business models are used as a method to give a systemic perspective on how to do business while considering sustainability principles (Schaltegger, Lüdeke-Freund and Hansen, 2016). The majority of prior research on sustainable business models is focused on the ecological aspect of sustainability, however sustainable business models could also be used as a means to address social issues (Lüdeke-Freund and Dembek, 2017). As corporate sustainability should be of interest in all sectors, it is important to extend academic knowledge on different topics of the service sector and social issues as well.

Looking into the service sector, a different type of analysis of a business model might be needed. There is a higher relevance of key partners that needs to be considered because services are created and delivered in a service ecosystem and network (Wieland *et al.,* 2012), and value exchange takes place between multiple stakeholders. Because of the high degree of interaction between various stakeholders and the intangibility of services, stakeholder theory is an appropriate conceptual lens to study the relationships between stakeholders and the types of value creation in the service industry. This is why we apply a stakeholder theory perspective framework on business models and the value creation for sustainability proposed by Freudenreich, Lüdeke-Freund and Schaltegger. This framework is derived from Edward Freeman, who set the agenda for what is now called stakeholder theory with his book Strategic Management: A Stakeholder Approach (Freeman *et al.*, 2010). The alternative view on business models is based on value creation and multi-directional value flows in value networks (Freudenreich, Lüdeke-Freund and Schaltegger, 2020).

Value Creation has different definitions. The strategic management literature distinguishes between the shareholder value created and the total value created by the firm and its stakeholders. In both terms there is a focus on economic value and stakeholders are defined as "any group or individual who creates and captures economic value in its interaction with the firm." (Garcia-Castro and Aguilera, 2015, p. 138). As seen in sustainable business model literature, not only the economic, but higher moral, ecological and social value creation resulting from exchange processes with stakeholders should be considered (Lüdeke-Freund *et al.,* 2020). Thus, this broader understanding of value creation follows the basic concept of the triple bottom line.

Prior sustainability literature has a strong emphasize on ecological sustainability, but when studying the service sector, this understanding is too narrow and requires to extend to other dimensions of sustainability. Especially the health care sector aims to resolve social problems and therefore is concerned with social value creation. There is a lack of access to quality, affordable healthcare for many people and cooperatives may have the possibility to expand access to health care (United Nations, 2019). Therefore, it is important to analyze the role and competitive advantage of cooperatives in meeting health care needs.

After conducting a literature review on sustainable business models and the service sector, it became apparent that there is little to no research on sustainable business models in the health care context. There are only few reports on health care cooperatives and sustainability. Moreover, there is a lack of academic research specifying on the business model of cooperatives in health care and their value creation in their stakeholder network as well as its implications for sustainability. This research aims to contribute to closing these research gaps by addressing the question of how value is created for networks of stakeholders (Freudenreich, Lüdeke-Freund and Schaltegger, 2020). This involves the analysis of relationships and trade-offs between different stakeholders and their value exchanges.

The research will be based on a case study on the company Savvy, which operates as an intermediary in the health sector that brings manufacturers and patients together for clinical and market research activities. The company's overall goal is to make health care more patient friendly and the unique characteristic is that it is a public benefit co-op, i.e., Savvy is legally owned by its members (Savvy Cooperative, 2020). This setting differs significantly from established structures in health care in which cooperatives mainly consist of health care professionals, management of health care facilities or insurances (United Nations, 2019). In contrast, Savvy works as a mediator connecting patients with manufacturers of medical devices and pharmaceutical products to improve health care services and products.

Savvy was chosen as the object of a single case study as the firm's business model is unique in the health care sector and the value creation within a cooperative is a research gap which could be useful for future sustainability issues. Semi-structured interviews will be conducted for data collection as interviews are an essential source of case study evidence, because well-informed employees can provide important insights into human affairs (Yin, 2014). The interviews will start with an executive representative of Savvy to gain insights into the business model, value creation and the stakeholder network. Next, it is planned to conduct interviews with different stakeholders of their service network, namely patients, employees and clients (i.e., snowball sampling). The evaluation method for the data analysis will be a content analysis.

Often stakeholders have a dual role in sustainability problems and solutions: The actors causing social problems are the same needed in the development of solutions (Freudenreich, Lüdeke-Freund and Schaltegger, 2020), which is intended to be uncovered at Savvy and their stakeholders. While analyzing the contributions of the business model to sustainability and their stakeholders, it might become visible that economic value is joined by social and ecological value (Freudenreich, Lüdeke-Freund and Schaltegger, 2020). In fact, cooperatives might show that sustainable business models are not only about value creation, but the focus is on building relationships and maintaining them. The created outcome might be perceived valuable by its recipients in different ways.

It is anticipated that cooperatives might be an alternative type of organization, which creates value for multiple stakeholders, and it might be noticeable that there are different types of value created for different involved groups. Moreover, the importance of stakeholders and the relationships within the business model in the service sector might become evident. Also, the influence of the company operating as a cooperative, its uniqueness and its effect on relations and social problems will be uncovered. We also expect to see how the value capture logic of sustainable business models in the service sector might be different from other types of business models.

In conclusion this research tries to fill the gap regarding sustainable business models, value creation and stakeholder relationships in the service sector. We highlight different types of value creation in a cooperative and the importance of the relationships with multiple stakeholders. The goal is to give an insight into the stakeholder relationships and the value capture logic, which then could be applied to other business models and extends the literature in the service sector.

Keywords

Sustainable Business Model, Stakeholder, Value Creation, Service Sector, Cooperatives.

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Track 2.5.

Data-driven Business Models for Sustainability in Emerging Fields

Track 2.5. Data-driven Business Models for Sustainability in Emerging Fields

Track chairs: Magnus Holmén[1], Lauri Paavola[2], Maya Hoveskog[1]
[1]Halmstad University, Sweden; [2]Aalto University, Finland

This track aims to explore how data-driven business models shape the overall ecosystem value propositions for sustainability.

Today, many firms experiment with and diversify into new data-driven solutions. A trend triggered mainly by the capabilities digital technology provides. In data-driven business models, data is the key resource for business activities, and its value is often created and captured within a digital ecosystem (Xu et al., 2020). Through experimentation, firms are attempting to create new ecosystems. One practical illustration is the expected emergence of autonomous, connected, electric shared vehicles (ACES). They have the potential of opening up new opportunities for more sustainable transportation (e.g. increased degree of utilization of vehicles, decreased pollution) as well as a more customized mode of travelling by allowing for seamless changes in transportation modes (car, bus, bicycle, walk). Along with the economically motivated potential in such data-driven solutions and business models, they also display potential for social and environmental contributions (Schneider, 2019).

During such digital transformations, incumbents in mature industries face cognitive, resource and capability barriers to becoming more data-driven, and they are therefore characterized by lock-in to their existing business models and industrial structures. A partial explanation is that changes into data-driven solutions will affect the firms' value propositions, and their relation to each other and their customers. Such ecosystems differ from traditional industrial value and supply chains, since the focal value proposition is based on its alignment structure (Adner, 2017), and characterized by complementarities in production as well as consumption (Jacobides et al., 2018).

This track intends to empirically analyze and conceptualize the emergence of the overall ecosystem value propositions for sustainability as well as the structure of ecosystems in emerging fields. The track is focusing on but is not limited to, the interplay between products and services vs data-driven business models for sustainability and ecosystem; data acquisition strategy and new business models; the role of digital platforms for sustainable business model innovation; methods for developing sustainable, data-driven business models in ecosystems.

Papers can address one or more of the following questions, which is not an exhaustive list:

- How best to leverage data-driven business models to address environmental and societal challenges?

- What are the opportunities and challenges related to data-driven business models for sustainability?
- How do digital platforms, their corresponding ecosystems as well as overall ecosystem value propositions for sustainability emerge and evolve?
- How do SMEs approach data-driven business models for sustainability to operate on multisided markets?
- How can SMEs maximize the positive implications of their data-driven business models, while minimizing the negative ones along all three dimensions of sustainability?
- Which are the critical complementarities in digital platforms and their corresponding ecosystems in emerging fields?
- How do different designs of digital platforms affect companies' data-driven business models for sustainability?
- How can/should companies govern their engagement in digital platforms and what are the implications for business models for sustainability?
- What are barriers and drivers to digital platforms and their corresponding ecosystems success and their sustainability?

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Drivers and hinders for engaging in innovation ecosystems: the case of a digital platform for Mobility-as-a-Service

Bergquist Magnus[1,*], Blanco Harvey [2,*], Esmaeilzadeh Alireza [2,*]

[1]School of Information Technology, Halmstad University, Halmstad-Sweden; [2]School of Business, Innovation and Sustainability, Halmstad University, Halmstad-Sweden.

*magnus.bergquist@hh.se

*harvey.blanco@hh.se

*alireza.esmaeilzadeh@hh.se

Extended Abstract

INTRODUCTION

One challenge in data-driven business model innovation is to gather a multitude of stakeholders to collaborate and **develop** sustainable joint business opportunities. This is especially valid in emerging fields such as Mobility-as-a-Service (MaaS), where large volumes of data are enablers for innovative business models (Hartmann et al., 2016). Since MaaS builds on combinations and repurposing of data from multiple sources, different actors must come together to provide both data resources and analytical tools. This to explore and exploit data and make sense of how resources can be applied to enable innovative business models. The setting in which different actors work together to create a new integrated business model for MaaS can therefore be described as an innovation ecosystem in line with Adner's (2006, p. 2) definition: "*the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution*."

Depending on the phase of development of an innovation ecosystem, actors might engage in the network for different reasons. Although various studies have already explored aspects of innovation ecosystems, there is still a gap regarding identifying what drives and hinders actors from joining an innovation ecosystem, especially in the early phase

(Baloutsos et al., 2020). Actors have different motives to join the initiative; for example, private companies' primary reason to join an innovation ecosystem would be to gain a higher market share. Small companies, consequently, might join an innovation ecosystem to develop their network with noteworthy alliances. Larger companies, i.e., mobility service providers and public transport operators, might be more interested in quality demand data (Polydoropoulou et al., 2018).

Therefore, this study tackles the research question, *what are the drivers and hinders for actors to engage in an innovation ecosystem for knowledge co-creation at the early stage*? To capture what drives and hinders engagement for the successful development of MaaS at the early stage, this paper offers the concept of *innovation ecosystems* as a theoretical backbone for studying actor engagement in MaaS innovation and co-creation. The project Open and Self-Organizing Mobility-as-a-Service (OSMaaS) was chosen as a case for the study. It demonstrates the dynamics of an emerging innovation ecosystem where different actors work together to realize the MaaS.

METHOD

The research approach used for this study was abductive. An abductive method was adequate for this study since our objective was to discover new insights and variables for which actors have engaged in innovation ecosystems. The following characteristics describe why we decided to use the OSMaaS project as the case for this study: (I) the project was set for the knowledge co-creation, (II) it is composed of interconnected and interdependent actors from different sectors, which includes government, university and private organizations, (III) the nature of the innovation is somewhat improvisational, and (IV) although a leading organization manages the project, the governance responsibility is distributed among the actors.

The interviews were taken from the 5th of march to the 25th of march of 2020. All the interviewees were representatives of the actors (organizations) engaged in the OSMaaS project. We targeted the individuals that were actively contributing to the workshops and meetings of the project. A total of seven individuals participated in the interview.

The method encompassed six stages for data coding adapted from Federay and Muir-Cochrane (2006) and Pearse (2019). Table 1 provides an example of the structural coding used in this research.

TABLE 12 AN EXAMPLE OF DATA-DRIVEN CODES WITH SEGMENTS OF TEXT FROM PARTICIPANTS

	Data-driven code
Label	**Individuals' aspects**
Definition	It is the degree to which an individual can influence the decision of whether to join or not an innovation ecosystem. Individuals' features such as knowledge, know-how, relations and time allocation could impact engagement.
When it occurs	Use this code to capture expressions like knowledge, know-how, contacts, relations, key people, time, and pronouns such as I, he, and she.
Participant	**Data segment**
Interviewee 1	From my perspective, I want to be a spearhead in value creation from service-dominant logic.
	When I put a consortium together, it's usually based on who I know.
	Individuals' aspects can damage long-term collaborations.
Interviewee 6	My background is within the research of digital services - within outline - the um autonomous car development.

The themes were discovered through thematic analysis and are presented in the next section.

PRESENT RESULTS

The analysis revealed sixteen themes depicting the interviewees' experiences regarding what drove or hindered them when joining the OSMaaS project (Table 2).

TABLE 2 DRIVERS AND HINDERS FOR ACTORS TO ENGAGE IN AN INNOVATION ECOSYSTEM FOR KNOWLEDGE CO-CREATION

Drivers/Hinders	Aspects	Theme	Factors Driving the Theme
Drivers	Ecosystem aspects	Collaboration	Partner constellation Mutual interest Quality of communication
		Governance and structure	Neutral Governor Cross-functional work Funding IP protection
		Proximity	Geographical proximity Proximity to Gothenburg Regional culture
	Innovation aspects	Relative advantage	Sustainability Scalability
		Complexity	Simplicity for customers
		Observability	A significant problem to solve
		Compatibility	Aligned with business ambitions
		Trialability	Opportunity for experimentation
	Knowledge co-creation aspects	Competitive advantage	Global competition Industry understanding Affect users' behavior Market knowledge
		Product development	Development of future vehicles Complementary Capabilities
	Individual aspects	Personal interest	Learning
		Knowledge	Knowledge background
		Know-how	Expertise background
		Contacts	Size and quality of personal network
Hinders	Ecosystem aspects	Competition	Disclosure of critical information
		Governance and structure	Ecosystem bureaucracy Organizational bureaucracy Traditional industry
	Innovation aspects	Complexity	Complexity for suppliers
	Knowledge co-creation aspects	Competitive advantage And Product development	Diverse and changing interests of the actors Poor outcome of an innovation ecosystem
	Individual aspects	Time	Busy schedules

DISCUSSION

Among the discovered themes, eight themes act strictly as drivers, only one strictly as hinder, and four as drivers and hinder, depending on the innovation ecosystem context. Proximity was the only innovation ecosystem aspect that arose as a pure driver when engaging actors in OSMaaS. Innovation aspects that drove actors to engage in OSMaaS included: relative advantage, observability, compatibility, and trialability; actors perceived MaaS as an innovative idea with high diffusion and value capture opportunities. Furthermore, five individuals' aspects that drove actors to engage in OSMaaS were identified including, personal interest, knowledge, know-how, and contacts. People leading, researching, and developing the product in OSMaaS attracted engagement in OSMaaS. However, Individuals' time is the only aspect that acts as a pure hinder when engaging in OSMaaS. The logic behind it is that organizations may involve busy workers with limited time when collaborating with the innovation ecosystem. Lack of time may result in lack of contribution, un-attendance, and conflicts between actors in the ecosystem.

Four themes are bred as both driver and hinders. Collaboration drove actors to engage in OSMaaS; however, when collaboration is turned into competition seemed to hinder it. Furthermore, the co-creation of knowledge brought actors into collaboration; nonetheless, when the actor turns the produced knowledge into individual competitive advantages might lead to a conflict of interest, which hindered engagement.

CONCLUSION

This research draws a guideline for similar initiatives to motivate the key actors and eliminate the hinders that might weaken the collaboration in an innovation ecosystem. Regarding the specific characteristic of the OSMaaS project, as an attempt to create a data-driven innovation, this study can contribute to similar initiatives by mapping the drivers and hinders for actors' engagement. We also suggest that future research should track events to extract the dynamism of the identified drivers and hinder in this study. As a complementary source of data, we call to jointly analyze engagement during the different stages of development of an innovation ecosystem. Furthermore, the empirical part of this study was conducted as a single case study with a limited interview sample. We suggest further research with a larger sample and multiple cases, which will provide a more comprehensive understanding of the topic.

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Endnote:

This extended abstract is based on a master thesis work (Esmaeilzadeh and Blanco, 2020).

Digitalization and Business Model Innovation in Health Ecosystems

A Systematic Literature Review

Luís Irgang[1*], Magnus Holmén[1], Henrik Barth[1]

[1]Center for Innovation, Entrepreneurship and Learning, Halmstad University

*E-mail of corresponding author: luis.irgang@hh.se

Extended abstract

1. INTRODUCTION

Digitalization refers to manifold sociotechnical phenomena and processes of adopting and using information and communication technology (ICT) in broader individual, organizational and societal contexts (Legner et al., 2017). ICT solutions such as big data, artificial intelligence and machine learning connect machines, things and individuals, and have promoted dramatic changes in organizational processes, products and services. In the health industry, specifically, digitalization has contributed to ensuring the delivery of more efficient, cheap, safe and quality services to patients (McKinsey & Company, 2016). For hospitals and medtech firms, digitalization allows to mitigate historical problems related to the management and sharing of large amounts of diverse and complex information (Agarwal, et al., 2010).

While the use of ICT solutions has been proven very helpful in the improvement of healthcare services, prior literature shows that the digitalization in the health industry is suboptimal, particularly because firms struggle in formulating strategies to create and capture value to maximize the benefits of the adoption of ICT solutions (Itälä & Töhönen, 2017). Besides, as the health industry often involves multi-stakeholder networks which interact and co-create value in complex ecosystems (Beirão et al., 2017), the adoption of ICT solutions may demand changes on the way on how the stakeholders interact and collaborate. Therefore, the success of digitalization in health ecosystems relies on how the stakeholders innovate in their business models (BMs) to explore and exploit ICT solutions and how they align their BMs with other ecosystem actors to create interdependencies and benefit from complementarities (Agarwal et al., 2010).

A firm's BM comprises three main domains: value creation, value proposition and value capture (Clauss, 2017). Value creation is related to how firms combine intra and interorganizational resources and capabilities to create value along the value chain. Value proposition aggregates the solutions (i.e., products and services) offered to customers and how they are delivered. Value capture comprises how to obtain incomes from value proposition and achieve sustainable competitive advantage (Clauss, 2017). In order to maximize the benefits from digitalization, firms must innovate in these three dimensions, involving not only increasing in benefits for customers, but also (re)designing processes and defining new strategies to deliver such benefits (Björkdahl & Holmén, 2019). However, prior research shows that business model innovation is both difficult and cumbersome because of various barriers such as lock-in mental models and routines, formal and informal expectations of "what to do", resource allocations, and relationships with other actors including suppliers, complementors, and distributors (Chesbrough, 2010). This is especially problematic when firms operate in complex ecosystems and need to (re)design the logic and patterns on how to create and capture value based on complex interactions with multiple actors in the value chain.

Although prior literature has largely explored the benefits, barriers and facilitators for digitalization in health ecosystems (e.g., Pikkarainen et al., 2017; Sun & Medaglia, 2019), how stakeholders' business interactions occur from the integration of ICT solutions remains poorly researched. Therefore, additional research is needed to address how digitalization affects how medtech firms innovate in their BMs to co-create and capture value through ICT solutions within its stakeholders in health ecosystems (Senyo et al., 2019; van Meeuwen et al., 2015). Moreover, as the digitalization blurs the boundaries between actors of an ecosystem (Constantinides et al., 2018), additional studies are needed to investigate how medtech firms redesign business operations in health ecosystems to maximize their benefits from the collaborators' complementarities.

To fill these gaps, this study aims to answer the following research questions:

RQ1: What is the current research status and the most promising strands of research on digitalization and business model innovation in health ecosystems?

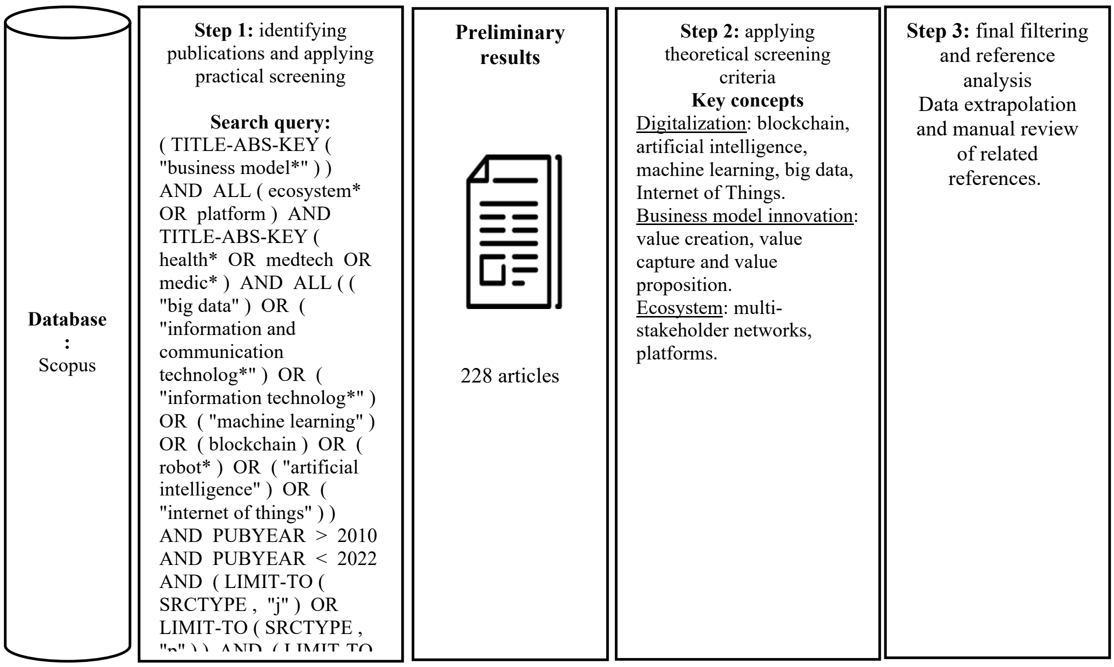
RQ2: How does digitalization transform the business models of medtech firms?

To answer these questions, we will conduct a systematic literature review by investigating featured research areas related to digitalization, business models and ecosystems.

2. METHOD

To scrutinize relevant literature on digitalization and business model innovation, and to aggregate and integrate existing insights on the ecosystem perspective, we chose a systematic literature review approach, as it allows to identify, evaluate, and synthesize research results that can contribute to determine gaps within the extant research and provide guidance for further research activities (Peters et al., 2015). Similar to Parida et al. (2019), this study follows a systematic process based on three steps: identifying publications and applying practical screening (1), applying theoretical screening criteria (2) and final filtering and reference analysis (3). In step 1, we conducted a comprehensive searching on scientific journals indexed in Scopus, as this is the largest abstract and citation database of peer-reviewed literature. We defined a list of keywords and synonyms related to digitalization, business models, health industry and ecosystems to be included in the search and filtering by abstract, title and keywords (see Figure 1). Next, we searched for peer-reviewed articles published in journals and conference proceedings, and we excluded working papers, commentaries, book review articles and book chapters. Further, we filtered the articles that were published in the last 10 years (between 2011 and 2020) and written in English. This resulted in an initial set of 288 articles as depicted in Figure 1.

Figure 1. Steps in the literature search and classification process.



In step 2, we will apply a theoretical screening criterion through the analysis of articles from concepts related to the literatures on digitalization, business model innovation and ecosystems. We will read the articles' abstracts and select only those that address aspects related to digital solutions (e.g., blockchain, artificial intelligence, machine learning, big data, Internet of Things), business model innovation (value creation, value capture and value proposition) and from an ecosystem perspective (multi-stakeholder networks and platforms). In step 3, we will conduct a final filtering through a process of data extrapolation, following an accurate reading of the studies and considering the research topic, the data collection and analysis methodology, and the nature of the studies (qualitative, quantitative, conceptual or review). Moreover, we will also use the articles' references as a secondary source of literature analysis (see Figure 1).

The data will be analyzed from a qualitative approach, divided into a descriptive and thematic analysis (Tranfield et al., 2003). The descriptive analysis will help us to present bibliographic data and to categorize and contextualize the articles in themes and sub-themes. In the thematic analysis we will evaluate the material through deductive and inductive categories to identify central themes and interpret results (Tranfield et al., 2003).

3. EXPECTED RESULTS

By drawing this systematic literature review study, we expect to describe the state-of-the-art of how digitalization enables business model innovation of medtech companies in health ecosystems and identify how firms use digital solutions in products and services to create, deliver and capture value. Besides, the research findings will provide an overview about the research tendencies on digitalization, business model innovation and health ecosystems and how they have been related in the recent literature, considering the past ten years. Furthermore, this study will also identify research gaps from the related literature and provide guidance for future research in the subjects of digitalization, business model innovation and health ecosystems.

Keywords

Digitalization, Information and Communication Technology, Business Model Innovation, Health Ecosystems.

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Business models for system change or how to enhance transitions towards sustainability:

A case study from the wood construction value chain

Andrey Abadzhiev[1*], Alexandre Sukhov[1], Mikael Johnson[1]

[1]CTF—Service Research Center, Karlstad Business School, Karlstad University, Karlstad, Sweden

*andrey.abadzhiev@kau.se

Abstract

Technological innovations have been widely considered as a remedy for sustainable business development, but it remains unclear whether and how the potential of the technology will find its way to grow and scale. In this paper, we explore the role of the business model for scaling technologies towards more sustainable outcomes. Using a case study method and drawing on multiple data sources from an emerging engineered wood technology, in the construction sector, we show how scaling of technology occurs in a larger system, and how it enhances transitions towards sustainability.

Keywords

Business model innovation, Sustainability transitions, Multi-level perspective, Technological innovations, Construction value chain.

INTRODUCTION

Technology entrepreneurs are in the spotlights of hope in driving green economic and social sustainability. The entrepreneurs' role in sustainable development is often related to bringing technologies that reduce the environmental impact or meet social needs in a better way (Kemp and Volpi 2008). However, sustainable technology by itself is simply not sufficient for a success story. Lessons from the past tell of companies, which are able to create breakthrough ideas but fail against the existing technological and business paradigm (Dosi 1982; Bettis and Prahalad 1995). Examples like biofuel, ocean power or road cells illustrate sustainable technologies that are good on paper but have not achieved broad implementation. This illustrates that finding successful forms of sustainable development goes beyond technology and require radical transformations across actors and system levels (Loorbach 2010). Hence, the potential of sustainable technologies to adequately meet the grad societal challenges today is often rooted in deep changes in the value creation logic of entire industries (Jonker and Faber 2019).

Realizing the need for structural changes, some technology entrepreneurs take the frontlines of driving transitions towards sustainability. Typical examples of transformative businesses that rely on sustainable technologies like Tesla (electric vehicles), Patagonia (organic clothing) and Michael Green Architecture (sustainable architecture) are seen as drivers of radical changes both within organizations and on the markets where they operate. Entrepreneurs and businesses engaged with such a transformative role require innovative business model approaches that link the company perspective to the wider governance of sustainability transitions (Gorissen, Vrancken, and Manshoven 2016).

Sustainability oriented literature has synthesized insights from transitions and business model disciplines in addressing sustainability of large-scale industrial contexts (e.g. Hannon, Foxon, and Gale 2013; Bolton and Hannon 2016; Huijben, Verbong, and Podoynitsyna 2016; Schaltegger, Hansen, and Lüdeke-Freund 2016; Wainstein and Bumpus 2016; Sarasini and Linder 2018; Jonker et al. 2020). The role of business models has been recognized in accelerating niche sustainable technologies and transforming the societal systems (Proka, Hisschemöller, and Loorbach 2018; Gorissen, Manshoven, and Vrancken 2014). However, there is considerable uncertainty around the value creation logic behind transformative business models, although the dynamic environment requires “changing the logic of doing business rather than merely improving how it is currently being conducted” (Fjeldstad and Show, 2018, p. 7). Despite the existence of theoretical models and research on the topic of value configurations, only a handful of studies have provided empirical insights on how companies that bring sustainable technologies to the market configure their value creation in a business model that renders success (Stabell and Fjeldstad, 1998).

The purpose of this paper is to show how a technology entrepreneur configures their value creation for accelerating sustainable technology and driving system-level changes. The applied theoretical framework expand the business model innovation approaches by combining elements of sustainability transitions and configurations of value creation to favour balanced sustainability and profitability. This paper uses a case study of a forest-based manufacturing company, Stora Enso, which develop sustainable wood technologies for the construction industry. The current study closely traces the change of value creation logic and business model activities that occur in the organization and show how this logic affects the development of sustainable technology in the traditional construction sector. The results highlight a need for transformative business model innovation, based on multi-actors collaboration and higher customer engagement for accelerating the development of sustainable technologies.

Furthermore, this paper makes three main contributions. First, we show how a change in the value creation logic of the company influences the strategic choices related to the selected business model. Second, we find that the business model changes towards network openness and higher customer engagement that further accelerate the spread of new sustainable technology at a large-scale industry level. Finally, we find support for the role of the business model in linking the space between the niche innovation and the established regime (Bidmon and Knab, 2018, Proka et al., 2018, Jonker et al., 2020). Thus, we propose that transitions toward sustainability are not locked in a black box, but that there are ways to manage this even in a traditionally unsustainable and conservative industry. Based on our findings we suggest that for enhancing sustainable technologies and driving system-level transitions toward sustainability, business models should be based on collective value creation and higher customer engagement.

The extended abstract of this paper has been accepted to the NMB 2021 Conference and moved from "Exploring the system level" track to "Data-driven Business Models for Sustainability in Emerging Fields" track. The presented paper followed the reviewers suggestions (we are thankful for the constructive comments of reviewer #2).

METHODOLOGICAL APPROACH

The paper uses a qualitative single-case study of a leading provider of renewable solutions for wood construction, Stora Enso. Two "embedded" units of analysis (Yin 2018) have been chosen within the single-case: i) traditional construction wood (TCW) and ii) engineered construction wood (ECW). The two units (see fig. 1) have distinctively different product characteristics and established business patterns over time.

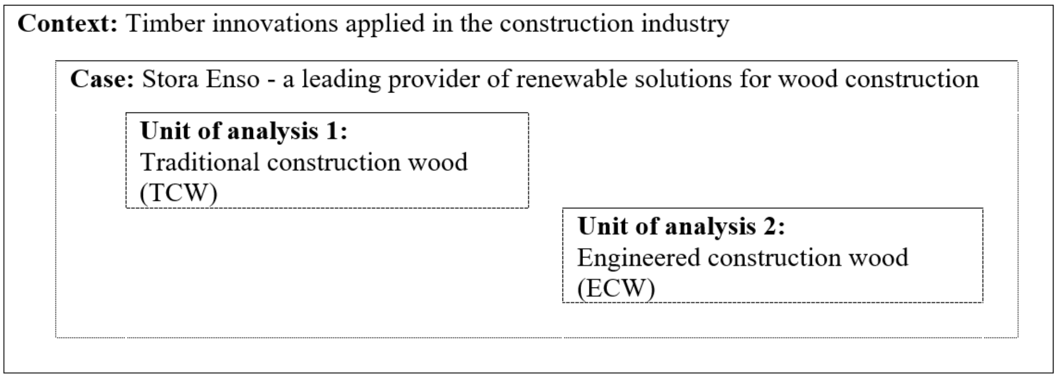

Fig. 1. Embedded single-case design and multiple units of analysis

The study was based on multiple data sources (Table 1). The corroborated and triangulated findings from multiple data sources strengthen the trustworthiness of the research (Jack and Raturi 2006). Data was collected through semi-structured interviews, participant observation and secondary sources such as company documentation, corporate website, and industry reports on the researched topic.

Table 1

Data sources of the case study

Data	*Source*	*Respondents*	*Data collecting method*	*Details*
Interviews	Stora Enso	Top-and-middle-level managers of Stora Enso	Audio recording, notes	Duration: 7,2 h No. of people: 8 No. of organizations: 1
Participant observations	Stora Enso, Large cluster organization	Managers of multiple industry organizations (public and private)	Audio recording, notes	Duration: 18 h No. of people: 16 No. of organizations: 18
Documents study	Stora Enso	Business presentations, product specifications, industry reports, corporate website	Notes	Volume: 50 pages No of documents: 8 No. of organizations: 1

All interviews were audio-recorded and transcribed and coded using thematic analysis. The field notes were coded similarly to the interviews. A backup audio record was also available for refining the notes. Coding was performed via NVivo software. For each unit of analysis, we described the industry specifics, the business models and traced differences in their components. Explicitly, we described and compared the business models of traditional construction wood (TCW) and engineered construction wood (ECW) in terms of value creation, value proposition, value distribution & capture. We developed for each of the business model (BM) component sub-level coding elements applying the business model framework of Gärtner and Schön (2016) and value configuration framework by Stabell and Fjeldstad (1998). The coding elements were extended and refined as data analysis progressed and compared with data from participant observations and documents for coherence. As a result, each business model was assigned to a particular value configuration archetype (table 2). The outcome of each value configuration was assessed by investigating the impact on the business model and the firm's ability to establish on the market technological innovation.

Table 2

Organizing the data into coding structure (value configurations of TCW and MCW business model)

BM type	Applied Value creation logic	Data quotations
BM of Traditional wood	**Value chain** - focus on product benefits by enhancing production value chain	"The production site is still very traditional and we have that kind of heritage in the company that we have been manufacturing all these (wooden) products already 150 years." "The core of our business model is that we have those basic products that are very cost-efficient to produce. " "The production itself is what it is. We need to be industrial efficient, in producing this, so when we are investing in a mill, we need to have it running like with 100% capacity in order to pay it back. " "Production of traditional wood construction products is more related to operational efficiency." "At the end of the day, we are producing physical good. We are producing wooden products and this is what we are selling." "We are producing and delivering high-quality products"
BM of Engineered wood	**Value shop** – focus on customer benefits by servitization and higher customer engagement in value co-creation.	"We are not selling only product, but we are selling a complete service package if the customer wants it. Our service package includes, as a first, the physical product, but then this package can include many value-added services." "What we have started now is to develop more and go more in a direction of looking which services we should add on top of this (wood production)." "Our thinking in the last two years have moved towards to services and solutions. So we are more thinking of customer perspective. " "Our strategy is providing more services to our customers. " "Services will increase, and we also think about innovating them. We are working on new services for the product and those services will increase significantly" "Architects are in contact with us, and sometimes we do the design together with the architectural office, helping them with the design and optimize the design." "This is practically not only selling the final product but also the services and linking our partners to different actors and markets. It contains elements of Business Development, creating demand first of all, and then it involves in the process of creating a solution, which involves different Technical and Engineering teams inside Store Enso."
	Value network – focus on building a network by value co-creation in a network of actors based on connectivity, interdependence and mutual benefits	"We cover a small part in the construction value chain with the production of our CLT elements, but we really try to support our partners in different parts of the value chain, to get the whole industry more efficient. I believe although that one needs to line with more stakeholders across the industry, to make a fit, opening up the ecosystem environment. It is not a "you do it yourself" approach." "We have to work with all institutional organizations in different countries for supporting multi-storey wooden buildings." "We are matchmaker and orchestrating the relationships within the network." (David) "The other thing, which is the trickier one, which is to develop an ecosystem for a new (engineered wood) product. It was obvious for us that we need to have a strong partnership from the very beginning onwards. In this part, before we start with our production, we tried already to connect with some key players".

KEY INSIGHTS

The empirical case

"Niche" innovations originating from the forest-based industry, such as engineered wood, formed seeds of sustainability transitions in the construction value chain. Engineered wood is a revolutionary technology that becomes a core of more sustainable and resource-efficient construction, which significantly contributes to the decarbonisation of the sector. Wood has a positive environmental image as it absorbs and stores carbon from the atmosphere throughout its lifespan and serves as an ecological building alternative (Lilja and Moen 2017; Vatanen et al. 2017). Due to the robust technical properties, engineered wood is able to enter the market segments that are not typically associated with wood construction, such as high multi-storey buildings, sports halls and other large-scale projects. The technology allows a high level of prefabrication where the majority of the production is done in a controlled environment, which saves both time and money (Jones et al. 2015). The environmental benefits in combination with the high efficiency at the construction site, make engineered wood a threat to the established regime and building practices dominated by steel and concrete technologies.

The transitions of the construction value chain via engineered wood (fig. 2) is an alternative direction or development path that lead to a change towards more sustainable development and might disrupt or restructure the existing regime. The engineered wood already built its momentum as a niche innovation. Ongoing landscape changes pressure the regime and create an opportunity for scaling up in the mainstream construction market. Forerunner companies with sufficient size, resources and traditions in the forest-based industry are on the edge of initiating transitions in the construction value chain towards a more sustainable future. Their efforts are in establishing engineered wood technology as a mainstream solution by reshaping the established socio-technical system. In the following sections we present a deeper dive into Stora Enso, the largest worldwide producer of engineered wood, and further illustrate the changes in their value creation logic and BMs for achieving transitions in the construction value chain with two different wood technologies.

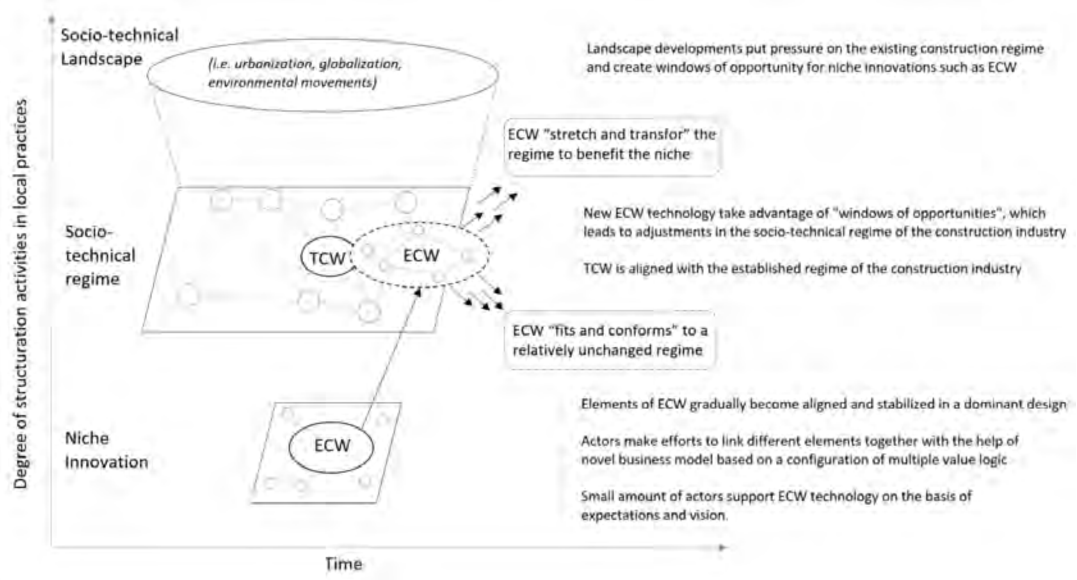

Fig. 2. Multilevel and multiphase perspective of transitions, an illustration of the coevolution between landscape, regime, niche and different pathways of transitions (adapted from Geels, 2002 and Loorbach et al, 2017)

Value creation logics and business model of the TCW

The business model of TCW consists of one-size-fits-all offerings and a highly standardized set of products with limited possibilities for customization and servitization. There is no need for a diverse network of stakeholders, and the value system follows a sequential chain of suppliers, intermediaries, and customers. The TCW implies primarily the value chain configuration logics (see Table 3 for more details).

Table 3

Value configuration of the TCW business model with examples from the case study

Value configuration types	Dimensions of the TCW Business model: *Value proposition*	*Value creation*	*Value delivery and capture*
Value Chain (manufacturing)	Standardized wood products with high quality are available on stock via intermediaries. *"Traditional sawn [TCW] is a very mature product that we are manufacturing and delivering via wholesalers and traders."*	*"The core of our business model is that we have those basic products that are very cost-efficient to produce"* The company invested heavily in modern production technologies for high efficiency. *"Key activities in traditional wood construction products are more related to operational efficiency."* Business and manufacturing processes are designed for ensuring low production cost, reliable delivery and high quality.	With TCW products, the company does not have direct contact with the end-users and entirely depend on their distribution channel for building and maintaining customer relations *"With TCW we usually are not connected with our customers. "* The revenue model is transactional, "relying on the sales of physical products" via intermediaries
Value Shop (servitization)	Low level of servitization. Most of the value-add services are offered by intermediaries and other partners beyind the BM of the company.	-	-
Value Network (platformization)	Narrow network space. The partnership network consists mainly of industrial actors along the value chain (from raw materials and machine suppliers to industrial integrators, merchants and DIY retailers, as well as wholesalers and trading houses.	-	-

Value creation logics and business model of the ECW

Contrasting the TCW, the ECW technologies enable radically new ways of designing and organizing the value creation of the business model. The traditional focus on products with low added value is now extended to efficient and environmental ECW building concepts, that are co-created in an ecosystem of various actors. The extended focus implies integrating multiple value creation logics (see Table 4 for more details), which is further explained in the text that follows.

Table 4

Value configuration of the ECW business model with examples from the case study

Value configuration types	Dimensions of the ECW Business model: *Value proposition*	*Value creation*	*Value delivery and capture*
Value Chain (manufacturing)	*"At the end of the day, we are producing physical good. We are producing CLT [type of ECW] and this is what we are selling. The production itself is what it is. "*	The manufacturing process starts with the raw material from the sawmills, included in further production of different ECW elements to the physical distribution. *"We need to be industrial efficient, in producing this, so when we are investing in a mill, we need to have it running like with 100% capacity in order to pay it back."*	The revenue streams mix different pricing mechanisms, combining fixed and dynamic pricing, based on the volume, market and applied customizations and extra services.
Value Shop (servitization)	*"We are not selling only CLT [type of ECW], but we are selling a complete service package if the customer wants it. Our service package includes the CLT as a first, the physical product, but then this package can include many value-added services."*	The company applies its know-how and intellectual capital to address customer needs, which require different organization and sets of skills. Customers have an active role in the co-creation process. *"Our thinking in the last two years have moved towards services and solutions. So we are more thinking of the customer perspective."*	With ECW, the company moves closer to its customers. *"[Customers] are in contact with us, and sometimes we do the design together with the architectural office, helping them with the design and optimize the design."* For a few services (e.g. the design services and some cutting services), Stora Enso is charging extra, and the rest are offered free of charge.
Value Network (platformization)	*"We want to bring all stakeholders into one platform. Then the whole chain gets more efficient, and then I would say the main goal is that we can have really efficient wooden buildings, which will allow us to differentiate from concrete and steel business."*	Stora Enso is becoming orchestrator of a loosely coupled network consisted of contractors, architects, engineers and constructors, in addition to research institutes and regulatory authorities. *"[Stora Enso is] matchmaking and orchestrating the relationships within the network"*. With ECW *"we are linking our partners to different actors and markets."* *"Through our solutions, through co-creation, and collaboration, we should be able to manage the construction industry in a much more efficient way."*	Through HEAL (this spin-off initiative), Stora Enso collaborates with multiple partners across industries for *"finding efficient and innovative solutions to make the construction and building industry more efficient"*. HEAL become an innovation platform, where Stora Enso takes the role of a *"platform leader"* by introducing ECW as a core technology and playing the orchestrating role within the network. The company has started to identify alternative value capturing mechanisms, but they are not yet there.

DISCUSSION AND CONCLUSIONS

In their aim to accelerate sustainable technology (ECW), Stora Enso is changing the value creation logic and introducing a new business model that aims to transform the existing regime and shifts the construction industry towards a more sustainable future. The company changes the value creation activities of the business model towards sharing and gaining different kinds of resources, building trust and forming new partnerships with other actors (Parida, Sjödin, and Reim 2019). This change combines multiple value creation logics: *Value chain*, based on cost optimization, together with *value shop*, where the customers take a central role in the value creation process, and *value network*, where the company organize value creation activities beyond firm and industry boundaries by connecting various actors and structuring its business in cooperation and interdependence (Fjeldstad and Snow 2018). The result of this novel value architecture is a business model that shows a transformative power to shape markets and catalyze the sustainable development of the whole industry. In other words, a transformative business model is bridging the technology potential with demand-side realms, shifting the main source of competitive advance from physical infrastructure and products to knowledge and collaborative capabilities, and shaping the environment by driving new institutions.

Our findings show that Stora Enso extend its *value chain* logic by increasing customer engagement (*value shop*) and network openness (*value network*), as shown in fig. 6. Through the *value shop* logic, Stora Enso is building mechanisms to increase customer engagement. The customer engagement applied in the B2B situation is a process of joint value creation in the context of services (Oliva and Kallenberg 2003), in which customers and providers exchange knowledge and skills intending to create mutual value (Grönroos and Ravald 2011). The company combine higher customer engagement with wider network openness (*value network logic*) in order to push sustainable technological development in a direction that transforms the industry. The openness of the business model is built on the partnership between multiple organizations across and outside the traditional industry boundaries (Takey and Carvalho 2016) meaning that the collaboration goes beyond the scope of individual construction projects (Dubois and Gadde 2002).

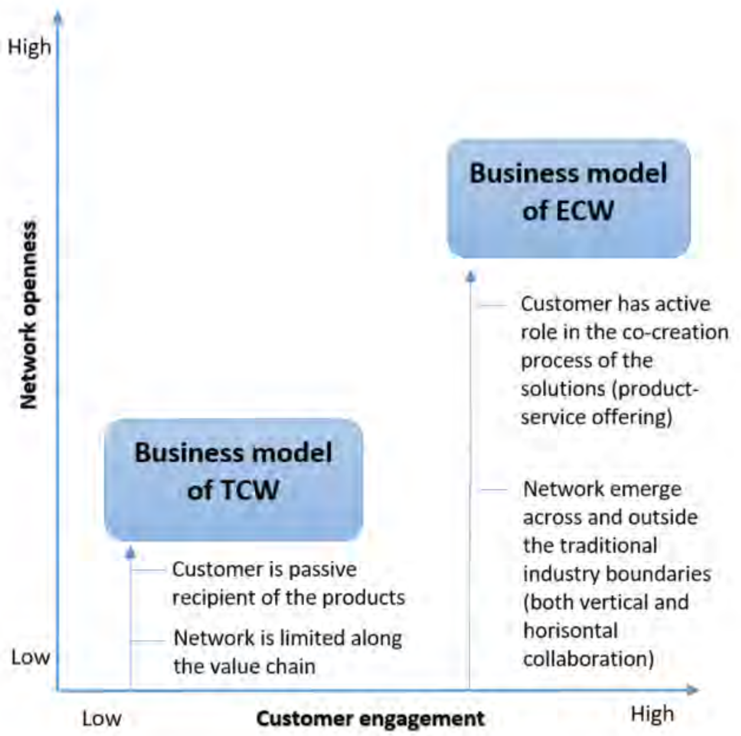

Fig. 3. Comparison of BMs openness and customer engagement

Our findings are in line with previous research on transformative business models and their critical role in the process that links the niche and regime levels (Groissen et al, 2014, Bidmon et al, 2016, Proka et al, 2018). We further argue that customer engagement and network openness accelerate the development of sustainable technologies and give birth to a new economic, social and technical structure, in which industry-spanning actors collaborate in loosely coupled principles. The openness of the BM supports the formation of new network arrangements by coordinating and structuring activities between different actors (Berglund and Sandström 2013). Technology entrepreneur becomes responsible for orchestrating the network by applying “platform business” principles (Cusumano, Gawer, and Yoffie 2019), and create value by building a core technology, which connects multiple actors in an “industrial network” (Lundgren 1991) or “innovation ecosystem” (Adner 2013; Nambisan and Sawhney 2011).

Indeed, we acknowledge certain limitations of our research. The first limitations concern our analysis, which is based on the present development of the technology, without extended and retrospective process tracing of the trajectories. However, the technology does not have a rich history and the business model innovation was made quite recently, which encompass to a large extend the scope of the study. All interviewed managers were involved in the BM changes that have been studied in this paper.

Another limitation aspect of the present study is related to our case study context. The paper analysis is limited to value configuration and business model innovation within the B2B context. Thus, our sample is narrowed down to a large manufacturer operating in the forest-based industry. We encourage scholars to initiate research within other industries, involving both B2B and B2C perspectives. Moreover, testing the empirical relationship between value configuration, business model innovation, technological innovation and sustainable transitions would also be of interest. Thus, we encourage future research to take on where we have left off.

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Early phase development of innovation ecosystems in product-service system business model development

Håkan Knutsson[1*]

[1]Halmstad University, Halmstad, Sweden

[*] hakan.knutsson@hh.se

Abstract

The digitalization and renewal of the District Heating (DH) sector is often slowed down by incapacity to adopt and implement innovations. The purpose of this study is to explain how small technology suppliers are trying to come around this by forming innovation ecosystems, within the framework of product-service system design methodology. Inter-actor relations in a case study are studied to understand how early-stage innovation ecosystems are formed and developed. The finding is that scarce resources define an opportunity-based strategy and the inter-actor relations of a focal company can shift dynamically. Such that, a complementor relation can shift to a competition, to a customer or to a supplier relation. The digital product-service system development is not synchronised and consequently the busines model of the focal company can shift abruptly. The findings contribute to better understanding of early-stage formation of innovation ecosystems.

Keywords

Innovation ecosystems, product-service systems, district heating, production innovation

1. INTRODUCTION

Literature shows that innovation is slow, difficult, time consuming and/or costly (Winch, 2003). This seems to be true especially for industries and production systems characterized by high capital and sunk costs, legal or natural protection, such as utilities, mining and the construction industry (Speight, 2015). In situations characterized by a focus on exploiting existing resources, it is difficult to explore new opportunities (March, 1991). In the long term, 'lock-in' to a high-level exploitation, ignoring new opportunities is detrimental to industries.

District Heating (DH) is such an infrastructure-based utility industry that formerly was regulated and protected as a monopoly (Westin and Lagergren, 2002) but now is exposed to increased competition from new entrants or substitutes such as heat pumps.

Approximately half of the energy consumed in Europe is used for heating and cooling (Connolly et al., 2016). District heating (DH) is a key technology for increasing the efficiency of heating processes and has been acknowledged by the European Commission as an important instrument to decarbonise energy usage (EUcommission, 2016) and transform to a circular economy

District heating (DH) is an engineered system in which heat is collected from a variety of sources and distributed to a number of customers, by means of a hydraulic system (Frederiksen and Werner, 2013). Important assets of a DH system are the 'heat distribution network' (HDN) and the heat transfer units' (HTU) at the customer side. A DH system can have a variety of heat supply units. Fuel can, for example, be used to produce hot water, but heat can also be captured from other sources, such as from combined heat and power production or industrial surplus heat (Frederiksen and Werner, 2013).

According to Pavitt (1984) taxonomy, the DH industry can be classified as a supplier-led industry. The industry is fragmented, with more than 150 companies, in Sweden only operating one or few DH systems each. Also, the technology supplier industry is fragmented with a low rate of internationalisation with protected domestic markets. Consequently, the suppliers are mostly Small and Medium Enterprises (SMEs). Technology suppliers are facing slow approval and adoption processes for innovations to diffuse in the DH-industry, but it is not a well explored field of research (Knutsson et al, 2021).

A way to break away from lock-ins are the formation of innovation eco-systems by the technology suppliers. Ecosystems are important because they explicate alternative ways of how firms and other organizations can organize to innovate and create value compared to markets, value chains and networks (de Vasconcelos Gomes et al., 2018).

According to Gawer (2014), ecosystems consisting of complementary actors that together create value for customers have begun to dominate several industries, especially in the digital domain.

Jacobides et al. (2018) see a clear-cut difference between ecosystem, traditional market segments (horizontal competition) and supply chains (hierarchical structures).

Many for instance (Gawer, 2014, Jacobides et al., 2018) are analysing ecosystems from a perspective of large digital platforms, dominated by few global corporations.

Frameworks such as the Resource Based View (RBV) mostly concern themselves with owned resources (Jacobides et al., 2018), even though Lavie (2006) is studying RBV and interconnected firms.

This suggests that the formation of innovation ecosystem among technology suppliers, in collaboration with key customers may be a powerful way for mature, aging or stagnant industries to improve its innovativeness. However, while the innovation literature has made important contributions in terms of ecosystem-as-affiliation (Jacobides et al., 2018), there are few studies of how ecosystems-as-structure evolves in the early stage. Among the early works are Dattée et al. (2018) who studied early stage innovation ecosystems under uncertain conditions, in the global deep ICT-industry. Peltokorpi et al. (2019) investigated the formation of an innovation ecosystem, with the real estate industry as customer, with limited focus on focal actor and the balance between collaboration and leadership and type of relation, competition, or collaboration. Bengtsson and Kock (2014) drawing on network theory conclude that future research is needed related to 'understand the balancing of cooperation and competition'.

First Overholm (2015) and then Hannah and Eisenhardt (2018) studied nascent ecosystem in PV solar industry, but more from business ecosystem aspects, in commercialization phase with a limited degree of innovation. Despite this, there are few studies on emerging early-stage ecosystems with small technology firms, their dynamic relations to other firms based on scarce resource more than on risk management. Thus, our understanding of the formation of ecosystems in the early phases aiming to break away is limited.

The design methodology literature such as Product-Service Systems (Goedkoop et al., 1999) study the product and service design processes, but mostly from an intra-company or customer-supplier perspective.

Currently there are few studies that combine studies of cognition and action in terms of how different types of actors are attempting to increase their speed of improvements and innovation with scarce resources, in early stage of creation of innovation ecosystems, when relation can shift from competition to supply chain. Another not so well explored area is how is complementarity between suppliers and reference customer expressed in relations and output (innovation). This paper can contribute with more theory on the shift of relations around the complementarity.

Thus, the purpose of this paper is to analyse how suppliers collaborate in early-stage development and answer two research questions:

RQ1: How do technology firms act in early-stage innovation processes?

RQ2: How do technology firms balance supply chain relations, cooperation (innovation ecosystem) and competition in early innovation processes?

2. THEORETICAL FRAMEWORK

Ecosystem is a popular term, widespread, with wide definitions and used by many in diverse context.

Innovation Ecosystem (IE) has its roots from “a new ecology of competition” (Moore, 1993), with a view on ‘economic communities between firms’. We must though define IE more precisely in order to use the framework more accurately. Adner (2017) defines two groups of ecosystems. The first is ‘ecosystems-by-affiliation’ or by communities. The other is ecosystems-by-structure, which is an alliance of companies with a common value proposition. With terminology from Valkokari (2015) and (Gifford et al., 2020), we can call an ‘ecosystem-by-affiliation’ a business ecosystem (a loosely connected community).

Jacobides et al. (2018) establish a theory of ecosystem, more precisely drawn from the ‘innovation ecosystem’ defined above. They claim that modularity enables ecosystems emergence. They argue that the surge of ‘ecosystems’ in strategy research mainly focused on what ecosystems are and how they operate. Consequently, they complement the literature considering when and why ecosystems emerge and what makes them distinct to other governance forms. Ecosystems do not fit into the classical firm-supplier relationship (Porter, 1985), supply chains – ‘hierarchy based’ value chains, because these inter-actor relations are controlled by the downstream customer. An ‘ecosystem based’ value system is also different from ‘market based’ value systems where companies either compete or complement (generic) each other in direct relation to the end customer. In this case there is no need to develop relations between actors.

Three subgroups of ecosystems are defined and compared (Jacobides et al., 2018): ‘business ecosystems’, ‘innovation ecosystems’ and ‘platform ecosystems’. The ‘business ecosystems’ centers on a firm and its business environment influenced by dynamic capabilities (Teece, 2018), but not on specific common value propositions. The ‘innovation ecosystems’ focuses on an innovation or a new value proposition and the constellation of actors supporting the innovation. The ‘platform ecosystems’ outlines how actors organize around a platform to provide value to customers, for instance android. Furthermore, they conclude that it is broadly agreed that innovation ecosystems require providers of complementary innovations. Having an inclination towards platform ecosystems, Jacobides et al. (2018) describes levels of complementarity in production and in consumption.

This article argue that the three groups of ecosystems might be seen from an evolutionary perspective. Many firms can be partners in ‘business ecosystems’. There are not so many that comply with the definitions to be focal company or complementor in an ‘innovation ecosystem’. It is even fewer who manage to create a platform ecosystem.

Adner (2006) used the term ‘innovation ecosystem’ and defined it further by introducing three risks to consider in a single firm’s innovation strategy. The first risk is the ‘initiative risk’, the first mover risk, which means the internal development work does not turn out as expected, or the output is not as attractive to customers as forecasted. The second risk is ‘integration risk’, that links in the supply chain will fail. The third risk is ‘interdependence risk’ of coordinating with complementary innovators, the innovation ecosystem perspective. In contrast to a value chain, where the downstream actor controls actors upstream, complementors are independent actors. The complementors must develop, launch and commercialize their innovation in pace with our focus company, called focal company. Otherwise, the focal company will fail.

Relations in ecosystems or other structures must be studied in a context, in this case the process of value creation. Additional theories are needed to develop the case study. It is needed to understand the logic of business model innovation and the logic of Product-Service System (PSS) value creation process and value propositions. PSS is interesting in the era of digitalization. PSS is defined as the parallel offering of product and service fulfilling customer needs (Goedkoop et al., 1999). Tukker (2004) presents a widely accepted categorization of PSS; product-oriented service (POS), use-oriented services (UOS), and result-oriented services (ROS).

The innovation processes in the DH industry involve product-service system development, very much enabled by digitalization. Therefore the framework of data-driven product-service system design and delivery (4DPSS), by Sala et al. (2020) is suitable for this case study. It is a four-stage (continuously revolving) model; 1) Need Identification, 2) Concept Generation and Design, 3) Implementation, 4) Monitoring and follow-up.

1) Need identification is collecting ‘voice of customer’ and own experience from previous product or service performance.

2) Concept generation and design is the value creation and can, based on complexity, include suitable design methods, such as: a) PSS Lean Design Methodology (Pezzotta et al., 2018), b) Value models (Bertoni and Bertoni, 2019, Bertoni et al., 2018).

3) Implementation of the new product-service system.

4) Monitoring of the product-service system and accumulation of experience. This stage is collecting data for a new iteration of the 4DPSS cycle, starting with customer need analysis.

PSS can radically change a firm’s business model. Business Models define the firm’s ability to create, deliver and capture value (Teece, 2010) and (Osterwalder and Pigneur, 2010) who also introduced canvas business model.

3. DATA AND METHOD

Given little research, theory and evidence of phenomenon related to early phase actor inter-relations (creation of innovation ecosystems), in the field, a qualitative embedded single-case study (Yin, 2017) of the development of a predictive maintenance solution for DH networks was done. The aim of the data collection and analysis was to understand the dynamic actor relations during the development process. Focus was on the focal company and non-generic complementary firms, which follows Jacobides et al. (2018) as the core of ecosystems. Firms like maintenance service, installation and general software providers were classified as generic complementarities, thus not included in the interviews.

Empirical data was collected through semi-structured and open-ended interviews with representatives of seven different organizations. The questions were pre-defined, but the interviews allowed for a freer and more flexible follow-up in order the capture themes of interest. Publicly and internal documentation was also used. Important empirical data came also from five years of documented observations of the firms in focus and the specific setting. The setting is the 'knowledge-intensive business ecosystem' called SweHeat (Swedish Council for District Heating) and more specifically the Vinnova-sponsored innovation project SAM – Smart Asset Management of distribution networks. This 'business ecosystem' consists of more than 30 leading Swedish DH operators, technology suppliers, research institutes and universities. All informants, but one was recruited from this constellation.

Informants are listed in the next chapter. They were chosen because they represented management and prime sources of decisions. This study, aimed as conference paper, is a pre-study to a more extensive research study and therefore I did not strive to reach saturation in the data collection.

In total, 10 interviews were conducted, with a purpose of triangulation of data collection.

I used a combination of thematic and content analysis of the data. The data were coded several times, first from an inductive perspective, forming themes. Then the data was coded deductively, from pre-defined themes, from literature. I used four type of tools, inspired from literature, to develop the framework of questions and themes. First I used 4DPSS from Sala et al. (2020), which has a process and method map of activities in the design and development phase of Data-Driven Product-Service Systems Design and Delivery (4DPSS). Secondly, I used the canvas business model (Osterwalder and Pigneur, 2010) as a visual tool for the interviews. Third, problem root causes were unveiled by using 7 management tools, KJ Shiba (Alänge, 2009). Fourth, I was inspired by the tool 'Ecosystem Pie Model' (EPM) by Talmar et al. (2018).

The unit of analysis was the ecosystem itself and I looked for:

-'Fuzzy relations' (that could change): Supply chain relations (customer-supplier), innovation ecosystem (cooperation) or competitor.

-Type of complementarity: Asymmetric complementarity, double direction complementarity, One-way complementarity.

Transferability of the study could be possible. DH industry is a good representative to similar adjacent utilities:

-Monopolies: water, sewage, waste collection, power transmission & distribution.

-Previously monopolies, now deregulated: District Heating (DH), Power Generation, Telecom.

Power Generation and Telecom are changing rapidly due to radical technology change in combination with heavy subsidies.

Knowledge of how innovation in DH industry can be accelerated and replicated to other industries can be useful.

4. CASE OVERVIEW

Before presenting the findings, I briefly present the case and the companies, see map in Fig 2.

Focal company, 'Focal'

The focal company, hereafter called 'Focal' is a small company with its roots in field service, more precisely in leakage detection & localization at pipes distributing pressurized water. The company is compared to its size very innovative and known as a problem solver. The 'focal' company started its digitalization journey six years ago, the development of Digital Product-Service System. Earlier field service is being automated and enhanced by the development of an Internet of Things (IoT)-based sensor box. The sensor box has several unique features, such as a patented power supply (using energy harvesting of heat instead of batteries or grid power supply). It can also produce specifically designed acoustic pulses via actuators, which are propagating along the pipelines and picked-up by special accelerometers and recorded. By proprietary algorithms, the trend of corrosion (weaker steel pipes) can be calculated and displayed. This is a condition based, predictive maintenance service, enabled by the installation of an advanced IoT sensorbox. The only purpose of the product, the sensor box, is to collect data from the DH distribution network. Acoustic data is recorded, and other data collected, such as humidity, temperature on pipes and in chambers, water level, air quality etc. Hundreds of advanced IoT sensor boxes are to be installed in the district heating network. The infrastructure, pipelines are very expensive to replace, can then be used its full technical lifetime (much longer than the economic depreciation time), and be repaired or replaced just-in-time before rupture. The case study is based on this company and the following number of other companies that form an ecosystem around 'Focal'. Four representatives from this company were interviewed, incl follow up, chairman, CEO. Interviews were made in December 2020 – January 2021.

Company 'P1'

This company has developed a solution for relining of old district heating pipes. The benefit from relining is that minimum excavation and welding are needed when extending the life of a pipe and minimising risk of rupture. 'P' is a product company focused on carbon fibre composites, specially designed for its purpose. One representative, the sales manager, from this company was interviewed, incl. follow up. Interviews were made in January 2021.

Company ‘P2’

This company is supplying monitoring solutions for DH pipes, adjacent to ‘Focal’. The CEO has been interviewed in December 2020.

Company ‘D’

This company is supplying Network Information Systems (NIS) to DH companies. This is a digital tool for supporting asset management, based on Geographic Information Systems (GIS). One representative, the product manager, from the company was interviewed in February 2021.

Company ‘O’

This is the reference customer, one of the top 10 leading DH companies in Sweden. The company has the vision to ‘monitor every meter of the DH pipe network in 2025’. The technical manager for the distribution network was interviewed, incl. follow up, in December 2020 – January 2021.

Company ‘R1’

This company is supplier of complete sensor boxes to ‘Focal’. ‘R1’ has developed, designed the sensor box system (hardware and software) and is also the assembler, manufacturer of the products.

Company ‘R2’

This company is developing database solution and customer interfaces in UNIX and open source. The CEO of the company was interviewed in December 2020.

Company ‘S’

This company was the first supplier of proprietary sensor boxes (hardware and firmware) to ‘Focal’.

Company ‘U’

A new design & development supplier to ‘Focal’.

5. FINDINGS

In this chapter, I draw from the case study and the theory on ecosystem and 4DPSS to identify the main points of learning in the innovation process of the ‘Focal’ company and the emergence of an innovation ecosystem. The ambition is to decontextualize the particular pathways (and consequences) chosen by a small, high tech company with very scarce resources, who must collaborate with other firms.

5.1. A reference customer is crucial.

‘Focal’ has over the years been successful to establish good relations with specific customer, DH operators.

CEO of the ‘Focal’ company:

“…without the requirements, engagement and support from our prime reference customer, we would not have been able to achieve anything…”

The customer ‘O’ has a unique vision to monitor all of its network, aiming at utilizing the assets full time until technical end-of-life (much longer time period than actual economic depreciation period), but still avoid and minimize repair cost and risk of harmful pipe ruptures. This DH operator has also initiated the long process to transform its organisation from reactive/corrective work to preventive/predictive and data driven maintenance routines, in order to fully appreciate the value proposition from ‘Focal’.

The finding is that ‘co-creation’ with lead customers, including early co-financing of prototype development is very crucial for success. ‘Focal’ started its relationship with ‘O’ about 10 years ago, with manual predictive field measurements, followed by smaller prototype tests with automated on-line measurements (IoT). In 2019, ‘O’ launched a public procurement, with installation of more than 500 IoT/sensor boxes with ability for predictive monitoring. ‘Focal’ won this bid.

From a 4DPSS (Sala et al., 2020) perspective, the Need Identification phase has worked out very well. The same goes for Implementation and Monitoring. The reference customer, company ‘O’ has also been very active in the Concept Generation and Design phase. The ‘front-loading’, evaluating many alternative solution, according to the Value Model (Bertoni and Bertoni, 2019), has been significant.

5.2. Dynamic relations and asymmetric complementarities.

The ‘Focal’ company is having true ecosystem relations, according to definition by Adner (2006) with some companies.

There is a dual-direction complementarity with company ‘P1’, but ‘P1’ is more dependent on ‘Focal’ than vice-versa, which make the complementarity asymmetric. The data-driven predictive condition monitoring system developed by ‘Focal’ will locate weak pipeline sections in DH networks. By adopting a new pro-active and preventive work process, the DH operators can reline weak pipes with the products from ‘P1’. ‘Focal’ and ‘P1’ have a joint mission to convince customer to change their work routine. If this consultative sales work is successful, ‘Focal’ will also benefit from fast customer adoption and more orders.

Company ‘D1’ has today yet no relation with ‘Focal’. In fact, ‘D1’ has seen very little customer interest (voice of customer from DH operators) in integration of collected monitoring data from any systems connected to DH grids. The customer value of the NIS system from ‘D1’ would increase significantly if an integration has taken place, but not yet any strong customer requirements. An explanation can be that the digitalization of the energy companies is in early phase. Companies ‘Focal’ and ‘D1’ would both benefit if a data integration would occur, in relatively balanced dual-direction complementarity.

Company 'P2' is a supplier of other condition monitoring products to DH operators. Their products are mature and there is an established marketplace, quite locked-in. Within a period of a year (during 2019), 'P2' has appeared as complementor, competitor, supplier and customer to 'Focal', see fig 1. Initially the two companies, 'focal' and 'P2' had a (weak) complementor relationship. They had two parallel monitoring technologies, one mature and one new, that not competed. 'P2' asked for buying an acoustic module (part of the more advanced sensor box system) from 'focal'. Confronted by the risk of having 'P2' entering the technology segment of 'focal', the latter accepted to sell the required module to 'P2'. 'P2' sold several hundreds of basic IoT-boxes to DH-operators. Due to poor understanding of the concept of predictive maintenance, this simple box cannibalized on the market volume for the coming, more advanced sensor box from 'focal'. 'Focal' had little experience as product supplier and failed to comply with quality. 'P2' kept the concept but purchased design and delivery from another supplier. Suddenly 'P2' appeared as a competitor in 'Focal´s' low range product segment.

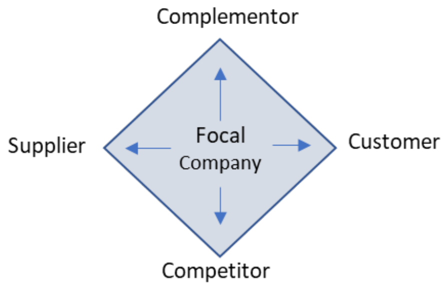

Figure 1. The relations between the 'focal' company and other actors, such as 'P2' changed from complementor, to competitor, supplier or customer over a period of one year.

Finally, 'P2' has repeatedly offered to sell the Database application and Graphic User Interface to 'Focal', without success.

5.3. Dynamic setting in supply chain.

Due to scarce financial resources and lack of internal capability, 'Focal' has chosen suppliers that requested low price for the development work. For prototype 2, in 2016-2017, they found company 'S', who had developed a proprietary IoT-based sensor box, developed for the purpose of heavy vehicle condition monitoring. It had functions suitable for 'Focal', although not all, for instance the advanced audio recording functions and actuator acoustic pulse generation. 'Focal' gained experience and a 'stage gate' customer approval, but at the expense of internal turmoil and longer time-to-market. 'Focal' discontinued the supply from 'S'. By changing supply chain, they also lost experienced gained from the first prototype installations.

Scarce financial resources have guided 'Focal' in the choice of the new hardware and firmware supplier, company 'R1', in 2017-2018. 'R1' is neither a pure design company, nor a pure manufacturing company. In fact, 'R1' develop and manufacture high-end microphones and amplifiers for professional musicians, core components that are used in the sensor box of 'focal' for a very different application. Low upfront development cost was achieved at expense of lock-in to only one supplier, repeated delays, quality problems, disputes in ownership of designs and inflexibility in the firmware coding.

'U' is a new, the third supplier to 'Focal', of designed circuit boards, since 2020. 'U' is a pure design & development company of electronics and firmware, focused on customer projects, without own proprietary products, nor production/assembly. 'U' has developed a new circuit board, not yet implemented in any product. Parts of the development work will most probably be used for a new low-end, more simple sensor box to be launched during 2021.

5.4. Challenge to simultaneously develop product and service concepts.

'Focal' has a proud tradition and capacity of problem solving in their field service business. Customers in emergency situations with pipe ruptures call 'Focal' who pulls out and find water leakages. It is a very different logic to develop, deliver, install, support technically advanced sensor products in high quantity scale. There have not yet been sufficient resources to develop the digitalized service logic, the automated data analytics services and user interfaces.

'Focal' has not spent any resources on raising external capital/equity. In fact, 'focal' gave away the potential service fees in order to get the reference order from 'O'. 'Focal' has delivered test installations to more customers. They have invoiced the product delivery, but the service component and its fees are pending, but open to define jointly with the customers. The development of the product logic, the hardware (IoT sensor boxes), corresponding firmware and database software have been so overwhelmingly time consuming so there have not been any resources for the service logic.

'Focal' and its main supplier 'R1' have not followed a well-structured Design Process, for instance Lean Design Methodology (Pezzotta et al., 2018). As small companies, with scarce resources, it has been more of trial-and-error.

Many papers in the field of Product-Service Systems describe large global capital goods suppliers who develop additional Service offerings, typically condition monitoring, enabling availability/utilisation of the product. There are few example on companies that simultaneously develop new advance products and digitalized services.

5.5. Immature and uncertain digital marketplace.

User interfaces, for instance Graphic User Interfaces are very important in digitalisation processes. The marketplace for SCADA (Supervisory Control and Data Acquisition) for DH distribution networks is very immature, for instance compared to the power distribution, and more important there is a lack of process routines. There are supplier proprietary user-interfaces for some functions, for instance for alarm wire monitoring (detecting moisture in pre-insulated pipes). NIS (Network Information Systems) for maintenance management are widely used. Gradually global data platforms like Microsoft Azure and Amazon Web Services are gaining ground in the segment of energy utilities. The two latter cannot be classified as generic IT-service. These systems require software engineering and coding resources, which could be complementarities to 'Focal' or a competitor. See the specific ecosystem visualized in figure 2. Notable is that the dominant suppliers to energy companies, ABB, GE, Siemens are not present in this marketplace.

First movers, pioneers like the reference customer 'O' and the PSS supplier 'Focal' cannot rely on much of 'pull support' from any complementor in the field of user interfaces. From a 4DPSS perspective, the visualization in the Implementation phase and the Monitoring phase must depend very much on internal resources and capabilities.

PSS services to energy companies are complex also from a data security perspective. A trend is that cloud services will be very restricted. The energy companies will require servers in-house, behind firewalls.

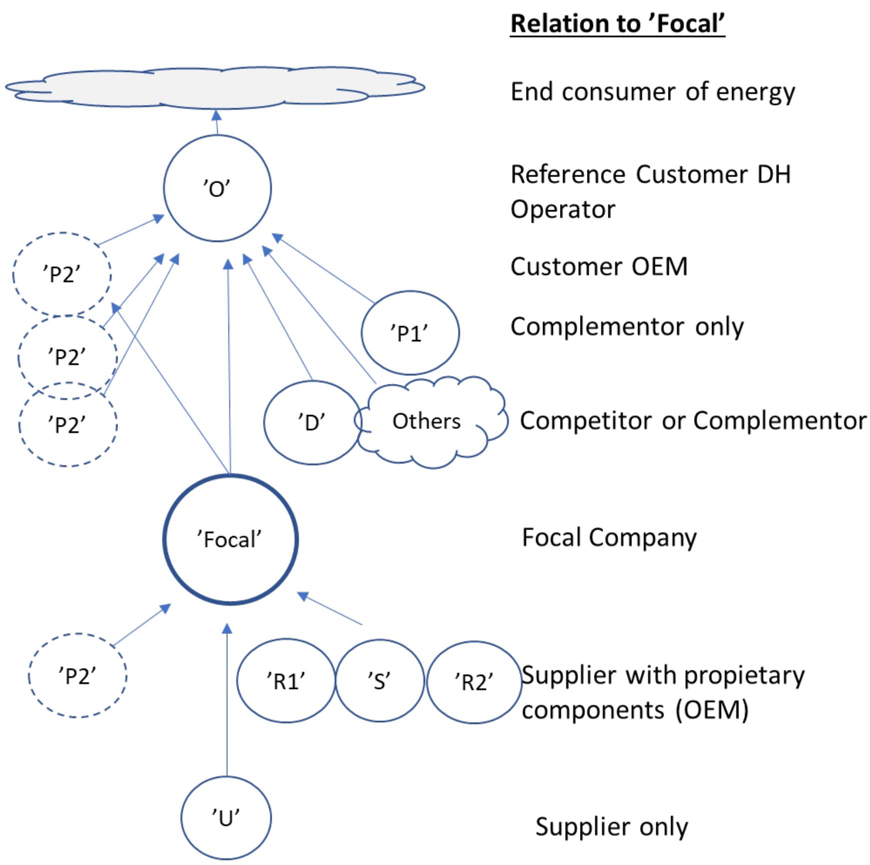

Figure 2. A map of an emerging specific innovation ecosystem.

In 2020, 'Focal' and the reference customer, 'O' has, jointly with a researchers at Royal Institute of Technology tested to apply machine learning on the vast amount of monitoring data that is collected. Preliminary results are very promising.

5.6. The business model is the final result.

'Focal' had an initial idea of business model. The actual outcome was different. The 4DPSS value proposition is not yet developed, only the product logic. Internal resources, engineering capacity and capital have been scarce, which have defined the choice of partners.

6. DISCUSSION

In this conference paper I have investigated how suppliers collaborate in early-stage design & development phases. The case study focuses on high tech SME's, with scarce resources, a very different setting than that of global companies, that usually are analysed. Unique in this case study is the PSS setting of the 'Focal' company. Their background is from advanced field service. In order to capture and deliver their new digitally based, automated value, they had to develop and design a very complex product, the sensor box system. 'Focal' is moving from service dominant logic to product dominant logic. Many cases studied in the PSS literature is based on large, global product companies, with long experience of product development. For them, the move of business model, to a PSS logic, including a service component is not so risky. For 'Focal' it is a very radical move to go from manual services, to develop a unique sensor box (first of its kind in the world) and then deliver digitally based product-service system values.

Due to scarce resources, 'Focal' has been chosen suppliers offering a low cost of supply. A large company had most probably chosen suppliers more specifically focused on development & design of customer specific solutions. 'Focal' made the choice of lower price tag, from companies that developed from a previous proprietary platform.

I have presented findings in response to the research questions:

RQ1: How do technology firms act in early-stage innovation processes?

RQ2: How do technology firms balance supply chain relations, cooperation (innovation ecosystem) and competition in early innovation processes?

The decontextualization of the empirical data in the case study provide provides knowledge about the relations among SMEs and how their business models are shaped, in iterative steps.

6.1. Theoretical contribution

The findings that inter-actor relations could change rapidly in an early-stage innovation ecosystem could be a contribution to the ecosystem literature. A complementor relation could quickly change to a competitor relation. Scarce resources is a main driver to decisions, not as in Adner (2006) – risk management.

A contribution to the PSS-literature and indirectly to the business model literature is that it is difficult for a company to take radical leaps, from service-logic to a 4DPSS logic (data driven product-service system design and delivery). The actual business model is very much a combined result of conscious and semi-arbitrary decisions.

A major part of the value creation was produced outside the 'focal' company, by complementors or by suppliers focused mainly on own proprietary products.

6.2. Managerial implications

A managerial finding is that a SME can reach far, without raising massive capital/equity, resulting in diluted ownership. Being a high-tech supplier to a conservative industry, it is important to reach collaboration with at least one pioneering, first adopter, in this case a reference customer. It is also important to establish a broader input of 'voice-of-customer', to assure that the design under development is too far ahead of the market requirements.

6.3. Limitations and future research

I have studied the design & development work of a radical innovation (4DPSS) aimed at a conservative industry, by a SME, with scarce resources. The study is limited to its specific contextual analysis and data collection. However, from this work it is possible to outline general success factor for innovation.

Further research could analyse deeper and with more samples the inter-actor relations, how complimentary relations could strengthen the actors. A better understanding and application of the design principle of Product-Service Systems, in this case 4DPSS, Digital Product-Service Systems Design and Delivery (Sala et al., 2020).

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ICT and Business model innovation in the Agricultural sector: A Systematic Literature Review

Ghazal Zalkat, Henrik Barth, Per-Ola Ulvenblad &

Pia Ulvenblad

Halmstad University

*Ghazal.Zalkat@hh.se

BACKGROUND AND PROBLEM AREA ADDRESSED

There is a growing consensus that widespread adoption of information and communication technology (ICT) across agri-food value chains is a priority for sustainable development. It can significantly contribute towards addressing the challenges faced by the global agri-food systems (FAO 2020; European Commission, 2019).

Information and communication technology (ICT) have been important in the agriculture sector since people sought information from one another when they started planting and raising livestock. The use of ICT technologies has grown and evolved rapidly over recent years, and this trend is forecasted to continue (World Bank, 2017). ICT technologies such as machine learning, big data analytics, cloud computing, internet of things and blockchain represent a great opportunity in agriculture to improve productivity, address several problems such as yield improvement, tackle the increasing challenges of agricultural production, enhance food security, access markets, and find employment opportunities (World Bank, 2017; Sharma et al., 2020). In addition, promoting ICT reduce bureaucracy, overcome market failures, and ensure healthy innovation ecosystem by providing research, extension, and regulations of data ownership, privacy and liability (Busse et al., 2014; Wiseman et al., 2019).

However, some of the ICT technologies still are at an early development stage and many barriers need to be addressed (Kamilaris et al., 2017). Measuring the impact of ICT for agricultural initiatives is still limited and challenged (Nakasone et al., 2014). Economic research suggests that the impacts of ICT services on agricultural adoption, behavior and welfare is mixed (Aker et al., 2016). The ICT adoption is facing challenges of technology integrating in business operations, business models innovation and lack of ready-made technological solutions.

Digital technologies will allow improving productivity of the agricultural sector and developing systems that support different agricultural processes (Gómez-Chabla et al., 2019). The presence of digital infrastructures helps overcoming the concept of geographical proximity and promoting social innovation (Ievoli et al., 2019). However, the use of digital technologies will cause major shifts in roles and power relations among different players in current food supply chain networks. Further, the United Nations System Standing Committee on Nutrition (2020) warn against digital technologies potential threats to the privacy of health information. In order to develop and strengthen a sustainable competitive agricultural sector and to achieve profitable development, it is important to increase the knowledge of digitalization and its affects in relation to the agricultural sector.

Innovative business models and partnerships is one of five main key drivers of the use of ICT in agriculture (World Bank, 2017). Thus, to release the full potential of ICT and for widespread adoption of ICT, it is important to empower developed business models and governance of innovation ecosystems. The governance of ICT innovation ecosystems improves the availability and use of ICT. Governance and business models are key issues to be addressed in future research as these are currently the most inhibiting factors (Wolfert et al., 2017).

There are several gaps associated with the design of ICT for agriculture despite the numerous ICT initiatives for agriculture deployments worldwide and growing research in several disciplines in this subject (Aker et al., 2016). Klerkx et al. (2014) have conducted an exploratory review of social science on digital agriculture and call for future systematic reviews which can be the base for further theoretical development. From a socio-economic perspective, Wolfert et al. (2017) suggest giving research priority to organizational issues concerning governance issues and suitable business models for data sharing in different supply chain scenarios.

AIM OF STUDY

In order to contribute to the filling of these gaps, this paper aims at reviewing and analyzing the literature on ICT and how this development relates to business model innovation and adoption in the agricultural sector. This systematic literature review will explore and analyze the characteristics of the research studies on ICT technologies and business models. Further, the aim is also to suggest a future theoretical framework regarding the use of ICT in the development of business model innovation in agriculture.

In summary, following research questions will be addressed in this SLR:

1. What type of opportunities and challenges exists when it comes to ICT implementation and business model innovations in the agricultural sector?

2. What are the dominant research areas and gaps addressed for ICT-based business model innovations in the agricultural sector?

METHODOLOGY

This study is a part of the EU-funded project “SustainIT - Releasing the potential of ICT for sustainable milk and beef cattle value chains”, which aims to identify institutional, economic and social barriers of widespread adoption of ICT in relation to animal health and welfare, develop conceptual business models and provide recommendations for governance of innovation ecosystems to release the full potential of ICT in dairy and beef value chains.

A systematic literature review is conducted in the study presented in this paper. This literature review will be organized as follows: determine the reviewing protocol, document the literature extraction, analyze the literature and finally identify areas covered by the literature. The studies included in the literature review will be retrieved from Scopus by using a search string with a set of selected search keywords to yield relevant results. The key words of the literature review are ICT, information and communication technology, business model innovation, agriculture, farming, digital farming, IoT, e-agriculture, e-farming and management information systems (Table 1).

Table 1, The key words of the literature review

Main concept	Alternative concepts and search strings
Business model	Business model*
Information and Communication Technology (ICT)	Information technology, IoT, Digital*, Block chain, Big data, e-agr*, Information management
Agricultural sector	Agr*, Farm*

The following search string was used: "Business model*" AND ("Information technology" OR "Internet of things" OR Digital* OR "Block chain" OR "Big data" OR "e-agr*" OR "information management") AND (Agr* OR Farm*).

All the selected articles will be screened based on title, abstract and journal of publication. Then inclusion and exclusion criteria will be followed.

1. The chosen articles should address ICT, business model, agriculture and these keywords are mentioned either in title, abstract or keywords.
2. The chosen articles have been published in a scientific peer-reviewed journal and have been written in English.

After the inclusion and exclusion process the selected articles will be analyzed by the authors in order to avoid any possible bias.

The important information from the selected articles such as: research studies characteristics, ICT technologies characteristics, purpose of the paper, theoretical focus, method/data collection techniques, empirical data, key concepts, findings, practical/ theoretical implications etc. will be documented and organized in an Excel sheet and then analyzed.

EXPECTED RESULTS

This systematic literature review will cover the state-of -the-art of research with focus on ICT and business models in the agricultural sector. The results will also encompass identification and discussion of main issues that are covered in the fields of ICT and business models in agriculture, challenges as well as opportunities will be addressed.

According to Aker et al. (2016) there is various methodologically disparate literatures on ICTs in agriculture so by better understanding of this literatures, we will be able to identify barriers, opportunities, and co-create solutions to overcome barriers and utilize opportunities of more widespread adoption of ICT thereby improve the resilience and sustainability and provide suggestions for future research and policy.

PRELIMINARY CONCLUSIONS

The preliminary conclusions (on-going) include a proposed theoretical framework focusing the adaption of ICT in the development of business models in agriculture. In line with Centobelli et al. (2020) the potential of such a framework is to make it possible to understand emerging trends, identify unexplored dimensions and topic areas, and offer elements to inspire future academic studies, actions of managers, and policymakers' activities. The conclusions will also present suggestions for future research regarding ICT enhanced business models in agriculture.

Keywords

ICT, digitalization, business model, agriculture, systematic literature review

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Realizing Make-by-Customer Supply Chains through Additive Manufacturing

Industrial Business Models beyond Mass Customization

Prof. Dr. Carsten Wagner

HAWK University of Applied Sciences and Arts Hildesheim/Holzminden/Göttingen

carsten.wagner@hawk.de

INTRODUCTION TO MASS CUSTOMIZATION

To increase competitiveness, the attention of many companies is shifting to the heterogenization of demand, which is accompanied by a move away from mass production. Reasons are the shortening of product life cycles, the increased competition, that has led to the breakdown of many mass industries (Da Silveira *et al.*, 2001), and the internationalization and digitalization of markets (Labarthe *et al.*, 2007). In order to master this change as a manufacturer, the concept of mass customization has been developed decades ago and successfully implemented in companies. The concept was first described by Davis, who promotes mass customization as the ability to provide individually-designed products and services to every customer at lower cost (Davis, 1989). While the customer acts as a passive value-added recipient in the production of mass goods, he is assigned an active role in the fragmentation of mass markets. Duray describes the two essential aspects of mass customization as the degree of customer influence and the degree of modularization of the product in the supply chain from design, manufacturing, assembly to use (Duray, 2002). She defines four main types of mass customizers: Fabricators, Involvers, Modularizer and Assemblers. While customer involvement can increase the individuality of the product and consequently customer value, the degree of modularization determines the exploitation of economies of scale in the supply chain as well as the limits of individuality.

MASS CUSTOMIZATION 2.0 THROUGH ADDITIVE MANUFACTURING

Additive manufacturing technologies enables customer involvement far beyond the mass customization approaches described above. Particularly in the end customer sector, considerable technological progress has been made in recent years, enabling numerous new applications. Various 3D printing equipment suppliers are on the market in all price segments, making it possible to produce high-quality components at low prices. In literature, additive manufacturing is often described only from a single technological perspective to manufacture individual products. Various authors have emphasized in their essays that additive manufacturing must be viewed from business model perspective in order to leverage the full potential (Reeves *et al.*, 2011; Berman, 2012; Piller *et al.*, 2015). There are still missing contributions that describe theoretical frameworks for business model patterns in the context of additive manufacturing that combine collaboration between manufacturers and end customers on an industrial scale. This is essentially, because the methods for implementing business models for customized mass production using additive manufacturing are enabler for manufacturers to disrupt existing supply chains. The questions to be answered are what new business models derives, how products and supply chains need to be redesigned.

Thus, this paper shows how manufacturers and customers can realize so called make-by-customer supply chains beyond mass customization based on additive manufacturing. The new make-by-customer typology is classified in the concept of the customer order decoupling point and existing supply chain typologies. In analogy to the mass customization configuration model, the new strategy group of additive integrators is defined and associated business models are outlined. The last part shows how products can be structured for manufacture in make-by-customer supply chains on the basis of suitable modularity criteria.

THEORETICAL FRAMEWORK OF MAKE-BY-CUSTOMER SUPPLY CHAINS

In terms of supply chain management, the concept of the customer order decoupling point (Olhager, 2010) and the supply chain typologies based on it show how the degree of customer influence affects the supply chain targets. According to Nyhuis, customer anonymous make-to-stock manufacturers with a late customer order decoupling point at primarily pursue the cost objectives of high capacity utilization and low inventories, with the effect, that only a limited number of product variants can be offered (Nyhuis & Wiendahl, 2009). The postponement approach as part of the mass customization strategy moves the customer order decoupling point upstream towards assembly so that late variant creation can lead to a wide variety of products at acceptable additional cost.

With the innovative approach of the make-by-customer supply chain the former make-to-stock manufacturer supplies a low-variant standard product platform to the end customer, who then additively manufactures and assembles one or more variant components himself. In this way, the customer order decouplig point moves downstream to the customer who consumes a customized product adapted to his needs. The

manufacturing costs are analogous to those of a make-to-stock manufacturer and the variety of variants is broader than with a postponement approach. The make-by-customer supply chain thus combines all the advantages of both worlds. From a sustainable point of view, the product lifetimes of consumer goods could be extended and due to local production CO_2 and supply chain targets could be achieved.
In addition to the described advantages of a make-to-stock manufacturer, completely new business models arise for the manufacturer, which can result in much stronger customer loyalty. In addition to the actual product, manufacturers can provide customers with customizable 3D data for variant components, make suggestions for new product designs, or build up customers as partners for the production and marketing of their own design ideas and earn royalties for this. In analogy to Duray's concept, the new group of additive integrators is therefore created.

TRANSFORMATION FROM MANUFACTURER TO ADDITIVE INTEGRATOR

Additive integrators are characterized by the fact that they support the highest degree of customer involvement and modularization. Only the design of the standard product platform can be done alternatively with or without customer involvement. Otherwise, the customer can be part of the supply chain from the time the digital data model is processed: as designer, 3D manufacturing and assembly employee in person.

The individual business models of the manufacturers for acting as additive integrators in the future must be developed company-specifically according to known methods (Osterwalder & Pigneur, 2013). Only a few basic characteristics of possible business models are presented below.

Full-service provider: The manufacturer offers end customers in a direct relationship the complete service from the provision of the standard product platform, CAD data, printing material and production know-how for a product defined by the manufacturer.

Platform provider: The manufacturer works with distributors or 3D printing centers through a licensing model. The manufacturer provides the standard product platform and CAD data to the distributor, who provides the remaining services from data manipulation to 3D printing to the end customers.

Enabler: The manufacturer completely abandons production and becomes an enabler. He generates revenue essentially through his design and production know-how by developing products virtually in the form of 3D data and selling them to end customers. It buys the standard product platforms itself or suggests alternative procurement sources to the end customer.

In all cases, the prerequisite for the transformation to additive integrators and the establishment of make-by-customer supply chains is the effective modularization of the product. The integrated view of product and production is an essential aspect of supply chain design. In accordance with the requirement 'Production follows Product', the structure of the products is transferred to the structure of production (Wagner & Nyhuis, 2009).

DESIGN FOR ADDITIVE MANUFACTURING IN MAKE-BY-CUSTOMER SUPPLY CHAINS

Erixon has developed the Modular Function Deployment method, which can be carried out in five steps, for the modularization of products based on established procedures (Erixon, 1998). In the following, suitable modularity criteria for a design for additive manufacturing approach are described, which can be integrated into the Modular Function Deployment method suitable for the problem.

Customer-oriented manufacturability: The system element must be additively manufacturable with existing, widespread 3D printing technology at end customers; for requirements, see (Gibson *et al.*, 2015)

Customer-friendly assemblability: The system element must be combinable with the standard product platform using simple tools. To this end, standardized interfaces such as plug-in or screw connections are to be preferred; for requirements, see (Boothroyd *et al.*, 1994; Redford & Chal, 1994; Pahl *et al.*, 2007; Ulrich & Eppinger, 2012)

Styling: Within the product family, the element varies in shape or color.

Safety: Product safety must not be impaired by faulty manufacture or assembly, and liability for any risks must be transferred to the customer.

Data and material availability: It must be possible for the customer to obtain suitable 3D data and printing materials.

Classical product modularizations end after the fifth step, as supply chain typologies and distribution channels change only marginally. In the approach described here, it should be pointed out once again that it is necessary to strategically redesign the entire business model.

SUMMARY AND OUTLOOK

Additive manufacturing processes help to make individualization more flexible. To achieve this, it must be possible to integrate the processes as an important component in the supply chain for the creation of variants close to the customer. A promising approach here is the design of make-by-customer supply chains based on the design for additive manufacturing approach described above. It will be crucial for manufacturers to develop the entrepreneurial vision to fundamentally renew their business models and become additive integrators. In this way, they will benefit from the digital transformation of industrial production in the medium to long term. Planned research will focus on creating practical use cases together with industrial companies in which new business models can be evolved and the methodology further developed.

Keywords

Supply Chain Management, Additive Manufacturing, Mass Customization, Sustainability, Business Model

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Tensions of Managing Inter-Platform Complementarity: A Case Study of Digital Care Pathway Ecosystem

Mahmoud Mohamed*, Petri Ahokangas, Minna Pikkarainen

University of Oulu, Finland

* mahmoud.mohamed@oulu.fi

Abstract

Ecosystems built around multisided digital platforms comprise the central platform and complementary applications. The architectural design of the multisided platform enables the central platform to provide the technical infrastructure for complementors to create their complementary offerings and excel well in the market. Nowadays, ecosystems increasingly consist of several platforms that are so-called; platform of platforms, where each platform may share part of the main infrastructure with others.

In this study, we examine the larger complex platform-based ecosystem that has been conceptualized in the form of the platform of platforms. Each platform shares the same infrastructure with other platforms to provide complementarity offerings for the main platform. Nevertheless, managing modularity between different modules in the platform ecosystem can be critical, especially if some modules tend to trigger cross-layer competition between ecosystem modules.

The modular platform ecosystem is conceptualized by two elements: (I) complementarity between ecosystem modules, and (II) multi-layer competition between ecosystem modules. The platform ecosystem evolves as many complementors decide to join the platform, still, modular design is the key element of managing interdependencies between ecosystem modules and bringing the cooperative power to system dynamics to maintain market dominance for the platform and guarantee equal opportunities for all players involved in the platform ecosystem.

Keywords

Multisided platforms, ecosystems, modularity, complementarity.

Track 2.6.

Business Model Experimentation for Sustainability

Track 2.6. Business model experimentation for sustainability

Track chairs: Nancy Bocken[1], Lars Jacob Tynes Pedersen[2], Sveinung Jørgensen[2], Jan Konietzko[1], Marc Dijk[1], Ilka Weissbrod[6], Maria Antikainen[7]

[1,]Maastricht University, The Netherlands; [2]NHH Norwegian School of Economics, Norway; [6]Leuphana University, Germany; [7]VTT, Finland

The track aims to explore the topic of "Business model experimentation for sustainability". The aim of experimentation is to put forward and accelerate novel and impactful solutions (Bocken & Snihur, 2020). This special track investigates different contexts in which experimentation could take place, such as new ventures, established business, social businesses, but also local governments such as cities, and collaborations between these actors.

What is business model experimentation for sustainability? How might it be conducted in different contexts? Who are the main actors?

Business model experimentation for sustainability comprises several interrelated stages of experimentation (Antikainen & Bocken 2019) from idea generation to the development of testable ideas and experiments building on hypotheses about the future business (Bland & Osterwalder 2019; Ries, 2011), and the design and execution of such experiments using various tools and methods (Bocken et al. 2019; Bashir et al. 2020; Døskeland & Pedersen 2015). It involves deliberate learning and decision-making about follow up actions (e.g., more experiments, pivot, scalability of results). Moreover, effectual logic (Sarasvathy, 2001; Baldassarre et al., 2020) suggests that companies experiment, using available knowledge, means, and resources and iterative processes through stakeholder interaction.

With business experimentation as a popular topic in business research and practice, broader questions arise. These relate to the ethics of experimentation in the field, the outcomes of experimentation, how to stimulate a culture for experimentation, and how to organize and govern experimentation practices into business development units or other organization units. These are relevant for the understanding of business model experimentation for sustainability (e.g. Weissbrod & Bocken 2017).

Research questions and themes proposed for this track on Business model experimentation for sustainability" include, but are not limited to:

Process

- How to formulate testable hypotheses in business model experimentation?
- What kind of tools and methods are needed for experimentation?
- To what extent can randomized and controlled experiments be developed in a business context?

- What are the possibilities for collaboration and/or action research in business model experimentation for sustainability?
- How to co-create a business model experimentation process with stakeholders?
- How does ecosystem experimentation work, e.g. in cities or regions?

Impacts

- How to measure the circularity/sustainability of the outcomes during business model experimentation?
- What are success and failure cases of experimentation, with reported sustainability impacts?
- What are the unintended consequences and rebound effects associated with the outcomes of business model experiments?
- How does sustainable business model experimentation differ from conventional business model experimentation?
- What are the challenges when scaling-up of findings from experiments in practice?
- How to shift from qualitative and exploratory experimentation to more quantitative, hypothesis-driven experimentation?

Ethics and biases

- How can ethically justifiable experiments be developed in the field?
- What are the design challenges in experimentation, including sampling of customer segments and possible biases?

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Sustainable Business Model Innovation: An Ecosystem of Tools

Matthew Coffay[1,*], Lars Martel Antoine Coenen[2]

[1]PhD Candidate, Department of Business Administration, Western Norway University of Applied Sciences

[2]Professor, Innovation and Sustainability Transitions, Mohn Center for Innovation and Regional Development, Western Norway University of Applied Sciences

*mcof@hvl.no

The concept of sustainable business model innovation (SBMI) has gained increasing traction amongst researchers and firms. While considerable progress has been made around cataloguing and describing sustainable business models typologically (e.g. Lüdeke-Freund et al., 2018; Nosratabadi et al., 2019; Bocken et al., 2014), there are still a limited number of practical tools available for firms and consultants to use in developing new, sustainable business models: such tools are 'increasingly in demand, but still rare' (Geissdoerfer, Bocken & Hultnik., 2016, p. 2; Evans, Rana & Short, 2014). Prominent examples of SBMI tools include Evans, Rana & Short (2014), Bocken et al. (2013), Bocken, Rana & Short (2015), Geissdoerfer, Bocken & Hultnik (2016), and Yang, Vladimirova & Evans (2017), which focus on value mapping; and Joyce & Paquin (2016) and Tiemann & Fichter (2016), which adapt the Business Model Canvas toward sustainability (Osterwalder & Pigneur, 2010).

Two trends emerge: 1) a focus on value proposition ideation via a sustainable value mapping approach, and 2) limited engagement with 'sustainability' on a conceptual level. For example, Geissdoerfer, Bocken & Hultnik (2016) define a 'sustainable business model' as 'a simplified representation of the elements, the interrelation between these elements, and the interactions with its stakeholders that an organisational unit uses to create, deliver, capture, and exchange sustainable value for, and in collaboration with, a broad range of stakeholders,' but do not offer an explicit definition of 'sustainable value' (p. 2). While Joyce & Paquin (2016) engage more explicitly with sustainability in terms of the triple bottom line, recent research has revealed that this model is lacking in theoretical depth (Purvis, Mao & Robinson 2019).

There is thus a two-part gap in the literature. On the one hand, there is a need for development of SBMI tools which explicitly engage with sustainability on a conceptual level. At the same time, tools are needed which go beyond value proposition ideation in terms of value mapping: such tools would also take stock of value creation, delivery, and capture in alignment with the commonly held understanding of a business model as the way an organization creates, delivers, and captures value (e.g. Osterwalder & Pigneur, 2010; Evans, Rana & Short, 2012; Geissdoerfer, Bocken & Hultnik, 2016). As Geissdoerfer, Vladimirova & Evans (2018) point out, most extant tools 'are addressing single phases of the sustainable business model innovation process,' and 'while these tools can provide some support with the conceptual design of business models, they offer only limited guidance through most of the remaining business model innovation process' (p. 409). The same can be seen in a recent review by Pieroni, McAloone & Pigosso (2019), where SBMI tools are categorized according to a ‘sensing’, ‘seizing’, and ‘transforming’ dynamic capabilities approach to representing the BMI process, with most tools only relevant for one or two of the process stages.

We therefore believe that a complete and internally coherent ‘suite’ of tools is needed which firms and consultants can leverage for SBMI. The development of a full suite of SBMI tools — which we term the ‘SBMI Ecosystem’, to highlight the mutual interdependence that such a suite of tools should exhibit — would ideally work to encourage users to engage more explicitly with sustainability on a conceptual level as well, helping to foreground otherwise implicit assumptions, goals, and value judgments around sustainability. In this way, the SBMI Ecosystem would also help to facilitate greater responsibility in innovation processes by incorporating aspects of responsible innovation — e.g. anticipation, reflexivity, inclusiveness, and responsiveness — into the activities surrounding business model innovation (von Schomberg, 2011; Stilgoe, Owen & Macnaghten, 2013). The need for such tools has been recently identified in the responsible innovation literature (e.g. Bessant et al., 2019).

In order to address the entire business model innovation process, the SBMI Ecosystem will encompass the following dimensions.

Organizational design. Recent research highlights the importance of organizational design for generating ‘dynamic capabilities’, which in turns allows organizations to engage in SBMI (Bocken & Geradts, 2020). Organizational design can hinder SBMI by creating institutional, strategic, and operational barriers for innovation activities, or work to facilitate SBMI by breaking down these barriers and introducing institutional, strategic, and operational drivers. One tool in the SBMI Ecosystem will therefore assist organizations in mapping out current barriers and drivers, particularly when it comes to organizational structure, values, and strategic priorities.

Value proposition ideation. A number of tools for value mapping already exist (e.g. Evans, Rana & Short, 2014; Bocken et al., 2013; Bocken, Rana & Short, 2015; Geissdoerfer, Vladimirova & Evans, 2016; Yang, Vladimirova & Evans, 2017). A value mapping approach to value proposition ideation is thus already well accounted for in the literature, and the SBMI Ecosystem will therefore include one or more tools for value proposition ideation which go beyond the scope of these existing tools. Such tools could, for example, build on the work of Bocken et al. (2013) and Bocken, Rana & Short (2015) to include a greater focus on customer (and other stakeholder) insight in the vein of the Value Proposition Canvas (Osterwalder & Pigneur, 2015). This would likely require stakeholder interviews ('customer insight interviews'), which could be conducted using an accompanying Ecosystem tool.

Hypothesis, testing, and pivoting. Value propositions must be de-risked before being brought to market. In the case of SBMI, such risks are two-fold. On the one hand, there is the risk of market failure — this is the traditional understanding of risk embedded in BMI. Additionally, with SBMI, there is the risk that a new business model may not actually meet its desired sustainability outcomes. The Ecosystem will therefore include a set of tools around formulating hypotheses, running tests, and gathering data to de-risk the proposed value proposition(s) and business model(s), allowing for pivoting as needed.

Value delivery and capture. The Business Model Canvas offers a simplified representation of how an organization creates, delivers, and captures value (Osterwalder & Pigneur, 2010). One existing SBMI tool, the Triple Layer Business Model Canvas, adapts the BMC to SBMI by combining it with the triple bottom line (Joyce & Paquin, 2016). This approach has two drawbacks. The first is the added complexity of using three canvases simultaneously. One major appeal of the BMC is its elegance and simplicity; this is arguably compromised when attempting to represent a business model across three (modified) canvases. (The Sustainability Canvas of Tiemann & Fichter (2016) suffers from a similar problem, as it relies on a long list of 'leading questions' which must be utilized in a workshop context.) The other drawback is the reliance on the triple bottom line conception of sustainability, as recent research has called into question this conception's theoretical depth (Purvis, Mao & Robinson, 2019). The Ecosystem will develop an entirely new approach to representing value delivery and capture for SBMI which simultaneously foregrounds assumptions about sustainability.

SBMI portfolio development. Recent work in business model innovation highlights the need for organizations to develop an 'innovation portfolio' of business model ideas which can be developed, tested, pivoted, and scaled (or shelved). Such an approach to innovation seeks to avoid disruption and balance 'exploit' and 'explore' activities within an organization (Osterwalder et al., 2020). One critique of this approach is its neglect of environmental or social sustainability in building an innovation portfolio, considering recent claims that 'the sustainable business model concept might eventually supersede the business model concept much like sustainable competitive advantage has superseded competitive advantage' (Geissdoerfer, Vladimirova & Evans, 2018; Grant, 2010). The Ecosystem will therefore include tools for developing an SBMI portfolio.

Keywords

sustainable business model innovation, business model innovation, sustainability

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BM Experimentation; A tool for calculating the financial and sustainable business case of new Business Models

Albert Kraaij*, Kim Poldner

The Hague University of Applied Sciences

*a.kraaij@hhs.nl

Keywords

Business model innovation, innovation tools, business case for sustainability, business model experimentation, Sustainable Development Goals.

PURPOSE OF THE RESEARCH

This paper seeks to make a contribution to business model experimentation for sustainability by putting forward a relatively simple tool. This tool calculates the financial and sustainability impact based on the SDG's of a newly proposed business model (BM). BM experimentation is described by Bocken et al. (2019) as an iterative-multi-actor experimentation process. At the final experimentation phases some form of sustainability measurement will be necessary in order to validate if the new proposed business model will be achieving the aims set in the project. Despite the plethora of tools, research indicates that tools that fit needs and expectations are scarce, lack the specific focus on sustainable BM innovation, or may be too complex and demanding in terms of time commitment (Bocken, Strupeit, Whalen, & Nußholz, 2019a).

In this abstract we address this gap, or current inability of calculating the financial and sustainability effect of a proposed sustainable BM in an integrated, time effective manner. By offering a practical tool that allows for this calculation, we aim to answer the research question; "How can the expected financial and sustainability impact of BMs be forecasted within the framework of BM experimentation?

LITERATURE REVIEW; THE SUSTAINABLE BUSINESS CASE

A business case is a management tool connected to a business proposal that provides an analysis of a financial prognosis of the costs, benefits, risks that is expected of a new BM (Messner, 2013).

A business case for sustainability is different from a conventional economic business case in that it focusses on more than just the financial value created in the proposal. A business case for sustainability is mostly described as an outcome of a new BM where economic success is increased while performing well in social and environmental issues (Schaltegger, Lüdeke-Freund, & Hansen, 2012). In innovating BMs entrepreneurs are challenged to recognize both economic sustainability, as well as social and environmental sustainability equally (Parnell, 2008).

The proposed sustainable BM must be measured and argued for in a convincing way (Schaltegger, Lüdeke-Freund & Hansen, 2012). Therefore, the sustainability impacts and financial performance of the proposed BM and the trade-offs that ultimately must be made, need to be properly calculated (Epstein & Roy, 2003). For this a tool is presented.

This tool differs from other available tools like the Impact Forecast Tool (Impactforecast.org, 2021) in that it allows participants in the BM experimentation to simultaneously assess the trade-off between financial forecasting and sustainability impact analysis in order to achieve an optimal outcome. The social and ecological value created is based on the contribution to the SDGs. Furthermore the Excel tool is relatively easy to use and can be readily adjusted according to specific needs. Moreover linking results to the SDGs can help to connect to global priorities.

THE TOOL; THE POSITIVE FINANCIAL AND SUSTAINABILITY BUSINESS CASE CALCULATION

The intention of the instrument is to support students and other practitioners in conceptualising the consequences and interrelatedness of their proposed BM solution. The tool is a predefined calculation model in Excel where users insert numerical variables related to the proposed BM. The inserted values should be validated based on a combination of desk and field research. These relevant variables are:

Financial business case calculation:

- P; Price of product/service;
- Q: Expected quantity sold in a period;
- Costs: Expenditures that are projected initially and after the start;
- F: Financing.

Sustainability case calculation:

- SDGs: The affected SDG(s);
- UN Targets related to SDGs (United Nations, 2015);

- Impact Indicator: Unit of measurement that captures either outputs, outcomes or impacts as contributions to a specific SDG;
- Q: Expected quantity sold in a period;
- Δ SDG; The positive/negative net effect per product/service on a relevant SDG based on the Impact Indicator compared to the initial BM or an industry standard.

The key variable is Δ SDG (Delta SDG). This value connects the Financial Business Case and the Sustainability Case. By linking this value to the expected quantity sold, the sustainability case or contribution to the SDGs is calculated in measurable units. The logic behind this reasoning is that by being successful with a new sustainable BM you drive out non-sustainable competitors like what the economist Joseph Schumpeter called "creative destruction (Hart, 2005)". The variable Q acts as the driver. Increased sales mean increased sustainability performance of the newly proposed BM.

In order to visualize the tool an example is presented based on the start-up KLEER, a circular startup based on exchanging fashionable women's clothing.

- Financial business case calculation of KLEER:

Figure 1;

Financial Business Case Calculation:

Designed for: KLEER *Designed by:* Owners *Date:* 01/04/2021

Month	0	1	2	3	4	5	6	7	8	9	10	11	12	Total yr 1	Total yr 2
Revenues (cash-in)															
Expected sales in quantity	**Q**	194	388	582	776	800	800	825	825	830	830	830	830	8.510	9.960
Price product or service (incl VAT)	**P**	€ 43,00	€ 43,00	€ 43,00	€ 43,00	€ 43,00	€ 43,00	€ 43,00	€ 43,00	€ 43,00	€ 43,00	€ 43,00	€ 43,00		€ 43,00
Sponsoring, etc.		€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0
Sales revenue (incl VAT)		**€ 8.342**	**€ 16.684**	**€ 25.026**	**€ 33.368**	**€ 34.400**	**€ 34.400**	**€ 35.475**	**€ 35.475**	**€ 35.690**	**€ 35.690**	**€ 35.690**	**€ 35.690**	***€ 365.930***	**€ 428.280**
VAT payable		*€ 1.448*	*€ 2.896*	*€ 4.343*	*€ 5.791*	*€ 5.970*	*€ 5.970*	*€ 6.157*	*€ 6.157*	*€ 6.194*	*€ 6.194*	*€ 6.194*	*€ 6.194*		*€ 74.330*
Cash receipts excl. VAT		€ 6.894	€ 13.788	€ 20.683	€ 27.577	€ 28.430	€ 28.430	€ 29.318	€ 29.318	€ 29.496	€ 29.496	€ 29.496	€ 29.496	***€ 302.421***	€ 353.950
Costs (expenditures/cash-out)															
Total Initial Investment (specification)	€ 15.000														
Investment (pay out)		€ 15.000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	**€ 15.000**	€ 0
Cost of Goods sold (moment of payment, incl		€ 2.494	€ 4.989	€ 7.483	€ 9.977	€ 10.286	€ 10.286	€ 10.607	€ 10.607	€ 10.671	€ 10.671	€ 10.671	€ 10.671	**€ 109.414**	€ 128.057
Payroll expenses owner(s) (no VAT)		€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	**€ 30.000**	€ 30.000
Payroll expenses staff members (no VAT)	**Costs**	€ 5.000	€ 5.000	€ 5.000	€ 5.000	€ 11.000	€ 11.000	€ 11.000	€ 11.000	€ 11.000	€ 11.000	€ 11.000	€ 11.000	**€ 108.000**	€ 132.000
Housing expenses		€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	€ 2.500	**€ 30.000**	€ 30.000
Marketing expenses		€ 2.500	€ 750	€ 750	€ 750	€ 750	€ 750	€ 750	€ 750	€ 750	€ 750	€ 750	€ 750	**€ 10.750**	€ 10.750
Energy costs		€ 650	€ 650	€ 650	€ 650	€ 650	€ 650	€ 650	€ 650	€ 650	€ 650	€ 650	€ 650	**€ 7.800**	€ 7.800
Obsolete stock (10%)		€ 249	€ 249	€ 249	€ 249	€ 249	€ 249	€ 249	€ 249	€ 249	€ 249	€ 249	€ 249	**€ 2.993**	€ 12.806
VAT receivable		*€ 4.060*	*€ 1.586*	*€ 2.019*	*€ 2.452*	*€ 2.505*	*€ 2.505*	*€ 2.561*	*€ 2.561*	*€ 2.572*	*€ 2.572*	*€ 2.572*	*€ 2.572*	*€ 30.538*	*€ 32.873*
VAT net payable(-)/receivable					*€ 1.022*			*€ 10.269*			*€ 10.813*			***€ 22.105***	*€ 41.958*
average VAT%	**21,0%**														
Expenditures enterprise in period		€ 30.894	€ 16.638	€ 19.132	€ 22.648	€ 27.935	€ 27.935	€ 38.526	€ 28.257	€ 28.321	€ 39.134	€ 28.321	€ 28.321	€ 336.062	€ 426.244
Cash Balance		**-€ 22.552**	**-€ 22.506**	**-€ 16.612**	**-€ 5.892**	**€ 572**	**€ 7.037**	**€ 3.986**	**€ 11.205**	**€ 18.574**	**€ 15.130**	**€ 22.499**	**€ 29.868**		**€ 31.904**

Business Case before Financing: **Positive business case** **€ 31.904**

Conclusion: the financial business case is positive. After two years, the expected net cash inflow is €31,904.

- The sustainability case calculation:

Exchanging clothes means producing less new clothes. KLEER has a net positive effect on several SDGs (SDG3/6/11/12/15). Below the sustainability calculation of SDG12. This calculated effect on the SDG can be measured in reduced waste generation in kg's. The Delta SDG or ΔSDG in this case is the average weight of a piece of clothing sold at KLEER (0,36 kg). This ΔSDG is multiplied by the expected quantity sold (Q).

Figure 2:

Sustainability Case Calculation: *Designed for:* *KLEER* *Designed by:* *Owners* Date: *2021*

UN Sustainable Development Goal (17):	12. Ensure sustainable consumption and production patterns	*dropdown menu*
UN Targets (169):	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	*dropdown menu*
Impact indicators for the SDGs:	12.d Reduce waste generation through reuse in kg	*dropdown menu*

Period	0	1	2	3	4	5	6	7	8	9	10	11	12	Total yr 1	Total yr 2
Expected sales in quantity	**Q**	194	388	582	776	800	800	825	825	830	830	830	830	**8.510**	9.960
		x	x	x	x	x	x	x	x	x	x	x	x		x
Impact indicator p/product compared to original BM	**ΔSDG**	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36		0,36
		=	=	=	=	=	=	=	=	=	=	=	=	=	=
Calculated effect on SDG's		**70**	**141**	**211**	**281**	**290**	**290**	**299**	**299**	**301**	**301**	**301**	**301**	**3.083**	**3.608**
			**Calculated effect of Entreprise on SDG in two years:**											**6.690**	**12.d Reduce waste generation through reuse in kg**

The conclusion is that KLEER is expected to have a positive sustainability effect on SDG12 by reducing waste generation of 6.690 kg in two years.

METHOD

The tool has been iteratively developed and tested with a total of 400 students in a variety of national and international projects. To explore how the tool is used, 32 completed student projects were studied. The output was collected and analyzed and users and lecturers were questioned. The outcome of this analysis was used to improve the instrument in several iterations. The progress development of the instrument was controlled using the checklist for CBMI tool development.

PRELIMINARY FINDINGS

Table 1: Checklist for CBMI tool development (Bocken, Strupeit, Whalen, & Nußholz, 2019a)

Criterium	Obtained Result	Remark
The tool is purpose-made for sustainable BMI?	Yes	
The tool is rigorously developed—from both literature and practice insights?	Yes/No	To be improved
The tool is iteratively developed and tested with potential users?	Yes/No	Only with students
The tool integrates relevant knowledge from different disciplines.	Yes	
The final tool version has then been used by practitioners, preferably multiple times and an evaluation of this process is done to assess tool usefulness?	No	Final version not available
Evaluation of this process is done to assess tool use and usefulness.	No	Not available
The tool provides a transparent procedure and guidance on how others can use the tool?	No	Not available
Sustainability objectives and impact are firmly integrated into the tool and safeguarded when tool application is facilitated by others than the tool developer?	Yes	
The tool is simple and not too time-consuming?	Yes	
The tool inspires or triggers (business) change?	Yes	
The tool is adaptable to different (business) contexts?	Yes	

PRELIMINARY CONCLUSIONS

The tool is work in progress but is already used in several programs at different universities. Once tested, programs stick to it, which displays a strong demand for such a tool in educational programs. However, to be considered 'validated in practice', a tool must be empirically tested not only in student projects and needs to be documented in a future publication (Bocken, Strupeit, Whalen, & Nußholz, 2019a). This is not yet the case. Based on the preliminary findings we propose the following directions for future research. First, the design of a final version and empirical evaluation on its usefulness based on the data retrieved from students and actual practitioners. Secondly, the creation of a transparent procedure and guidance on how others can use the tool. Finally, the tool should be documented in a future publication to explain the "what, why, how and so-what" of the tool and the benefits of using it in practice.

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Model-based facilitation: A tool for sustainable business model conceptualization and implementation

Kajsa Ahlgren Ode[1*] and Emil Åkesson[1]

[1] Lund University, Design Sciences

* kajsa.ahlgren_ode@design.lth.se

Abstract

In this short paper, we elaborate a detailed outline of how model-based facilitation can be adapted to the conceptualization and implementation of business models for sustainability, and empirically evaluate our tool in a company workshop. The expected contribution is a tool supporting managers' and decision-makers' initial conceptualization of a new business model while also addressing the associated design-implementation gap.

Keywords

Business model innovation, sustainability, tool, conceptualization, implementation

INTRODUCTION

Our society is facing ever more challenging sustainability problems (IPCC, 2018). Although wicked problems like these (Rittel and Webber, 1984) require a complex web of solutions, firms' transitions to more sustainable practices is one of them. In this regard, scholars consider "business model" as a helpful concept representing a holistic understanding of how firms do business (Massa et al., 2017; Bocken et al., 2014) and what activities are involved (Zott and Amit, 2010). Over the last decade business models for sustainability, and the transition to them from prevailing business models, have been explored in the academic literature (Geissdoerfer et al., 2018). For example, research has presented typologies of various archetypes (Bocken et al., 2014) and outlined phases of the transition process (Rajala et al., 2016; Roome and Louche, 2017).

Scholars have also explored various challenges to sustainable business model innovation and developed tools to assist firms in overcoming these (for a review see Geissdoerfer et al., 2018). Among these tools a majority address early stages of the business model innovation process by supporting ideation and conceptual design, and only one approach combines different tools to also support later stages of the innovation process (Evans, 2014). If we turn to the general business model literature visualization has been pointed out as key when designing and analyzing business models to stimulate collaborative thinking, knowledge sharing and uncover underlying structures (Abdelkafi and Taüscher, 2016). Most of these tools are ontologies, meaning they offer a set of components to consider when designing a new, or reconfiguring an old, business model. A few scholars have suggested causal mapping as a way to visualize and explore the interdependencies underlying these components (e.g. Casadesus-Masanell and Ricart, 2010).

However, firms are still struggling to grasp what *a* business model is, what *their* business model is, and, especially, to conceptualize *their future* business model (for sustainability). Business model scholars have expressed a need for additional tools to support managers in the conceptualization preceding filling in components of an ontology (Felin, in press). At the same time, a problematic design-implementation gap has been pointed out in the business models for sustainability literature, suggesting that additional tools need to bridge the transition from ideas and conceptual design to implementation (Geissdoerfer et al., 2018).

In this paper we elaborate and test a tool based on what might be jointly labeled model-based facilitation (Ackermann & Eden, 2011; Eden, 1988; Rouwette & Vennix, 2006; Scott, 2019; Király & Miscolczi, 2019, Åkesson and Ahlgren Ode, forthcoming). We adapt this process tool, originally developed for strategy formulation in the strategic management and system dynamics literatures, to support managers in the process of conceptualizing a new business model for sustainability through individual and collective cognitive mapping. This process, we argue, allows managers to elaborate their thinking – individually and collectively – related to a new business model. It also provides a space for negotiation in which participants can discuss and shape a common view of their future business model and thereby create a foundation for implementation.

The paper contributes to the business model innovation and business models for sustainability literatures in two ways. First it elaborates a tool for business model conceptualization building on model-based facilitation, supporting managers to both think differently and think together to negotiate a common view supporting implementation. Second, we test this tool in a utility company transitioning to sustainability to evaluate its empirical applicability and make refinements. The remainder of this short paper consists of a method section, followed by a section in which the tool is presented. We conclude with preliminary conclusions.

METHOD

For the purpose of this paper, we have developed a detailed outline of how to empirically apply model-based facilitation to enhance business model innovation for sustainability on the basis of previous literature in cognitive mapping (Ackermann & Eden, 2011; Eden, 1988), group model building (Rouwette & Vennix, 2006; Scott, 2019; Király & Miscolczi,

2019) and conceptualizations of how it could be applied on business models (Åkesson and Ahlgren Ode, forthcoming; Furnari, 2015). In this section we elaborate on the case company and design of the workshop in which the tool will be tested, and in the next section we present an outline of the tool.

Case company

The case company is a Swedish utility company transitioning toward sustainability and a more digital company profile. The company has recently decided on a new vision to become an energy partner to their customers by integrating services, and have re-structured organizationally to support this aspiration. However, it is still not clear to top management what being an energy partner really means, and how this new role in the energy system will be achieved, and even more so what their new business model will be. We find this state of "being in search for a new business model" as suitable when testing our tool for conceptualizing a new business model.

The case company immediately showed interest and confirmed our assumption that filling out component boxes of ontological business model tools was not sufficient for them to grasp their new business model. As suggested within model-based facilitation, the selected case company was involved in, for example, formulating the focal question, selecting participants and deciding on the workshop length.

Workshop design

The aim of the workshop (taking place early spring 2021) is to test the effectiveness of our adaption of model-based facilitation to the conceptualization of new business models, and identify how the tool can be refined. Prior to the workshop, each participant will be interviewed to express their individual view of the new business model. The outcome of each interview will be an individual cognitive map, a points-and-arrow diagram visualizing causal relations between concepts (Axelrod, 1976). All individual maps will be aggregated into a collective map by the researchers before the workshop. During the workshop the participants will discuss, elaborate and make changes to the cognitive map as they develop their thinking and negotiate a common view of the new business model. The workshop will be tape recorded and one researcher will make observations to record non-verbal activities in the workshop space. After the workshop we will follow up with each participant to explore whether the perception of the new business model is 1) different, 2) more detailed, 3) more complete and 4) more in line with the other participants' views. We will also evaluate in what ways the tool supports or prevents conceptualization of a new business model, and subsequent decision-making.

ELABORATION OF MODEL-BASED FACILITATION

The vantage point of this research is the assumption that model-based facilitation can support the constructive process of conceptualizing a new business model, and therefore our tool more closely follows the qualitative and social nature of model-based facilitation (Eden and Ackermann, 2011). On this basis the tool has the following aims:

- To map individuals' perception of a new business model (subjective map) and support them to think differently by elaborating their own thinking and engaging in collective thinking in a workshop setting.
- To facilitate collective thinking by gathering individuals in a workshop and discuss an intersubjective map, a map aggregated by the facilitators on the basis of individual maps.
- To facilitate negotiation of a new business model among participants by using the intersubjective map as a vantage point for discussion and continuously changing it according to what is being agreed.

THE DESIGN OF MODEL-BASED FACILITATION FOR BUSINESS MODELS

Model-based facilitation builds on tools in the strategy literature developed to handle the process of conceptually developing strategies using cognitive mapping. However, as elaborated by Åkesson and Ahlgren Ode (forthcoming), these tools focus on strategy rather than business model development, and the structure of these two concepts are fundamentally different. While strategies are hierarchically linear with actions leading toward goals, business models are circular and consist of feedback loops – virtuous, vicious or stable - of value creation. Therefore, model-based facilitation as a process supporting individual and collective thinking and negotiation can be adopted, but the structure of the cognitive map as a central artefact in this process needs to be adapted to fit the particularities of business models. On this basis, we will use the following mapping notation when testing model-based facilitation for the conceptualization of a new business model:

- Concepts perceived as relevant to the particular business model should be mapped in a points-and arrow diagram (Axelrod, 1976; Eden and Ackermann, 2011)
- Concepts should be identified as either value creating activities or value receivers in line with an activity-based view on business models (Porter, 1996; Zott and Amit, 2010)
- Concepts and arrows are expected to create circular causalities or feedback loops (rather than hierarchically linear) and while constructing the map one should strive to cover value creation delivery and capture mechanisms.

These feedback loops should be closely evaluated to distinguish whether they support or prevent value creation.

PRELIMINARY CONCLUSIONS

In this short paper, we have argued for the adoption of model-based facilitation as a tool for conceptualizing and implementing a new business model for sustainability. Model-based facilitation is a joint label for different tools supporting the process of strategy formulation using a cognitive map to visualize strategy development. Our assumption is that by applying the procedure of model-based facilitation in a context in which business model conceptualization is sought for, the benefits of individual and collective thinking, negotiating a common view and creating a foundation for decision-making, can be reaped. However, due to structural differences between the two concepts - strategy and business model - we have suggested adaptations to the structure of the cognitive map used during the modelling process, to better fit the conceptualization of business models. By empirically testing the model-based facilitation in a company "searching for a new business model" we will be able to evaluate whether our tool will lead to the expected benefits associated with model-based facilitation, and assess the new notation that we propose to use when drawing a cognitive map of a business model.

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Business model experimentation to create shared value from mining: A case study

Jocelyn Fraser[1,*] Scott Dunbar[1],

[1]University of British Columbia

Vancouver, Canada V6T 1Z4;

*jocelyn.fraser@ubc.ca

In recent years, there have been increasing calls for businesses to serve the interests of stakeholders rather than simply their shareholders, and to adapt business models to create sustainable value. The pressure for business to change has led to calls for business models where sustainability concepts shape the driving force of the firm to generate both social and economic value (Bocken, Rana, & Short, 2015; Schaltegger, Hansen & Lüdeke-Freund; 2016; Freudenreich, Lüdeke-Freund, & Schaltegger, 2019; Bocken, Weissbrod, & Antikainen, 2021). Yet, understanding of "sustainable" business models and of how firms operationalize sustainable development remains weak (Bansal, 2005; Stubbs & Cocklin, 2008; Lüdeke-Freund & Dembek, 2017; Geissdoerfer, Evans, & Valdimirova, 2018).

The discussion about sustainability-oriented business models is particularly pertinent to the mining industry. With interest in the circular economy growing, questions have been raised about the need for the future mining of new materials. However, metal recycling flows for materials such as copper and nickel, required for the transition to a low carbon economy, will only be sufficient to meet a small percentage of future metal demand (Elshkaki, Graedel, Ciacci, & Reek, 2018). This means mining will continue to be necessary. But as diverse groups pressure the industry to improve environmental, social and governance (ESG) performance, and to create value for groups other than just shareholders, questions are being raised about the viability of the conventional business model of mining, which has remained relatively unchanged for decades (Dunbar et al, 2020).

The ways in which business models can create ecological, social and economic value for stakeholders have received little discussion in general (Evans et al, 2017; Lüdeke-Freund & Dembek, 2017; Schaltegger, Hansen & Lüdeke-Freund, 2016), and even less in the mining sector. As the location of any mine is inextricably linked to the geographic area where mineral deposits are found, mining companies, unlike many other industries, cannot simply relocate if ESG conditions are not favourable to business operations. This creates unique business model challenges.

One opportunity to explore economic, social, and environmental value creation and to deliver more positive outcomes from mining for business, society, and the environment is presented by the United Nations Sustainable Development Goals (SDGs). Introduced in 2015, the 17 SDGs target "grand challenges" that require collective, collaborative, and coordinated effort. Mining has contributed to the problems the SDGs seek to address, but it is also favourably positioned to make a significant contribution to the achievement of many of the global goals and create shared value[16] (Yakovleva et al., 2017; Chicksen et al, 2018; Fraser, 2019).

To further the discussion on business models for sustainability in an understudied sector, this paper uses a case study to consider business model experimentation in the mining sector. Case studies are useful for theory building when little is known about the phenomenon under investigation (Eisenhardt & Graebner, 2007), such as sustainability-oriented business model use in the mining sector. The case investigates changes to the business model of the Lundin Foundation, a non-profit service provider to the Lundin Group, 13 publicly-traded mining and oil and gas companies. The case employs a stakeholder theory perspective on business models (Freudenreich et al., 2019) with the objective of conducting an empirical inquiry investigating contemporary phenomena in an applied setting (Yin, 2009): the Lundin Foundation's work in association with Lundin Gold at the Fruta del Norte mine in Ecuador. Qualitative methods were used to research the Lundin Foundation's experimentation with its business model and to answer two questions: What drove business model change? What barriers and opportunities were encountered?

Case study research methods included intercept interviews (N=20) conducted at two major international mining conferences. The objective of these short interviews was to gauge awareness of the economic strategy of "creating shared value", explore definitions of the term, and identify examples of shared value projects undertaken by mining companies. Interview results identified the case for consideration: Fruta del Norte, a gold discovery in Ecuador owned and operated by Lundin Gold and where the Lundin Foundation had been engaged to work with local communities to realize economic benefits. To build understanding of the business models and sustainability strategies, publicly available materials produced by Lundin Gold and the Lundin Foundation were reviewed. Documents include annual and sustainability reports, management discussion and analysis, investor and conference presentations, media coverage and company web sites. The results informed the development of a semi-structured interview guide used in expert interviews (N=6) with Lundin personnel. The interviews provided insight to the company's business model, the motivations for business model experimentation, and the challenges encountered.

Established in 2006, the Lundin Foundation's mission – to create lasting benefits for communities impacted by resource development – has remained constant since its

[16] Shared value is defined as a strategy to improve socio-economic outcomes and related core business performance simultaneously (Porter & Kramer, 2011).

inception. However, the Foundation's business model, with its philanthropic origins, has undergone periods of re-evaluation and experimentation. In 2009, the business model changed as the Foundation shifted from charitable donations to social impact investing in Africa, focussing on the social enterprise space in an effort to deliver more value from mining to resource-rich communities. In 2016, a key business priority of the Lundin Group became a desire to find opportunities to create shared value to drive progress on the SDGs. This new objective was the impetus for further business model change at the Lundin Foundation.

The contribution of this case is three-fold. First, the rationale behind the Lundin Foundation's business model experimentation and change is explored and highlights the iterative nature of business model change. Second, the practical challenges of balancing the need for short-term reporting and the long-term impact sustainability initiatives are investigated. Third, specific examples of market-based initiatives that created shared value via cross-sectoral collaboration are examined to validate the business model and to measure the success of shared value projects.

Collective learning from – and with – stakeholders is a central tenet of business model experimentation and can accelerate business models for sustainability (Bocken, Boons, & Baldassarre, 2019). As the Foundation shifted away from its initial philanthropic work towards providing financing to respond to market opportunities surrounding extractive industry projects, business model change was needed. Business model experimentation enabled the Lundin Foundation to focussing on market opportunities aligned with the United Nations Sustainable Development Goals. Key to the success of the Lundin Foundation's current business model is collaborative partnerships with local individuals, groups and agencies, to co-create value aligned with regional sustainability interests and needs.

The findings from a single case cannot be generalized across the global mining sector. Nevertheless, the approach to business model experimentation and innovation employed by the Lundin Foundation offers insight to the role of business models for sustainability for accelerating social change, and how impact of these business models can be measured. Further, the findings offer encouragement for others considering how to transition from conventional business models towards those that move beyond shareholders to include all stakeholders, contribute to the SDGs, and endorse a new purpose of the corporation.

Keywords

Business model innovation, mining, shared value, sustainable development, Sustainable Development Goals

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Track 2.7.

New Business Models in an International Context

Track 2.7. New Business Models in an International Context

Track chairs: Svante Andersson[1], Petri Ahokangas[2]

[1]Halmstad University, Sweden; [2]Oulu Business School, Finland

All businesses have business models. Business models describe the design or architecture of how businesses create and deliver value to customers and how the businesses capture value to create profit (Chesbrough, 2010; Teece, 2010; Zott & Amit, 2007). Most business model literature does not deal with in which countries business models' value creating, delivering and capturing activities are localized (Onetti, Zucchella, Jones & McDougall-Covin, 2012). Especially for new international firms, localization decisions are important as these firms must deal with liabilities if newness, smallness, foreignness (Zaheer, 1995; Andersson et al, 2020). However, larger older firms that are entering new markets also need to deal with liabilities of foreignness. To create legitimation among stakeholders, such as customers, suppliers, financiers, personal it is important to create business models that are accepted of stakeholders in the different institutional context that the international firm operate in (Delgado et al, 2017). Following the above discussion this track invites submissions that deal with how new business models in international firms are created, developed and how the international context is influencing this process.

This track aims at attracting scholars to discuss their current research on sustainable business models in an international context. We welcome papers from different methodological background - including literature reviews, theoretical-, conceptual- and empirical papers. These papers can address one or more of the following topics, which is not an exhaustive list:

- Are there different types of new business models for international markets that prevail among SMEs and which factors predict the international business models (Child et al, 2017)?
- Where (in which countries) are international firms localizing value capturing, delivering and capturing activities, and why are they localized in these settings?
- How are new business models created and developed in international settings?
- Can business models explain the emergences of international new ventures and born globals (Hennart, 2014)?
- Are international new ventures changing their business models when they are growing (Andersson et al, 2020)?
- How can sustainable business models help firms to create legitimacy in different institutional contexts?

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SMEs, Global Value Chains and the Governance of Sustainability Performance

Empirical evidence from Turkey

Burcin Hatipoglu[1,*] Ahmet Uşaklı[2]

[1]University of New South Wales; [2] Bogazici University

* b.hatipoglu@unsw.edu.au

This study examines the effects of sustainability-oriented innovations (product, process, business model) on SMEs' sustainability performance (economic, environmental, and social) and questions how the large buyer companies can best govern SMEs for sustainability performance.

Representing about 90% of businesses and more than 70% of employment globally, small- and medium-sized enterprises (SMEs) have a pivotal role in most economies' economic growth (OECD, ETF, EU, & EBRD, 2019). SMEs' place in the developing economies is significant since they contribute to more than 35% of GDP in many developing countries (Alibhai, Bell, & Conner, 2017). In Turkey, SMEs are also the dominant form of business: they account for 99.8 percent of all businesses, employ nearly 74.4 percent of the private sector workforce, and are responsible for 54.1 percent of the total value added (OECD et al., 2019). Furthermore, SMEs worldwide are increasingly integrated into global value chains (GVCs) as suppliers for large companies and business partners (World Bank, 2019). Their economic significance and global presence suggest that SMEs' environmental and social sustainability performance will have a significant impact on society, which needs to be closely examined (Cantele & Zardini, 2018; Darcy, Hill, McCabe, & McGovern, 2014; Egels-Zandén, 2017; Singh, Del Giudice, Chierici, & Graziano, 2020).

More than before, firms organize their production globally, send parts to producers in other countries, and manufacture the final product or service in more than a single country. The development of global value chains creates new jobs and reduces poverty in those nations where production is transferred to (World Bank, 2019). However, this transfer of production often happens from western countries to lesser developed regions, which do not always have the most effective institutional structures to protect the environment or labor rights. Nevertheless, many of these large and global firms now agree that their efforts to achieve sustainability goals must extend beyond their organizations to their partners in other countries (Ashby, Leat, & Hudson-Smith, 2012).

A significant proportion of the suppliers that take part in the global value chains are SMEs in developing countries. The survival of SMEs is often dependent on their business with the large firms from western countries (Khan, Ponte, & Lund-Thomsen, 2020). Whereas countries that are subsumed under the umbrella term of eastern are regarded to be generally less strict in sustainability measures, and companies from those countries are more likely to emulate this approach. Consequently, various levels and types of pressures along the value chain can become key drivers for SMEs to improve their sustainability performance (Ciliberti, Pontrandolfo, & Scozzi, 2008).

Zott and Amit (2008, p. 3) define a business model as a “structural template of how a focal firm transacts with customers, partners, and vendors; that is, how it chooses to connect with factor and product markets.” Companies transform their business models and innovate to create economic, social, and environmental value (Bocken, Weissbrod, & Tennant, 2016). Sustainable business models are shown to provide a competitive success for SMEs (Matinaro, Liu, & Poesche, 2019). Despite the importance of sustainable business models, there is insufficient knowledge of companies' business model innovations during internationalization and innovation (Onetti, Zucchella, Jones, & McDougall-Covin, 2012).

SMEs’ involvement on the road to sustainable development is crucial; SMEs can, directly and indirectly, contribute to all seventeen goals of the 2030 Agenda for Sustainable Development (Sobir, 2019). To contribute to these goals, SMEs need to create sustainable products and services, innovative production methods, and business models to help them succeed in their markets (Schaltegger, & Wagner, 2011). When businesses are introducing new business models, a broad exploration of general knowledge from external sources is necessary (Snihur & Wiklund, 2019). SMEs will differ from large-sized enterprises in adopting sustainability-oriented innovations, but they will also engage in the themes of product, process, or organization innovations (Klewitz & Hansen, 2014). Thus, we hypothesize:

H1. SMEs’ sustainability-oriented innovations have a significant and positive effect on their sustainability performance.

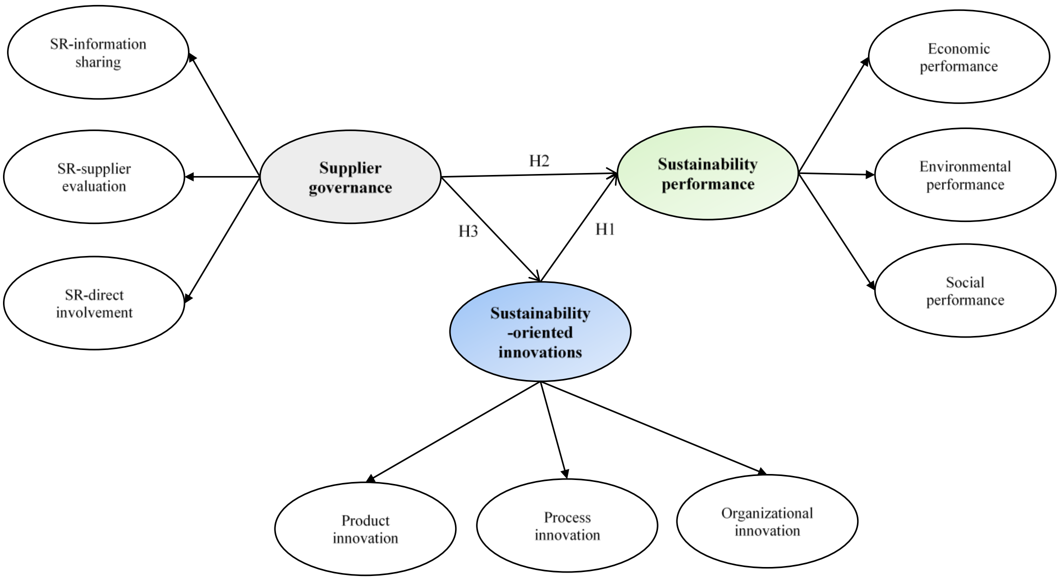
Companies integrate sustainability into their supply chain through multiple strategies. Seuring and Muller (2008) identify two strategies employed by companies in dealing with sustainability performance along the supply chain. First, they manage their suppliers for the dual goals of risk minimization and higher performance. Second, companies offer sustainable products to improve their position in the market. Gimenez and Tachizawa (2012) define buyer companies' sustainable strategies as internal and external action programs. Internal action programs include environmental and social practices created and applied inside the organization and positively affect sustainability performance. External practices consist of supplier assessment processes and collaboration with suppliers. In the literature, the three subdimensions of supplier governance are listed as information sharing, supplier evaluation, and supplier development (Wu, 2017). The incentives and penalties offered through supplier governance potentially reduce SMEs’ social and environmental risks, which in return may lead to higher sustainability performance. Thus, we hypothesize:

H2. The supplier governance activities of buying firms have a significant and positive effect on SMEs' sustainability performance.

When buyer organizations govern suppliers through assessment and collaboration processes, there is a flow of tangible (e.g., manuals on sustainable production) and intangible goods (e.g., knowledge passed through sustainability-related training) between them(Gimenez & Tachizawa, 2012). The exchange between the buyer organizers and the SMEs in human resources and education can improve the SME's knowledge and capacity to improve and apply its responsibilities (Wu, 2017). Thus, we hypothesize:

H3. The supplier governance activities of buying firms have a significant and positive effect on SMEs' sustainability-oriented innovations.

Figure 1 Research Framework



SRSD: Sustainability Related Supplier Development; SOIs: Sustainability Oriented Innovations: SP: Sustainability Performance

Figure 1. Conceptual model

To test our hypothesis, we collected data from SMEs involved in various sectors, including manufacturing of food, beverage, tobacco, wood products, pulp and paper products, machinery and equipment, electro-optical equipment, shipbuilding, aerospace, recycling sector textile, and transport equipment. The International Standard Organization (ISO) web sources showed that by the end of 2017, there were approximately 4000 companies with ISO 9001 certification in Turkey. However, about 75 percent of these companies were large enterprises. After dropping the large enterprises, we obtained an initial list of SMEs with ISO 9001 certification and used it as our sampling frame. As an initial criterion for the enterprises to be included in our study, compliance with the Turkish government's SME description, which defines micro, small, medium enterprises mainly in terms of their employee numbers, was sought (OECD et al., 2019). Out of the remaining roughly 1000 companies in our sampling frame, export-oriented manufacturing enterprises were identified.

The final sample consisted of 209 SMEs with headquarters being located in different regions of Turkey. A survey that consisted of 14 sections was administered to the SMEs. The answers to the questions were obtained from the managers who were able to provide information on SMEs' sustainability policies. These included owner-managers and top managers, export managers, HRM managers, and sustainability managers. The scales for supplier governance (20 items), sustainability performance (8 items), and sustainability-oriented innovation (11 items) were adapted from Wu (2017).

Table 1. Structural model results

Hypothesis	Beta	95% Bc CI	t value	Decision	f^2
H1: SOIs → SP	0.431***	[0.270; 0.548]	6.189	Supported	0.201
H2: SG → SP	0.055	[-0.079; 0.189]	0.805	Not supported	0.003
H3: SG → SOIs	0.379***	[0.220; 0.512]	5.035	Supported	0.167

*** $p \leq 0.001$ Bc CI: Bias corrected confidence intervals

Sustainability in global value chains is often researched from the perspective of large-sized companies that reside in western nations. Our aims in this study were to deepen our knowledge of sustainability-oriented innovations in SMEs, identify the key innovation factors in SMEs' sustainable business models and examine how the large buyer companies can best govern SMEs' sustainability performance. To analyze the data and test our hypotheses, we performed partial least squares structural equation modeling (Hair et al., 2017). Results confirm the hypothesized positive effects of *the supplier governance practices of buying firms* on SMEs' *sustainability-oriented innovations* (Table 1). Furthermore, we could confirm that *SMEs' sustainability-oriented innovations* have positive effects on their sustainability performance. Companies differ on how they embed sustainability in their business models (Bocken, Short, Rana, & Evans, 2014). Under the pressures of the buying companies, these exporting SMEs have transformed their business models and aimed to create and capture economic, social, and environmental value. The theoretical and managerial implications of the study will be discussed in light of the business model innovation literature (Carayannis, Sindakis, & Walter, 2015; Klewitz & Hansen, 2014; Schaltegger & Wagner, 2011).

Keywords

Sustainable development, sustainability-oriented innovation, supplier development, SMEs, Turkey.

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The role of business models in firm internationalization: An exploration of European electricity firms in the context of the energy transition

René Bohnsack[1] Francesca Ciulli[2,*], Ans Kolk[3]

[1]Católica Lisbon School of Business & Economics, Lisbon, Portugal; [2]Tilburg University, Tilburg, The Netherlands; [3]Amsterdam Business School, University of Amsterdam, Amsterdam, The Netherlands

*f.ciulli@tilburguniversity.edu

Abstract

We use the energy transition as empirical context to explore business models' relevance in firm internationalization. We conceptualize business model-related specific advantages (BMSAs), investigate their role in internationalization and uncover barriers to BMSA recombination in host countries. We suggest that the combination of BMSA and recombination barriers influences firms' internationalization.

Keywords

Internationalization, firm-specific advantages, location-bound/non-locationbound, business model, energy.

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Main text

INTRODUCTION

The global energy transition presents a challenge for almost all industries, but some face specific difficulties. A case in point are firms in the electricity sector: while traditionally electricity was 'generated in large power plants operating in a central location' (Alanne & Saari, 2006:p.541), and essentially included coal, gas, and nuclear power stations, the growth of electricity generation from renewables has led to a more variable and decentralized electricity system, with 'households, community groups, new energy companies, as well as utilities with new business models all becoming producer–consumer' (Smith & Raven, 2012:p.1033). Concurrently to the energy transition, electricity firms have been confronted with a gradual, albeit uneven, opening of markets and increasing cross-border competition (Kolk et al., 2014). The current stage of the energy transition is characterized by a diverse degree of internationalization among electricity firms, with 'traditional' business models co-existing with and being challenged by novel ones relying on new technologies, against the background of liberalization policies coupled with persisting national approaches (Geels et al., 2016). The business model has been mentioned in previous international business literature as key for realizing a competitive advantage across borders (e.g., Rugman & Verbeke, 2004). However, thus far, the role and potential of the business model concept in relation to firm internationalization have not been studied in detail, let alone in the context of a grand challenge such as the energy transition. We coin the concept "Business Model Specific Advantage" (BMSA) and propose that the degree to which the individual components of the business model are location-bound or non-location bound – i.e., linked to local idiosyncrasies, local knowledge, or local innovation activities – renders the entire BMSA configuration either as (more) location-bound or as (more) non-location bound. Stemming from this business model perspective our study investigates *what is the role of business models when firms internationalize?*

LITERATURE REVIEW

Location-Bound and Non-location-Bound FSAs

Stemming from a resource-based view of internalization theory, the 'Rugman school' (Narula et al., 2019) posits that successful international expansion depends on firm-specific advantages, i.e., the 'firm's unique knowledge resource-bundles in which it had invested as the foundation of survival, value creation and growth' (Verbeke & Kano, 2016:p.84). Rugman and Verbeke (2001, 2003, 2004) have distinguished non-location-bound FSAs and location-bound FSAs. Non-location-bound FSAs – such as final products, intermediate products or key routines – create value in multiple markets, and can thus be easily transferred and profitably exploited across countries (Rugman & Verbeke, 2001; Verbeke, 2009), enabling a rapid and efficient international expansion (Grøgaard et al., 2019). By being deployed in multiple markets, non-location-bound FSAs allow the firm to benefit from economies of scale and scope (Rugman & Verbeke, 2001). Location-bound FSAs – such as local knowledge, local reputation or local best practices – 'benefit the company only in a particular location' (Rugman & Verbeke, 2001:p.241).

In keeping with the compound nature of a firm's FSAs, the concept of 'FSA recombination' has been brought forward by the new internalization theory (e.g., Grøgaard et al., 2019), reflecting growing attention among IB scholars. FSA recombination indicates the need for an MNE to enhance the value of its non-location-bound FSAs by combining and 'melding' (Pitelis & Verbeke, 2007) them with location-specific assets in foreign markets (Coviello et al., 2017). While an MNE can sometimes be internationally competitive by 'simply' transferring and exploiting its non-location-bound FSAs (Verbeke & Kano, 2016), they are important but not sufficient for a successful foreign expansion to a host country in many other cases, in which access to complementary local assets is paramount (Narula et al., 2019).

Linking FSAs to Business Models

In line with the resource-based view of the firm, FSAs have traditionally been conceptualized as proprietary assets and resource characteristics that a firm needs to own in order to have a competitive advantage over other firms and thus 'engage in foreign activities' (Narula et al., 2019, p. 1234). Interestingly, several prominent IB scholars have hinted at FSAs as also encompassing the whole business model of a firm. More specifically, Rugman and Verbeke (2004:p.10) had, early on, already indicated that MNEs such as Nike and Walmart could 'outperform[..] other competitors' precisely because of their specific business model. Verbeke et al. (2018) mentioned business models in their listing of non-location-bound FSAs, while also noting a scarcity of insight into these components in IB research. Furthermore, when arguing that 'knowledge is the main FSA that MNEs seek to exploit in foreign markets', Hennart (2009:p.1437) demonstrated the use of a very broad definition of knowledge that includes 'the business models'. Despite these more generic references, attention to business models in the IB literature has been scarce. We build on the perspectives taken by Hennart, Rugman, and Verbeke et al. with the aim of shedding more light on the FSA–business model relationship, while also leveraging the strategic management literature, where the business model concept has been more extensively investigated. In linking business models to FSAs, we follow existing frameworks (Chesbrough & Rosenbloom, 2002; Demil & Lecocq, 2010; Morris et al., 2005; Osterwalder & Pigneur, 2010) and distinguish three business model components: the value proposition, the value network, and the revenue–cost model (Bohnsack et al., 2014).

On Business Model-Related Specific Advantages (BMSAs)

When linked to FSAs, the business model concept adds two core features: the higher-order configurational character and the link to external actors. First, BMSAs seem particularly pertinent when examining firms aiming to internationalize during technology-intensive changes, of which the energy transition is an example, given that the shift from fossil-fuel-based electricity generation to renewables depends on new technologies for the production, distribution, and consumption of electricity. While extant IB literature has indicated technology as a core FSA (e.g., Grøgaard et al., 2019), Massa et al. (2017:p.91) state that 'innovative technologies and ideas, per se, have no economic value, but only latent value. It is the function of the business model to realize part of that value by connecting these technologies and ideas to the realization of economic output in markets'. An MNE thus needs to combine a new technology with a suitable business model, that is, to set up a configuration of activities that create and capture value and that allow the MNE to deploy and successfully exploit the technology across borders.

With regard to the latter, the value of a business model perspective to FSAs is also tied to the integration of actors external to the focal firm that critically contribute to its international competitiveness. Value co-creation with an array of external actors within and across countries has become increasingly important for internationalizing firms, also thanks to novel technologies (Coviello et al., 2017). Networked value creation and capture is also often at the basis of FSA recombination, which entails the collaboration with external partners that own or control key location-specific assets (Narula & Verbeke, 2015; Verbeke & Kano, 2016).

As the business model perspective enables an extension of the concept of FSAs to include the whole configuration of value creation and capture, as designed by the focal firm and its stakeholders across countries, we use the concept of a BMSA to indicate a configuration of location-bound and nonlocation-bound activities that, as a whole, lead to a firm-specific advantage. For some firms, the BMSA configuration may be transferred and leveraged internationally with no or just minor adaptations if all the three business model components are nonlocation-bound. The BMSA of other firms may instead result in competitiveness only in the home country, but not internationally. In that case, in order to then ensure value creation and capture in foreign markets, the business model requires adaptation, through recombination with location-specific assets.

Figure 1 presents a framework that depicts the location-specificity of a BMSA by combining, on the vertical axis, the business model components (value proposition, value network, and the revenue–cost model) with, on the horizontal axis, the location-boundedness of the BMSA components. This framework thus allows for a reflection on the extent to which a firm's BMSA is transferable. A BMSA is highly transferable if all elements of the business models are non-locationbound, but more difficult to transfer the more elements of the business model are location-bound.

		TRANSFERABILITY	
		Location-bound	*Non-location-bound*
BUSINESS MODEL	*Value Proposition*	LB VP	NLB VP
	Value Network	LB VN	NLB VN
	Revenue-Cost Model	LB RC	NLB RC
	Σ of transferability → BMSA	**LB BMSA**	**NLB BMSA**

Figure 1: Conceptual framework for BMSA location-boundedness (the exemplary configuration represented by the dashed lines illustrates the underlying logic)

RESEARCH METHOD

In order to shed light on the role of the BMSA in firms' internationalization, we applied an exploratory qualitative approach based on a multiple-case study design (Eisenhardt, 1989; Yin, 1994). This is an appropriate method given the novelty of the topic under investigation and the adoption of a phenomenon-based research approach. Our convenience sampling approach allowed us to compile a sample of 14 firms that (1) covered all the core types of activities in the EU electricity sector (i.e. electricity production, transmission, distribution, supply, and technology provision), (2) included both incumbents and new entrants in the industry, (3) helped to understand mechanisms across actors, and (4) provided a suitable context to talk openly about strategic ambitions.

Interviews, conducted with the founders and product and/or project managers, were the core source of information. The data analysis encompassed four main stages. The first stage consisted of a deductive analysis with a focus on the business model components and their location-boundedness. The text was coded based on the business model components and their location-boundedness. The coded text was extracted and examined to find recurring patterns and differences, across cases, about the firms' BMSA location-boundedness, in keeping with Figure 1. The second stage entailed an inductive analysis (Gioia et al., 2013) about key (potential) host country-related challenges, to uncover barriers that impede firms to 'recombine' their BMSA in foreign countries. Third, we deductively analyzed the firms' internationalization by coding the data using the following codes: no internationalization, internationalization with adaptation, and internationalization with no/marginal adaptation. Fourth, we developed a framework representing, on the horizontal axis, the degree of BMSA location-boundedness and, on the vertical axis, the level of barriers to BMSA recombination. We plotted the cases in the framework based on the assessment conducted in stages one and two. We then examined the position of each case in the framework in relation to its internationalization, captured in the third stage, in order to uncover patterns across cases.

RESULTS

Location-Boundedness of BMSAs

A cross-case comparison of all firms in the sample uncovered three main groups of configurations. The first group includes firms with a high degree of location-boundedness, because two or all three business model components need to be significantly adapted and recombined to be competitive in foreign markets. It encompasses many firms active in the transmission, distribution and/or supply of electricity, as well as a technology provider. A second group, which comprises technology providers and consulting firms is characterized by low BMSA location-boundedness. They can thus transfer their BMSAs to host countries with very minor adaptations. Finally, we observed cases which are ‘in between’ the other two groups in terms of BMSA location-boundedness, as they need some degree of recombination and adaptation when entering foreign markets.

Barriers to BMSA Recombination in the Host Country

In addition to different degrees of location-boundedness, the analysis of the cases also revealed various barriers in the host country that may complicate recombination of firms’ BMSA with local assets. The barriers to BMSA recombination in foreign countries are factors, inherent to the host countries, which hinder the bundling and ‘melding’ (Pitelis & Verbeke, 2007) of the firms’ BMSA with local assets. These barriers either prevent the focal firms from accessing complementary assets present in the foreign market or they obstruct the existence of location-specific assets altogether. Three main kinds of recombination barriers emerged from our data: regulatory, infrastructural, and market barriers.

BMSAs and Internationalization

Our analysis shows that the BMSA and barriers to BMSA recombination have an influence on the internationalization of the cases. The combination of BMSA transferability and recombination barriers creates four options for the success potential of internationalization (see Figure 2).

		BMSA LOCATION-BOUNDEDNESS	
		Low	*High*
HOST-COUNTRY RECOMBINATION BARRIERS	*High*	1	2
	Low	3	4

Figure 2: A framework of BMSA location-boundedness and recombination barriers

In the best case a business model and all its components are transferable and can also be easily integrated in the context of a host country (e.g. a situation without regulatory barriers, similar market designs and no logistical challenges): this would result in a position in cell 3 in the matrix. The findings suggest that firms embedded in the new energy system, which is triggered by the energy transition and characterized by decentralization and smart technologies, are more likely to be positioned in cell 3. These companies are more likely to benefit from low costs of adaptation of the value proposition and network to local market needs. In such situations, limited impediments to BMSA recombination, coupled with low adaptation costs, will encourage a firm to engage in a wide internationalization. Instead, if part of the business model is not easily transferable, i.e. location-bound (e.g. culturally-specific value propositions or value networks entrenched with local infrastructures) and the barriers to recombination in multiple foreign countries are high (e.g. the necessary infrastructure is absent or the sector consists of a monopoly), then the firm moves further to cell 2 in the matrix and will have a hard time to internationalize. Firms that have a business model that is attached to the 'old', centralized energy system face higher costs and challenges to internationalize, and they are thus more likely to be positioned in cell 2.

DISCUSSION AND CONCLUSION

Building on the findings of our qualitative study, we contend that the degree of BMSA location-boundedness, together with the level of barriers to BMSA recombination, have three important implications for a firm's internationalization process.

First, the BMSA concept, by integrating the whole configuration of value creation and capture of a firm, proposes a systemic view of its competitive advantage. By showing that the degree of BMSAs' location-boundedness depends on the transferability of the three interrelated core business model components, which varies across firms, we uncover the complexity of the configuration that a firm has to take into account when deciding whether and how to internationalize.

Second, our study highlights that – in addition to the degree of BMSA recombination that is required – internationalization is affected by the extent to which this BMSA recombination is actually possible. Our findings indicate that firms often face barriers to BMSA recombination in a foreign market that hamper the creation of 'the right [BMSA] mix' (Narula & Verbeke, 2015; Rugman et al., 2011). This corroborates and expands the conceptual work of Hennart (2009), who pointed to hurdles tied to the accessibility of complementary local assets in the host country.

Third, building on the two dimensions outlined above, we proposed a framework that encompasses both dimensions and plotted the cases in the framework in order to uncover implications for firms' internationalization. We conceptualize the horizontal dimension as a continuum, where BMSA location-boundedness is high if, in order to rely on the BMSA in a foreign market, substantial changes are necessary across all business model components (and low when just minor adaptations are required). Likewise, BMSA recombination barriers in the host country can also be seen as a continuum. The level of BMSA recombination barriers is high when firms face multiple barriers that are difficult to overcome. They are, instead, low when local assets are easily accessible, making BMSA recombination viable with negligible or no hurdles. By relating the cases' positions in the framework to their internationalization, we advance internationalization theory, because we propose that firms' internationalization decisions are affected, concurrently, by the extent to which the BMSA is location-bound and by the severity of the barriers to BMSA recombination in foreign markets.

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Internationalization of Digital-platform Firms: A Business-model-change Perspective

Tamara Galkina[1],*, Irina Atkova[2], Peter Gabrielsson[1]

[1]University of Vaasa, Finland; [2]University of Oulu, Finland

* tamara.galkina@uva.fi

Abstract

Little is known how business models (BMs) are adapted to internationalization. The complexity of internationalization decisions is especially relevant for internationalizing digital-platform firms as the change of their BMs occurs in not only physical geographical space but also in digital on-line space. This article aims to study internationalization of digital-platform firms through examining the changes in their BMs along this process. We examine seven digital-platform firms from Finland and look how their BMs change during the expansion to foreign markets in terms of locus, focus and modus. Our findings suggest that physical dimension is still very relevant for them; moreover, activities in physical space can reinforce and enact activities in on-line space. We also suggest that the focus part of their BMs does not change much, whereas the changes predominantly occur in the modus part. We derive a model of BM change of internationalizing digital-platform firms and suggest implications for both international business and BM research.

Keywords

business models; internationalization; digital-platform firms; Finland

Track 3.1.

Assessing and Managing the Sustainability Performance of Business Models

Track 3.1. Assessing and Managing the Sustainability Performance of Business Models

Track chairs: Florian Lüdeke-Freund[1], Romana Rauter[2]
[1]ESCP Business School, Germany; [2]University of Graz, Austria

Whether and how new business models effectively support sustainable development and societal wellbeing, particularly the UN SDGs in a Decade of Action, is not just a matter of business model design, but also of the measurability and manageability of the performance and impacts of organisations' business models on different levels. While the interrelations between organisations' sustainability performance and their business models have been mainly discussed in theoretical and conceptual terms so far, we lack evidence of the actual effectiveness of sustainable business models as concerns their design, their management as well as their performance and impact respectively. This lack of evidence has its roots in a critical research gap: How to effectively assess and manage the sustainability performance of business models?

Concepts, frameworks, and practical tools for this purpose are more or less completely missing. Hence, the assessment and management of the sustainability performance of business models is a critical, yet hardly studied gap in both research and practice. Being able to assess and manage the sustainability performance of business models requires considering various levels simultaneously (incl. business model, stakeholder network and wider ecological and social systems) (e.g., Biloslavo et al., 2018) as well as tools and metrics found in fields such as sustainability accounting, life cycle assessment, or reporting (e.g., Kurucz et al., 2017, Lüdeke-Freund et al., 2017; Rauter et al., 2019).

Therefore, this track invites theoretical, conceptual, and empirical papers that integrate the notions of business model and sustainability performance assessment and management in new, unconventional, and convincing ways.

The following questions can be addressed by papers submitted to this track:

- Which frameworks, for example from sustainability accounting or integrated reporting, can be applied to effectively assess and manage the impacts of business models?
- Which best practices, in terms of organisations, business model patterns, and management accounting tools do we currently see in practice?
- Which synergies or conflicts with existing tools and systems could occur if new metrics are put into place?
- How to use sustainability accounting and/or impact assessments to test hypotheses about the 'sustainability consequences' of business models in terms of performance, value creation, and impacts?

- How to account for different sustainable business model designs, for example considering different business model patterns and/or different stages in the life cycle of a sustainable business model?
- How can the actual lack of 'truly sustainable' business models be explained from a critical perspective – what are themes of a critical discourse on business models and sustainability performance?
- How can it be avoided that sustainability accounting or integrated reporting is being (primarily) used for 'business model greenwashing'?
- To whom would companies report the impact of sustainable business models being in place?

Further topics are welcome.

This track is linked to a call for papers for a special issue in Journal of Cleaner Production. Further details can be found here.

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Assessing and Managing Sustainable Business Models

A Status Update

Florian Lüdeke-Freund[1,*,+], Krzysztof Dembek[2], Francesco Rosati[3], Romana Rauter[4], Stefan Schaltegger[5], Klaus Fichter[6]

[1]ESCP Business School, Berlin, Germany; [2]Swinburne University of Technology, Melbourne, Australia; [3]Technical University of Denmark (DTU), Lyngby, Denmark; [4] University of Graz, Austria; [5]Centre for Sustainability Management (CSM), Leuphana University, Lüneburg, Germany; [6]Carl von Ossietzky University, Oldenburg, Germany

*fluedeke-freund@escp.eu

[+]This submission is an update to the paper presented at NBM 2020, based on the feedback received during NBM 2020 and thereafter.

Assessing and managing the sustainability performance of business models requires a clear delineation of the unit of analysis ('the business model'), as well as frameworks, methods, and tools that are able to grasp this unit of analysis and its performance, created value, and impacts in relevant and useful terms (e.g., environmental performance, value created, social impact) (Lüdeke-Freund et al. 2017; Rauter et al. 2019). The emerging field of research and practice on sustainable business models shows an obvious bias towards the innovation and development side of business models (Breuer et al. 2018; França et al. 2017; Geissdoerfer et al. 2018; Press et al. 2020), but lacks sufficiently developed approaches on the assessment and management sides of it (Lüdeke-Freund et al. 2017; Schaltegger, Hansen and Lüdeke-Freund 2016). This bias is per se not a problem as knowing how to develop SBMs is a key capability needed for sustainable business and market transformations. But as a consequence, fundamental terms such as performance, value, or impact are neither clearly defined in this field of research, nor are they related to the notion of business model in any meaningful way.

This may also be due to several interrelated and overlapping issues in defining and conceptualizing sustainable business models (SBMs). The breadth and inclusiveness of the SBM concept is beneficial when it comes to 'thinking big' and dealing with the 'big picture' of business and its relationships to the natural environment and society (Upward & Jones 2016). But this breadth and inclusiveness turns into a fundamental problem when it comes to assessing and managing distinct qualities of business models (as indicated by the notion of 'sustainable' business model) or the impacts they are supposed to have on the natural environment and society (as in business models 'for sustainability'). What do we (not) know about the assessment and corresponding management of the sustainability qualities and impact of business models? What do we need to know? Which theories and scientific methods will allow us to develop the required knowledge?

The current SBM literature shows a broad variety of topics that are emerging – but research on the assessment and corresponding management of the sustainability qualities and performance of business models is still a critical gap. In particular, we are missing methods, frameworks, and tools that allow, for example, comparing different business models and their sustainability effects. This, in turn, requires qualifying and quantifying the ecological, social, and economic performance, value creation, and impacts of different business models in practice. As long as we cannot qualify and, where appropriate, quantify these effects, the notion of SBM remains purely hypothetical.

Based on a pre-review of existing SBM literature reviews and publications that address SBM assessment and management issues, an initial framework was developed to define the scope of the topic (Figure 1) as well as key terms for a literature review. In the next step (still to be done), an extensive literature database will be used to review the status quo of the elements of the initial guiding framework. The literature search has already been completed and led to around 200 journal articles which serve as a database for the proposed research. It is expected that the review will lead to further iterations of the framework and will finally allow deriving conclusions for a new research agenda. This paper is meant to identify those works that already deal with the issues indicated by our initial framework and, by critically discussing the status quo and remaining gaps, to define a research agenda that motivates collective and various efforts contributing to closing this gap. In our view, this research gap and associated research challenges result, inter alia, from the following issues:

- Traditional and sustainability-oriented business model concepts have been defined in various ways, from various theoretical perspectives, for example taking a stakeholder, activity, building block, or value flow perspective. Which perspectives are most suitable to provide the ground for SBM assessment and management approaches?

- Resulting from this, various boundary setting and scoping issues emerge that directly translate into assessment and management problems. How to define the boundaries of a SBM and how to assign certain environmental or social impacts to it? How to define the scope or reach of a SBM, and hence corresponding notions of responsibility, accountability, and governance – based on a value chain perspective, by distinguishing direct/owned and indirect/others' value-creating activities, or by some other scoping approaches? What can we learn from established disciplines such as sustainability reporting?

- While most frameworks suggest locating business models on the organisational level, value-creating activities and their impacts occur on multiple levels at the same time, from individual to global, from nano to macro. This is typically acknowledged in SBM research. But we still lack crucial insights, such as what kinds of sustainability impact do result from SBMs? On which levels does this impact unfold? How to make use of the available suite of sustainability assessment methods, ranging from individual to planetary levels?
- The latter point is amplified by the circumstance that various stakeholders have an interest in SBMs (Freudenreich et al. 2020), hence, various users of sustainability assessment approaches and impacted groups must be considered. Which approaches are suitable for which group? For example, consumers (to support better consumption choices), companies (to support their business, product, and market development), external bodies and regulating institutions overseeing and guiding companies' duties and performance (to provide sustainable value-creating incentives), and many more?
- Taking a systems and sustainability perspective requires dealing with various potential units of analysis – at the same time: business model, activity, performance, output, outcome, impact, value-added, etc. Which concepts and corresponding terminology are needed to develop sustainability assessment and management approaches for business models – which are already defined in a useful way?

The sustainability assessment and management of business models is a critical topic. Business models are said to be the core of organisational value creation, however SBMs have a fundamental function in terms of creating value in different forms and for other stakeholders, not only the organisation. The aforementioned issues may explain why comprehensive research approaches tackling SBM assessment and management are still rare (Lüdeke-Freund et al. 2017; Schaltegger, Hansen and Lüdeke-Freund 2016) and only slowly emerging in related domains such as sustainable start-ups (DIN, 2020; Trautwein, 2021). With this paper, we aim to structure this critical research gap and to motivate future research contributing to closing it.

The major issues to be dealt with in a future full paper are summarised in the guiding framework shown in Figure 1. This framework is used as a guide to structure the identified research gap. It is not a SBM assessment and management framework.

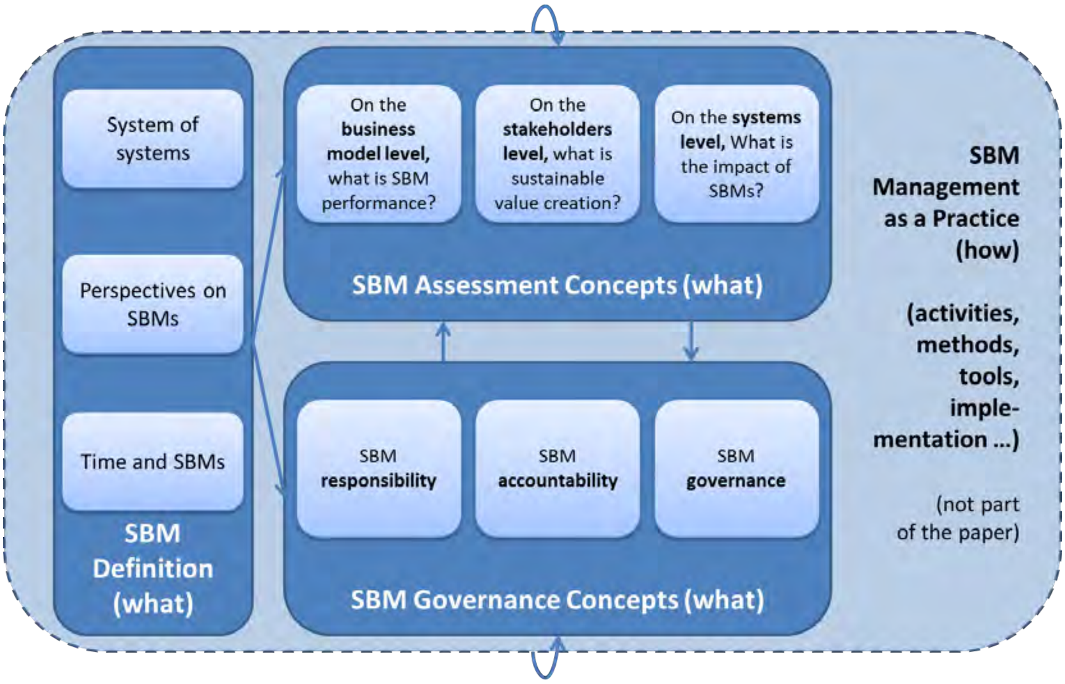

Figure 1. Framework guiding the development of a research agenda for SBM assessment and management.

From left to right, the following three major areas need some more elaboration and will be discussed in this paper: How are SBMs defined theoretically and conceptually – what is the scope of an SBM? How can sustainability assessment be operationalised – how to capture the scope of an SBM? Here, different levels and different sustainability effects must be considered – performance on the SBM level, sustainable value creation in relation to the stakeholders of an SBM, and impacts on the systems level. Finally, what does the scope and assessment of SBMs imply for managing business with regards to its responsibility, accountability, and governance of sustainability issues?

The presentation at NBM 2021 will focus on an overview of the main concepts contained in the proposed framework, their individual status quo, as well as their relationships as discussed in the current SBM literature. We will present the latest updates on these currently ongoing debates and sketch a potential research agenda on assessing and managing sustainable business models.

Keywords

Sustainable business model, sustainability impact, sustainability assessment, sustainable value creation, stakeholder, framework, method, tool, review, research agenda

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Assessing the Sustainability Performance of Entities

A review and classification of tools, methods, and approaches

Morris D. Fedeli[1,*], Martin Glinik[2]

[1]University of Southern Queensland, Brisbane, Australia

[2]Graz University of Technology, Graz, Austria

[*]morris@fedeli.nu

There is a plethora of approaches to sustainability performance measurement that have emerged over the preceding decades (Maltz et al., 2016; Nicolăescu et al., 2015). In the search for effective ways to increase countries, cities, companies and individual's contribution to sustainable development, the concept of sustainable performance measurement has emerged as a promising approach. This raises the question of how "*performance*" is to be measured, assessed, and hence managed from a sustainability-oriented perspective and what assessment criteria need to be applied to enable decision makers to steer their entity in the intended direction in a purposeful way (Schaltegger & Wagner, 2006).

Previous research has focused on the identification of the current (unsustainable) status quo, but both scholars and practitioners continue to have a need to appropriately capture the different sustainability effects or strategies of corporate activities, governments as well as individual consumers (Breuer et al., 2018; Foss & Saebi, 2016; Geissdoerfer et al., 2018; Lüdeke-Freund et al., 2015; Morioka & de Carvalho, 2016).

Research on sustainability performance in different contexts is becoming increasingly important, leading to the development of numerous concepts, methods, and tools with increasing difficulty in tracking progress and structuring existing knowledge (Myllyviita, Antikainen & Leskinen, 2017; Poveda & Lipsett, 2011).

Indeed, many researchers characterize the broader sustainability assessment literature as potentially confusing and difficult to navigate and criticize the usage of different terminologies and sustainability assessment methods (Hacking & Guthrie, 2008), making it considerably more difficult to standardize sustainability assessment methods to enable the comparison of the measured sustainability performance.

The applicability of existing sustainability assessment methods is as much diverse as numerous (Pope et al., 2017). In attempting to structure the various ramifications in the literature, reviews of specific indicator systems have emerged that facilitate the assessment of corporate sustainability performance (Labuschagne, Brent & Erck, 2005); and/or link business models to corporate performance and competitive advantage (Breiby & Wanberg 2011; Boons & Lüdeke-Freund 2013; Kiron et al. 2017; Pansera & Randles 2013; Prasad & Junni 2017; Varadarajan 2017). For example, no standard assessment method for corporate sustainability has yet become the standard in academia or practice (Montiel & Delgado-Ceballos, 2014). Still lacking is a systematic analysis of the applicability of pre-existing sustainability assessment methods on an entity level basis. In this study, we undertake, a diligent and rigorous analysis of the most appropriate methods based on an assessment against predefined objective criteria to bridge this gap.

From an examination of 856 documents, including 291 Q1 journals, 22 approaches have been uncovered and examined. The identified characteristics were ultimately consolidated into 14 criteria and tabulated, highlighting areas of difference and similarities. The outcome was derived by refinement through successive rounds of reviews by three independent experts. A summary of some of the approaches examined are found in ***Appendix A***.

These criteria were best illuminated as the result of a comprehensive review of the extant literature in the fields of industrial ecology, business model innovation, sustainability metrics, and informed by the natural and social sciences (Persson et al., 2018b). The criteria sought in this study advocate for harmonization and thus a consolidation of the field under review. Following successive iterations and refinements, fourteen criteria were identified, as described in ***Table 6.*** In developing such criteria, a broad multi-level entity perspective approach was adopted encapsulating the performance of entities from the nano to the macro scale. The entity levels are Creature, Company, Community, City, Country, Continent, and Cosmos (Assailing the Seven 7Cs, THRIVE Project Framework and Platform, 2021) as depicted in ***Figure 1***. Thus, when evaluating the performance of an entity, it is in respect to its associated scale-linked level, whereby each level is completely usurped by the one above it. This hierarchical structure enforces a strongly sustainable approach (Upward & Jones 2015), thereby ensuring meaningful context-based impact measurement and assessment.

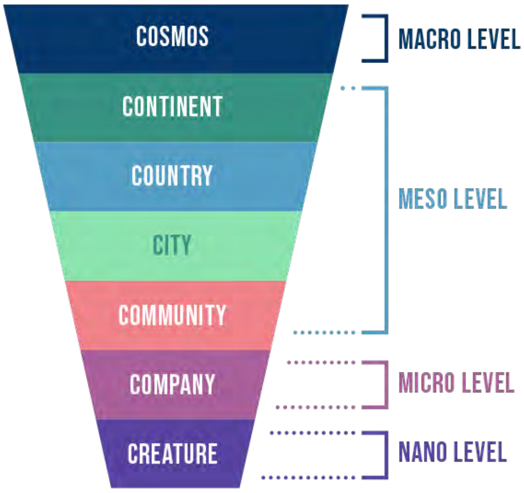

Figure 11. Assailing the 7Cs.

The first criteria #1, identifies the type of provider being examined. Worth noting is that criteria #2, #3 and #4 are necessary in order to replicate the findings. Criteria #5 considers whether the approach is multi-level, with criteria #6 directly addressing whether the entity model (such as the business model) is fully described by the assessment methodology. Next, #7 and #8 considers the entity and level at which it operates as depicted in the 7Cs. Importantly, #9 looks at whether the impacts are measured within the context of the eco-system within which the entity operates. Criteria #10 specifies if a score is arrived at, and #11 defines if it is of a quantitative or qualitative nature. Criteria #12 details whether the scoring method uses a single material topic or several and whether they are across all three pillars of sustainability. On this latter point, criteria #13 specifies if there is an alignment with a particular established standard, with #14 indicating if the result is in the form of a static report or an interactive tool.

The aim of this study is to extensively examine and tabulate several of the various approaches that have emerged over the last fifteen years across identified significant criteria with a view to provide a basis for ostensibly linking sustainability performance to business models, or more generically entity model innovation strategies. A promising initial step in this context is provided by Lüdeke-Freund et al. (2017) who propose a basic framework for the assessment of sustainability-oriented business models (SUST-BMA) and created a conceptual foundation. This field of research has hereby been identified as sustainable business innovation strategy (SBIS). Building upon this foundation together with the 7Cs, this study goes one step further and highlights how the entity model concept (e.g. business model, sector model, governance model) can be applied at several levels and indeed is a requisite for assessing the strong sustainability performance of entities.

#	Criteria	Description
1	Type of provider (Platform/Framework/Method/Data)	This criterion specifies if the approach under review is a platform tool, an underlying framework which brings together disparate methods, purely a

		method or simply a place to find data regarding entity (e.g. business, sector, governance) model assessment such as a report.
2	Explicit Data Sources (Yes/No)	This criterion states whether the approach under consideration explicitly reveals the source of the dataset used in their evaluation.
3	Public Data (Yes/No)	This criterion specifies whether the dataset in use is publicly available or otherwise.
4	Explicitly Public Methodology (Yes/No)	This criterion specifies whether the methodology is made explicit in detail, to the extent that the findings could be replicated.
5	Multi Entity Levels (Yes /No)	This criterion identifies whethere the approach is applicable at more than one entity level. For details of the level in question adopted, please refer to point #8.
6	Includes Entity Model (Yes/No)	This criteria specifies in the associated entity model is deemed as explicitely identified in the approach. For example at the enterprise level this could be the business model, at the city level it may be the governance model.
7	Perspective	This criteria identifies the perspective by which the assessment is being made, i.e. consumer, corporate, stakeholder, investor, governance, or society.
8	Entity Level (7Cs)	This criteria is based on the "Assailing the seven Cs" study which categorizes impacts along a continuum spanning seven levels from the nano to the macro scale. Further explanation found in this article.
9	Context-based metrics (Yes/ No)	This criteria informs whether impacts are assessed relative to norms or are used as simple numerators without being applied with respect to the context within these impacts occur.
10	Determines Impact or Sustainability (Yes/No)	This criteria specifies if a score is derived or actually determined from the assesssment.
11	Score type (Qualitative, Quantitative)	This criteria indicates if the score is of a qualitative or quantitative nature.
12	Single or Multi Topic /Multi-capital /Triple-bottom-line (Yes/No)	This criteria identifies is the scoring methodology is across a single topic, mulyiple topics or indeed, as a matter of intent, across the three pillars of sustainability.
13	Topic Alignment	This criteria indicates if the assessment method is self-defined or follows a known set standard such as GRI, SDG or B Corp etc.

14	Output (Report/Platform)	This criteria indicates if the output of the assessment is in the form of a static report or as an interactive database-driven platform or tool.

TABLE 6. LIST OF CRITERIA WITH EXPLANATIONS EVALUATED IN THIS STUDY.

The comprehensive review of the literature highlights a diversity of terminology in use across the disciplines associated with this study. While parts of the scientific community associate's sustainability assessment mainly on a policy-, project-, or program-level (Bond, Morrison-Saunders & Pope, 2012; Bond & Morrison-Saunders, 2011; Pope et al., 2017), other researchers use the term sustainability assessment in a broader context, and understand organization- and product-related assessment methods as forms of sustainability assessment (Angelakoglou & Gaidajis, 2015; Ness et al., 2007; Singh et al., 2012).

Thus, adopting a qualitative content analysis of the literature (Gläser & Laudel, 2010; Mayring, 2015) and supporting documents from several previous studies, we find a most useful approach to yielding baseline know-how, illuminating several insights for future research directions. Each approach listed in ***Table 6*** has its supporters and detractors. Numerous "yardsticks" have been proposed over time, each with its unique appeal. In this study, we provide a compendium of the most promising assessment methods, and contend that integration offers a promising way forward, through the creation of a universal framework which bridges the gap between these "*standards*". Instead of proposing, yet again, another yardstick, if one can identify the key features of and harmonize between the various approaches, this would yield the basis for creating a universal uniform standardized approach.

Thus, in this study, identified criteria are tabulated, reviewed, re-assessed, re-organized, and retabulated based on a succession of peer-reviewed rounds with industry experts and academics (Day & Bobeva, 2005). Whilst complete reconciliation of expert feedback is unlikely, the tabulated results serve to inform future research. This lays the foundations for consolidating and developing a set of key factors suitable for building universal tools, methods and approaches to sustainable business innovation strategies.

Against this background, this work aims to present practicable approaches and requirements to assess the sustainability performance on an entity level basis, and thus actively assist entities to manage the sustainable impact of the respective entities as they transform towards becoming more sustainable (Fedeli, 2019). Thus, we offer the potential for the design of a universal standard for a group of solutions aimed at sustainable model innovation strategies (Gholami, 2016; Wahl & Baxter, 2008).

Significant identified criteria, as supported by the literature, include transparency (Lydenberg & Rogers, 2010), evidence-based (Persson et al., 2018a), measurements linked to practical knowledge (Lang et al., 2012), mass adoption (e.g.: Sustainable Development

Goals) (Eccles et al. 2012), consolidated standard (Williams et al., 2017), context-based (Haffar & Searcy, 2018), and perspective (Abdelkafi & Täuscher, 2015; Evans et al., 2017; Holmberg, Andersson & Erdemir, 2012; Schaltegger et al., 2017), to name a few. The contribution of this work is two-fold: First, based on a review of extant literature, we provide an analysis of existing methods, tools and approaches to sustainability performance measurement. Secondly, it investigated how these existing methods, tools and approaches to sustainability performance measurement may be identified and structured using 14 different criteria, which are potentially applicable on several entity levels (Beckett, 2016).

Further contribution to this research includes refinement of the criteria shown in the table in ***Appendix A***, based on the corresponding entity-level paradigm. This table summarizes the discovery of the characteristics of the various methods, tools and approaches, thereby forming the basis for consolidation and development of uniform methods, frameworks, and tools for implementing sustainable model innovation strategies across each of the scale-linked levels.

Keywords

Sustainability performance measurement, sustainable business model, sustainable model innovation, entity model assessment, scale-linked

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APPENDIX A

The following table illustrates the 14 criteria illuminated by the literature and used as the basis of comparison between the approaches indicated in the left-hand column. Six approaches are summarized here, with full details available in the complete study.

	Type of provider	Explicit Data Sources (Yes/No)	Public Data (Yes/No)	Explicitly Public Methodology (Yes/No)	Multi Entity Levels (Yes /No)	Includes Entity Model (Yes/No)	Perspective	Entity Level (7Cs)	Context -based (Yes/ No)	Determines Impact or Sustainability (Yes/No)	Score type	Single or Multi Topic / Multi-capital / TBL	Topic Alignment	Output
Corporate Knights	Platform	No	Yes	No	No	No	Corporate	Company	Yes	Yes	Quantitative	Multi Topic	Standard	Report
GRI Reports	Framework	Yes	Yes	No	Yes	Yes	Corporate, Investors, Governance, Society Stakeholder	Company	Yes	Yes	Quantitative	Multi Topic	Disclosure	Tool
IIRC <IR>	Framework	No	Yes	No	No	Yes	Corporate	Company	No	Yes	Qualitative	Multi Topic	Standard	Tool
SASB	Framework	Yes	Yes	No	Yes	Yes	Corporate, Investors	Company	Yes	Yes	Quantitative	Multi Topic	Disclosure	Tool
SDGs	Platform	No	Yes	Yes	No	No	Consumer, Corporate, Stakeholder, Governance, Society	Company, Country	Yes	Yes	Quantitative	TBL	Standard	Report
THRIVE Platform	Platform	Yes	Yes	Yes	Yes	Yes	Consumer, Corporate, Stakeholder, Governance, Society	Creature, Company, Community, City, Country, Continent, Cosmos	Yes	Yes	Quantitative	Multi Topic	Standard AND Self-defined	Platform

Figure 12. Illustrative Consolidated Comparison Table between approaches to sustainable business innovation strategies.

Sustainability Performance of Business Model:

The Stakeholder Value Map

Nadia Preghenella[1,*], Cinzia Battistella[2], Francesco Lagonigro[3]

[1]Department of Management and Engineering, University of Padova; [2] Polytechnic Department of Engineering and Architecture, University of Udine; [3] Hidra srl sb

*nadia.preghenella@phd.unipd.it

Summary

The study explores how companies assess their business model to achieve enhanced sustainability, focusing on tools that assist companies to measure sustainability performance of their business models. In line with the previous literature on sustainability performance, a new tool is proposed and it is based on the steps of a sustainability performance validation process, namely: definition of the unit of analysis; identification of the relevant sustainability aspects; assessment of the business model performance.

The result of the research is a proposal of the “Stakeholder Value Map” with the following functionalities: 1) analysis of a business model; 2) identification or insertion of sustainability aspects within each of the components of the business model; 3) measurement of the sustainability performance of each of the components of the business model; 4) consequent assessment of the performance of the business model at system level with regard to the most relevant sustainability aspects.

The Stakeholder Value Map is tested through six business case studies belonging to a wide range of industry sectors and with different levels of integration of sustainability aspects within their business model. The tool is finally refined using data collected through semi-structured interviews aimed to evaluate perceived usefulness and easiness to use the tool.

The research aims at contributing to the knowledge on sustainability performance measurement of the business model by creating a solution that could be adopted by companies. The creation of a tool for the assessment of business models could support both researchers and companies in measuring sustainability.

When speaking on business strategy performance assessment, the Balanced Scorecard (Kaplan & Norton, 1992, 1996) is one of the most consolidated concept. To such a point that even the literature on corporate sustainability has widely used it as a tool for sustainability performance measurement, coming to define the Sustainability Balanced Scorecard (Figge et al., 2002; Hansen & Schaltegger, 2016; Searcy, 2012). However, very few authors have explored the use of the Balanced Scorecard to assess the sustainability performance of a business model (Lüdeke-Freund et al., 2017). To the best of our knowledge, a tool for assessing the sustainability performance of a business model is not present in the literature. Yet, how the sustainable business model can contribute to the sustainable development goals should be measurable and quantifiable (Lüdeke-Freund et al., 2017).

This study investigates how companies might assess and evaluate their business model to achieve enhanced sustainability. The aim is to explore what new tools could be developed to support companies to measure sustainability performance of their business models. Therefore, we started from the idea to apply the Balanced Scorecard as a tool for measuring the sustainability performance of a business model. Some studies have already raised the relationship between the two tools (Osterwalder, 2004; Schallmo, 2014; Upward, 2013), beginning from the presumption that Osterwalder (2004) conceptualized the business model ontology starting from the tool created by Kaplan and Norton (1992). Particularly, the work of Lüdeke-Freund et al. (2017) deepens at the most the link between the business model and the Balanced Scorecard. The authors define a conceptual framework as well as an analysis process to follow in order to measure the sustainability performance of a business model.

To address our research question, we developed and tested a new assessment tool the "Stakeholder Value Map" that is functional and easily applicable by companies. To create the Stakeholder Value Map, we decided to follow the research methodology based on the engineering design process as suggested by Calabrese et al. (2018) in their study for the development of a sustainability-oriented service innovation tool. The engineering design process (Dym and Little, 1999) is a procedure for creating innovative solutions to different problems or needs. The procedure is divided into the following steps: 1) needs phase or problem definition, 2) conceptual design, 3) embodiment, 4) detailed design, 5) practical illustration or prototyping. These steps depict the theoretical sequence to be followed to convert a problem or need into an artifact for providing a solution to the starting problem or need (Calabrese, Forte & Ghiron, 2018).

To address the needs phase or problem definition, a systematic literature review was conducted according to methodological instructions by Jesson et al. (2011). The attention was driven to sustainability performance measurement, tool and metrics for the specific business model assessment and the specific application of the Balanced Scorecard to business models and system level theory. Particularly, we explored the limitations of existing approaches.

Concerning the conceptual design, the Stakeholder Value Map combines the concepts of Sustainability Balanced Scorecard and business model. Starting from the procedure of previous framework (Lüdeke-Freund et al., 2017), the Stakeholder Value Map works by following the steps listed below:

1. The definition of the unit of analysis that is a particular business model under consideration;
2. The identification of the so-called "hot spots". With "hot spots" the authors mean the most relevant sustainability aspects within the company business model;
3. The identification of suitable sustainability key performance indicators for each of the components of the business model;
4. The assessment of the business model performance with regard to the "hotspot".

The next phase is the embodiment and the detailed design. While Ludeke et al. (2017) develop the framework as a parallel combination of Sustainability Balanced Scorecard and business model, we propose a tool consisting of two dimensions of analysis: 1) Sustainability Balanced Scorecard and 2) business model. As a result, we want to obtain a sort of fitting matrix that uses the Balanced Scorecard as a system for assessing the sustainability of each of the components of the business model and then for the business model as a whole.

To provide a prototype of the Stakeholder Value Map, a test phase will be carried out. As suggested by Bocken et al. (2013) workshops will be conducted to develop, test and improve the proposed tool. The objectives of the workshops will be: 1) to test the effectiveness of the tool, 2) to explore opportunities to refine the tool, and 3) to explore facilitation methods to best use the tool.

We will select six business case studies belonging to a wide range of industry sectors, of different sizes and with different levels of integration of sustainability aspects within their business model. At the end of the workshops, data will be collected from the participants through semi-structured interviews aimed to evaluate perceived usefulness and help refine the assessment tool and the facilitation process for using it.

The result of our research is an assessment tool that can allow companies to evaluate their business model in terms of sustainability. The functionalities of the assessment tool can be summarized in:

1. design, definition and analysis of a business model;
2. insertion or identification of sustainability aspects within each of the components of the business model;
3. measurement of the sustainability performance of each of the components of the business model;
4. consequent assessment of the performance of the business model at system level with regard to the most relevant sustainability aspects.

The research aims at contributing to the knowledge on sustainability performance measurement of the business model by creating a solution that could be adopted by companies. Coherently with the aim of the study, the creation of a tool for the assessment of business models could support both researchers and companies in measuring sustainability. From the academic point of view, the research attempts to reduce the knowledge gap on sustainability performance of business models. From the managerial point of view, the research proposes a tested assessment tool that could be adopted in real corporate environments. Future studies may look at furtherly implementing and improving the proposed tool through both quantitative and qualitative methods, in order to strengthen the solution for assessing sustainability performance of business models in companies.

Keywords

Sustainability performance, business model assessment, sustainability balanced scorecard, sustainability assessment tool, sustainability reporting.

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Design Principles For Sustainability Assessments In The Sustainable Business Model Innovation Process

Rishi Bhatnagar*, Duygu Keskin, Arjan Kirkels, Sjoerd Romme, Boukje Huijben

Eindhoven University of Technology, Netherlands

* r.bhatnagar@tue.nl

Abstract

Assessing business models' sustainability performance has become necessary to help organizations transition towards sustainability and circular economy. Organizations face multiple challenges in developing sustainable business models during the sustainable business model innovation (SBMI) process. Many of these challenges can be solved by assessing the sustainability performance of the various business model designs. Scholars have employed various approaches to develop sustainability assessment tools and processes that fit different organizational needs in the SBMI process. This paper contributes to this organizational process by analyzing the existing sustainability assessment frameworks for business models and synthesizing the lessons from these into a set of design principles for supporting future assessments of business models. The proposed design principles act as guidelines to help organizations integrate sustainability assessments into their sustainable business model innovation (SBMI) process. For the methodology, the paper utilises a systematic literature review for selecting the sustainability assessment frameworks present in literature and CIMO-logic from design science for analyzing the selected assessment frameworks. The paper discusses the heterogeneity observed in the various frameworks' approaches and the wide range of functions the assessment frameworks fulfil within the SBMI process. These insights help understand how best to design sustainability assessments to support the SBMI process. The paper concludes by presenting a research agenda with identified avenues for future research to integrate sustainability assessments in the SBMI process.

Keywords

sustainability assessment, sustainable business models, sustainable business model innovation, design principles, CIMO logic

Identifying Leverage Points for "Truly Sustainable" Business Models: Current Efforts and Future Directions

Kristin Svärd[1,*]

[1]Center for Service Research (CTF), Karlstad Business School, Karlstad University

*Kristin.svard@kau.se

There is a growing interest in the quest of making business more sustainable, taking both social and ecological boundaries into consideration. As a result, sustainable business models (SBM) emerged. A SBM can be defined as depicting how a firm creates and delivers a value proposition while capturing economic value in a sustainable manner, which entails either significantly reducing negative effects or creating positive effects for the environment and society (Schaltegger et al., 2016; Lüdeke-Freund et al., 2018). However, it remains unclear to what extent the current efforts are successful in achieving "truly sustainable" business model (BM), or whether they are merely reducing unsustainability. To fully understand the ramifications of business activity and what changes are needed to achieve sustainability, a systemic perspective is necessary (Bidmon and Knab, 2018; Fehrer and Wieland, 2020). Hence, this paper draws on the concept of leverage points originally developed by Meadows (1999), to identify the most effectual place to intervene in a system for a sustainability transition. A problematizing approach has been used, where key texts on SBM have been identified and reviewed based on a number of selection criteria (Alvesson and Sandberg, 2011). Thereafter, the identified SBM solutions has been mapped against the leverage points framework (in the updated version by Abson et al. (2017), to understand their effectiveness. Finally, the leverage points framework informed the development of a research agenda focused on the so called "deep" leverage points for system change, with the aim to achieve "truly sustainable" BM.

One of the most recognized studies in the field has been conducted by Bocken et al. (2014), were they aimed to create a holistic understanding of SBM mechanisms and solutions. In the paper, Bocken et al. (2014) use the features of a sustainable economy developed by Jackson (2009) to guide the development of eight SBM archetypes, which later became nine with the additions made by Ritala et al. (2018). These archetypes are grouped in three categories: environmental innovation, social innovation, and organizational innovation. Mapping S&P 500 firms against the relative share of the archetypes, Ritala et al. (2018) find that more than 75% fall within the environmental innovation category, which focuses on recycling and eco-efficiency solutions. The social and organizational categories, consistent of archetypes such as delivering functionality instead of ownership, inclusive value creation and encouraging sufficiency, where vastly outnumbered in relative terms (Ritala et al., 2018). This is no coincidence as the most prominent SBM solutions today, such as the circular BM, are built on a technical foundation of efficiency improvements, framing the problem of sustainability as one of linearity (Urbinati et al., 2017). Furthermore, the triple-bottom-line approach is usually dominant (e.g. Stubbs and Cocklin, 2008), encouraging a simultaneous focus on profit, people and the planet, which is claimed to yield win-win-win effects (Elkington, 1994). In a study conducted by Lüdeke-Freund et al. (2018), they find that most SBM cluster in the middle of these values, creating a mix of social, environmental, and economic value, slightly tilted towards the environmental-side. Similarly, Schaltegger et al. (2012) talk about the business case for sustainability, where the key challenge is to design a BM that allows the firm to capture economic value by delivering environmental and social value.

Contrary to the necessary system-level approach that BM are usually claimed to create (Zott et al., 2011), the review conducted points to the fact that the SBM literature takes a predominantly firm-centric approach to sustainability (Isil and Hernke, 2017) by focusing on eco-efficiency instead of more fundamental root causes of unsustainability (Ehrenfeld, 2004). Additionally, the widely used triple-bottom-line approach has been disputed as a failed proxy for sustainability (Isil and Hernke, 2017), leading to an overemphasis of the financial viability of the SBM, at the expense of social and environmental sustainability (Lüdeke-Freund and Dembek, 2017). The triple-bottom-line approach also fails to recognize the existence of trade-offs by emphasizing win-win-win opportunities that merely lead to incremental improvements and weak sustainability outcomes (Hahn et al., 2010).

After having reviewed the current SBM solutions, these were then mapped against the leverage points framework. The framework consists of twelve leverage points ranked based on their ability transform the outcome of a system, where twelve is least effective and one is the most effective (Meadows, 1999). The framework has been further developed by Abson et al. (2017), identifying system characteristics connected to the leverage points, and categorizing the effectiveness of those interventions in to two overarching groups; shallow (twelve to seven) and deep (six to one) leverage points. The preliminary findings of the mapping show that most of the current SBM solutions are centered around the twelfth leverage point, i.e. adjusting parameters. In addition, efforts tend to be focused on changing positive and negative feedback loops in accordance with sustainability (leverage points seven and eight), mainly by attempting to counterbalance the unsustainability outcomes of the system (typically a firm or a group of firms). These leverage points are all considered to be “shallow” in terms of their ability to create change in a system. Thus, this paper sets out to develop an alternative by creating a research agenda centered on the six deep leverage points, presented below in ascending order in terms of their effectiveness to produce change in a system.

The "structure of information flow" (6) points to the need to better understand the unsustainability problem, and to adopt a sober view of the measures needed to achieve sustainability. The "rules of the system" (5) highlights the institutional mechanisms that drive sustainable and unsustainable BM outcomes, as well as the competitive pressures of a global market. The "power to add change and self-organize the systems structure" (4) examines the potential path-dependent effects of the organizational structure. In the section on the "goal of the system" (3), shareholder primacy and the profit and growth imperatives are discussed, as well as the resulting dynamics created from these societal goals. Finally, the "mindset from which the system arises" (2) and the "ability to transcend paradigms" (1) are discussed in tandem, where focus lies on understanding the impact of the basic values in society and the creation of a meaningful existence. A potential implication of this paper is to encourage researchers in the SBM field to move beyond the current reductionistic focus on symptoms of unsustainability, to a proper understanding of root causes of unsustainability and, thereby, allowing for the development of more effective solutions. Ultimately, the aim is to create a vision for new "truly sustainable" BM that can guide efforts in both academia and practice.

Keywords

Business Models, Sustainability, Systems, Leverage Points, Triple-Bottom-Line

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High Performance Benefit Corporations:

Exploring Recipes to Increase the B Impact Assessment

Silvia Cantele[1, *], Chiara Leardini[1], Luca Piubello Orsini[1], Silvia Valcozzena[1]

[1]University of Verona, Department of Business Administration

*silvia.cantele@univr.it

Abstract

This paper presents an analysis of 53 Italian Benefit Corporations (BCs) to describe possible combinations of organizational factors that create different “recipes” for achieving high B Impact Assessment (BIA). A fuzzy-set qualitative comparative analysis (fsQCA) is applied to highlight how size, age, profitability, and female presence can be combined to achieve a high BIA.

Keywords

Benefit Corporation, B Corp, sustainability performance, B Impact Assessment, fsQCA

WHAT DO WE KNOW ABOUT BENEFIT CORPORATIONS AND CERTIFIED B CORPS?

Benefit Corporations (BCs) were introduced in 2010 in different states of the United States (US) as a new legal form of company. Some years prior, B Lab introduced B Corp certification, propelling a movement of corporations aimed at changing the way of doing business. B Corp certification requires a business to assess its impacts using a specifically designed questionnaire that measures five main areas of organizational performance: workers, community, customers, environment, and governance. This B Impact Assessment (BIA) enables firms to self-assess their level of business sustainability and have their business certified from B Lab when they score more than 80 points on the questionnaire scale. Companies from all over the world can obtain B Corp certification; however, the legal status of BC can be achieved only by firms that are located in countries where BC regulation exists.

After the US experience, a regulation for BCs was issued in Italy at the end of 2015. Under Italian Law, a BC is a firm that engages in economic activity with the aim of sharing profits, while pursuing common benefits and operating in a responsible, sustainable, and transparent manner. To become a BC, an Italian company should change its by-laws and clearly specify its common benefit purposes. Directors must then administer the company by balancing this common benefit with the interests of shareholders and other stakeholders. BCs are required to designate one or more persons as “responsible for the impact”. The company is required to draft and publish an annual impact report and to adopt a third-party standard for impact assessment, which includes the following four areas: governance, workers, environment, and other stakeholders. The legal framework of BCs and B Corp certification are related: a BC can use BIA as a third-party standard, and certified B Corps are required to become a BC within two years of the first certification.

Given that BCs were introduced recently, and only in some countries (e.g., in the US and Italy), most studies have analyzed certified B Corps rather than BCs, and among these, there are few contributions that present empirical studies.

Stubbs (2017) investigated the features of B Corps as Sustainable Business Models (SBMs) and found that these firms are characterized by a stronger mission and leadership aiming to change the way of doing business by enabling greater integration of profit with social purpose. In fact, B Corps can be included in SBM archetypes (Bocken et al., 2014) under the category of “repurpose for society/the environment” (Ritala et al., 2018). The pursuit of both profit and social and environmental forms of value is consistent with the triple bottom line approach (Elkington, 2004), while the explicit relevance of customers, communities, and workers in BIA is consistent with stakeholder theory (Freeman, 1984, 2010). The literature on business models (Zott et al., 2011) has usually emphasized the financial model of value creation and capture and the role of customers and shareholders as main stakeholders. However, the evolution toward SBM marks a transition from focusing on “what and how” to focusing on the integration of “with and for whom” to create value (Freudenreich et al., 2020), and the B Corp model embeds both these principles.

Qualitative empirical studies have analyzed different aspects of B Corps, for example, the shifts that characterize their evolution (Sharma et al., 2018); the level of the social impact of online communication (Nigri et al., 2017); and the use of impact indicators in the governance and management decision-making process (Nigri et al., 2020a, 2020b).

Quantitative studies on B Corps have generally investigated the relationship between the status of certified B Corps—or their level of sustainability measured in terms of BIA—and their growth or productivity. The effect of certification on firm growth is controversial. For example, Parker et al. (2019) found that certified B Corps have lower growth rates (in terms of turnover) both one year and three years after certification, and this reduced growth was found to be particularly apparent for smaller and younger firms. Two other studies present opposing results. Using matched pair analysis, Romi et al. (2018) found that B Corps present higher growth rates than their noncertified peers, while Paelman et al. (2020) found a significant positive relationship between certification status and short-term (one-year) sales growth.

When BIA is used as an independent variable, the results seem indeterminate because the few studies analyzing the effect of BIA on growth or labor productivity (Chen & Kelly, 2015; Parker et al., 2019; Romi et al., 2018) or net income (Gazzola et al. ,2019) have found no significant relationship between any of these factors and BIA. To the best of our knowledge, no study has tested the inverse relationship by introducing a form of financial performance such as return on assets (ROA) as an antecedent of B Corp certification or BIA; however, previous literature on corporate social performance (CSP) and corporate financial performance (CFP) (Cantele & Zardini, 2018; Margolis & Walsh, 2003) demonstrated the existence of a positive reverse or bidirectional relationship (Lu et al., 2014; Orlitzky, 2008; Waddock & Graves, 1997).

In addition, very few studies have aimed to define the antecedents of higher sustainability performance, approximated by the B Corp certification or BIA score. Grimes et al. (2018) found that large firms have a higher probability of becoming certified; however, this holds true only when size is measured by revenues, but when it is measured by number of employees, the relationship is not significant. In contrast, Ardito et al. (2021) found a positive and significant relationship between BIA and firm size, measured by number of employees, but when size was measured by revenues, the relationship was not significant. In addition, Alonso-Martinez et al. (2020) found no significant relationship between BIA and size, measured by number of employees.

BC regulation and B Corp certification are a recent phenomenon. Some new ventures can now be born with BC status, while older firms might be considered less “innovative” and thus rarely aim to become a BC. Studies usually find that B Corps are young firms (Gamble et al., 2019; Parker et al., 2019) and that older firms are lower performing in relation to BIA (Ardito et al., 2021).

Another variable considered in the scant previous studies on B Corps is gender. For example, Grimes et al. (2018) found that firms owned by women have a higher probability of becoming certified B Corp and have better social and environmental performance (Harjoto et al., 2019). However, Ardito et al. (2021) found that when overall BIA and its different subscores are considered as separate dependent variables, the effects of female representation on the board are ambiguous.

Cantele et al.’s (2020) recent study confirmed that B Corps and BCs are a niche phenomenon. They found that most BCs in Italy are small, recently incorporated, and operating in the service sector (e.g., in consulting activities). These findings call for further research on the motivation to become a BC and the enabling factors that previous qualitative studies have not sufficiently considered. Moreover, the scant and contrasting results of the quantitative studies that do exist mean that further investigation is needed to understand the factors leading to a high sustainability performance. Such further research must also consider that methodological limitations could have affected the traditional regression analysis applied in the context of BCs.

RESEARCH DESIGN AND METHODOLOGY

A probable explanation for the contradictory and inconclusive results could lie in the fact that previous literature on B Corp certification and BIA used multiple regression analysis to explore the net effect of independent variables on a dependent variable. This approach assumes that these identified effects are both necessary and sufficient to predict the behavior of the dependent variable; however, Ragin (2000) asserted that most real-life events and associations are asymmetrical. In addition, the aim of multiple regression analysis is to define the significant positive or negative effect of a single independent variable on the dependent variable, and while this method also considers indirect effects (Hayes, 2017), it does not consider the effects of combinations of factors (Woodside, 2013). Thus, an outcome might depend on how the explanatory variables are combined rather than on the levels of the attributes of individual variables (Ordanini et al., 2014).

To overcome the inconclusive results of previous literature and capture the complexity of the B impact assessment, we adopt a configurational approach to analyze how the organizational factors considered by previous literature (Alonso-Martinez et al. 2020; Ardito et al. 2021; Gamble et al. 2019; Grimes et al. 2018) can be combined with each other in multiple configurations to generate high levels of BIA.

We conducted our analysis to consider the following two propositions.

Proposition 1: A high level of BIA can be achieved through different configurations of organizational factors (equifinality).

In relation to the principle of equifinality, different combinations of organizational factors might be sufficient, but no single combination must occur to predict an outcome (Ragin, 2000). In essence, different “recipes” exist for achieving high BIA levels.

Proposition 2: Each organizational factor is combined with others, rather than acting independently, to explain a high level of BIA (complexity).

According to the complexity proposition, the “relationships between variables can be non-linear, with abrupt switches occurring, so the same ‘cause’ can, in specific circumstances, produce different effects” (Urry, 2005: p. 4). This proposition infers that the relationships between BIA and other variables might not always be linear. Thus, we employ fuzzy-set qualitative comparative analysis (fsQCA) because it is a methodological approach that can identify the multiple configurations of interconnected factors that lead to the outcome of interest (Fiss, 2011; Ragin, 2008).

The variables were extracted from a database created by the authors. Beginning by using the list of Italian BCs gathered in previous work, we collected data about BIA from the B Corporation directory (see https://bcorporation.net/directory) and the other variables from the AIDA database of Italian financial statements. We used BIA as the outcome variable. To obtain B Corp certification, companies must undergo a rigorous process, referred to as "BIA", our outcome variable. The objective of the BIA process is to detect the company's strengths and weaknesses in five key impact areas of organizational performance: workers, governance, environment, customers, and community (Lopez, 2020). If the company obtains 80 points or more in the questionnaire designed to measure these impact areas, they can receive certification. In addition, they will be required to modify their strategies and governance processes to balance their social, environmental, and financial goals. Companies must repeat this process every three years to continue to be certified.

Based on previous literature, we identified five organizational factors (antecedents) to explain the BIA. Firm size (measured by revenues and employees, and constituting two factors) and firm age (years since incorporation) were used because these variables are usually included at least as control variables in previous studies on organizational performance; ROA as a measure of profitability because BCs should balance profit and social impact, and many studies have discussed the relationship between social performance and financial performance (and vice versa); and women on the board (the percentage of women directors of the board) because studies on the antecedents of certification and BIA have highlighted the role of female presence in the decision-making process. Our final sample has 53 Italian BCs with BIA.

Contrarian analysis was run before fsQCA. This step allowed us to better illustrate the complexity of BIA. To achieve this aim, we performed a quintile analysis and through using contingency tables, we tested whether the antecedents were asymmetrically related to high levels of BIA. The first real stage of fsQCA method is calibration, that is, transforming the variables into calibrated groups (Woodside, 2013). We generated membership measures through a combination of theoretical knowledge and empirical evidence (Ragin, 2000) to allow membership scores to vary according to how much the variables belong to a set: ranging from 1 (full membership) to 0 (full non-membership). The cross-over point (0.5) is the point of "maximum ambiguity in the assessment of whether a case is more in or out of the set" (Ragin, 2008: p.30). After completing the coding, all possible combinations of attributes were listed in a "Truth Table" (Russo & Confente, 2019). This table was refined: frequency and consistency allowed us to reduce the number of combinations of causal conditions that lead to the outcome (Ragin, 2008). To be precise, we kept all the configurations that had at least two cases and consistency higher than 0.8 (Ragin, 2008), considering only those for which the outcome of high BIA was present. In this phase of analysis, it is crucial to assess which combination might be a sufficient condition for the outcome. Consistency and coverage are appropriate indexes for this task. Consistency represents the percentage of causal configurations that lead to the outcome. Coverage explains the relevance of the combinations; it can be interpreted as the R^2 value extracted from correlational methods (Woodside & Baxter, 2013) and answers two important questions: How much does this combination matter? How many cases does it account for?

To define a configuration as sufficient, its consistency measure should exceed the 0.8 threshold (Woodside & Baxter, 2013). The last step of fsQca is the logical reduction and analysis of configurations (Russo & Confente, 2019), which aims to identify only configurations that beyond being consistent, also have an appropriate level of coverage—the acceptable threshold for coverage is 0.010 (Ragin, 2008).

RESULTS

Table 1 presents the intermediate solutions (Ragin, 2008), with coverage and consistency of the combinations that the fsQCA program software (Ragin & Davey, 2014) selected as sufficient. We used this kind of table to present our results as suggested by Ragin and Fiss (2008), where black circles (●) indicate the presence of a condition (i.e., high levels of the condition) and circles with a cross (⊗) indicate its absence (i.e., low levels of the condition). In addition, blank cells indicate that a condition is not considered, which means that it is treated as a “don’t care” condition (Ragin & Fiss, 2008) in a solution. To confirm that the results are not overly sensitive to the specific design choice, we performed sensitivity analysis.

The findings highlight an overall consistency of 0.83 and a solution coverage of 0.75, which means that a high proportion of the outcome is covered by the four configurations (i.e., recipes). Configuration 1 has the highest consistency and unique coverage, it reflects a combination of low levels of *Revenue*, *Employees*, *Women on Board* and high level of *Age*, while *ROA* is considered a “don’t care” condition. Configuration 4 encompasses low amounts of *Revenue*, *Employees*, *Age* and high levels of *Women on Board* and *ROA*. These two solutions are referred to as “small BC” (i.e., low quantity of employees and revenue). From this perspective, the company characteristics that allow a small BC to achieve high levels of BIA are either the presence of older *Age* and an absence (or low percentage) of *Women on Board*, or the presence of younger *Age*, high level of *ROA*, and a high percentage of *Women on Board*.

Configuration 2 combines the presence of *Revenue*, *Employees*, and *Age* with a small percentage of *Women on Board*. Configuration 3 includes the presence of high levels of *Revenue*, *Employees*, *Age*, and *ROA*. Configurations 2 and 3 represent the recipes to achieve high levels of BIA for a large BC. In both solutions, an important role is played by the age of the company. The percentege of *Women on Board* is low in solution 2, but it is a “don’t care” condition in solution 3. High *ROA* is present in solution 3, but it is a “don’t care” condition in solution 2. The existence of multiple sufficient configurations for high BIA indicates equifinality (Fiss, 2011), supporting Proposition 1. Proposition 2 is supported by the fact that a high BIA level is the result of a combination of multiple relevant conditions.

Table 1 – Configurations to high BIA

Configurations	1	2	3	4
Revenue	⊗	●	●	⊗
Employees	⊗	●	●	⊗
Women on Board	⊗	⊗		●
Age	●	●	●	⊗
ROA			●	●
Consistency	0.89	0.86	0.85	0.81
Raw coverage	0.33	0.31	0.35	0.15
Unique coverage	0.21	0.04	0.08	0.11
Solution coverage	0.75			
Solution consistency	0.83			

Legend: ● Causal condition present; ⊗ Causal condition absent

DISCUSSION AND CONCLUSION

The different configurations leading to a high impact (i.e., high BIA) for BCs highlight the role of each organizational factor in combination with the other factors. This understanding represents the first important contribution of our study because previous research based on regression analysis has found controversial results that tested the effect of only single variables on BIA or sustainability performance.

Previous literature has generally highlighted a positive relationship between firm size and sustainability performance (Grimes et al., 2018; Ardito et al., 2021). However, we found a different path to high impact for small and large firms. For small firms, experience and reputation (approximated by old age) and “traditional” governance (i.e., a low presence of women directors) can lead to high impact, but the same result can be obtained by small firms that have been recently incorporated (young age) but are highly profitable (high ROA) and have higher female presence on the board. For large firms, experience and reputation (approximated by old age) seem to be necessary conditions for having a high impact, but only when combined with two alternative solutions: high profitability (ROA) or a “traditional” governance (low female presence).

The second important contribution of our study is that it fills the gap in knowledge about the role of profitability on sustainability performance. While previous literature has generally found a positive relationship between CFP and CSP (Lu et al., 2014; Orlitzky, 2008; Waddock & Graves, 1997), our study found that a high ROA is relevant only in two solutions—one for small and medium firms and the other for large firms—while it is irrelevant in the other solutions.

Further, a high female presence on the board appears relevant only in small start-ups with high profitability potential. In the other solutions, the presence of females on the board is low impact or irrelevant. This sheds light on the need for further research to examine the relationship between female board presence and sustainability performance because despite female-owned firms seeming to be more likely to gain B Corp certification (Grimes et al., 2018), higher performance (in terms of BIA) is not always guaranteed when gender diversity is represented in terms of female presence on the board.

This study has some limitations. It explored the influence of five key factors on BIA. Future research could consider the role of additional causal conditions to better understand which further factors (not available in our database) should be combined to achieve high levels of BIA, for example, experience measured in years since first certification (Ardito et al., 2021; Gamble et al., 2019), or the peculiarities of new ventures that were born as a BC or were B Corp certified within a short time of being founded (Gehman & Grimes 2017).

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Realization of the sharing business model for sustainable value creation: Case clothing library

Nina Tura[1*], Minttu Laukkanen[1]

[1]LUT University

*nina.tura@lut.fi

Abstract

Sharing business models are linked to the potential to create sustainable value. However, it is not self-evident that sustainable value propositions are realized for sustainable value creation (SVC) in practice. SVC through business models is typically understood as the integration of economic, social, and ecological value creation with and for different stakeholders, but the understanding of the SVC is still limited. Applying a case study approach and exploring two Finnish clothing libraries, this study shows how to manage the sustainable value proposition of a sharing business model to create sustainable value and increase sustainability performance. This study has three main implications. First, this study introduces a framework that guides the assessment and management of SVC through business model. The framework helps in addressing value proposition from the different perspectives of SVC, thus tackling one of the core components of sustainable business model design. Second, this study increases the understanding of the SVC, which refers to the realization of a company's sustainable value proposition, through sharing business models. The study reveals how sustainable value propositions are translated into perceived value by customers and shows that new business models of clothing libraries hold huge potential for SVC, but in practice, companies' sustainable value propositions are not always realized as such. Third, this study shows that sustainable value propositions, motivated by Sustainable Development Goals, are co-created in a joint value creation process and mutual stakeholder relationships.

Keywords

Sustainable value creation, value proposition, business model, sharing economy, clothing

INTRODUCTION

New sustainable business models challenge existing business logics by leveraging a fundamental shift to more sustainable modes of production and consumption (Markard et al., 2012). Through sustainable business models, companies provide value to the various stakeholders and to the natural environment and/or society (Lüdeke-Freund & Dembek, 2017) by integrating sustainability principles into the company's value proposition and value creation logic (Stubbs & Cocklin, 2008). Today, many traditional manufacturing companies are changing their business models to increase sustainability, e.g., by selling services instead of products, improving the utilization of resources, and extending product life (Yang & Evans, 2019). Also, interest in business models based on circularity, saving resources, and eliminating waste (Pieroni et al., 2019), and new forms of consumption, such as sharing (Laukkanen & Tura, 2020), is growing.

Sustainable value creation (SVC), which is the central process to any sustainable business model (Roome & Louche, 2016), is typically understood as the integration of economic, social, and environmental value creation with and for different stakeholders (Freudenreich et al., 2020; Lüdeke-Freund et al., 2020; Velter et al., 2020). Furthermore, SVC is seen as a strategic approach to address the United Nation's Sustainable Development Goals (SDGs), and business opportunities related to them (Kuckertz et al., 2019; Morioka et al., 2017; Rauter et al., 2017). Although in most studies, SVC is used to describe benefits (Cardoni et al., 2020), an increasing body of SVC literature considers also negative consequences, tensions, and conflicting value outcomes between different value forms and different stakeholders that might occur (Biloslavo et al., 2018; Oskam et al., 2020; Tura et al., 2019). Many studies concerning creating positive impacts or avoiding value destruction focus on either company's sustainable value proposition and SVC process, or the value perceived by customers and other stakeholders (Bocken et al., 2014; Upward & Jones, 2016), but these two perspectives are less studied simultaneously. To help companies in assessing and forecasting the sustainability impact of their new sustainable business models, there is a need to better understand the multiple forms of sustainable value, how companies realize it, and how different stakeholders perceive this value (Lüdeke-Freund et al., 2020).

The aim of this study is to assist companies in designing sustainable value propositions and building understanding on sustainability impacts, including SVC to customers. The study is guided by the research question of how to manage the sustainable value proposition of a new business model to create sustainable value and increase sustainability performance? To address this question, we present a managerial framework, that reveals how business model is realized for SVC. This framework is developed to help in both assessing and managing the sustainable value proposition of a new business model, tackling one of the core components of business model design. The proposed framework is developed based on the conceptual framework for analyzing SVC (Laukkanen & Tura, 2020), created based on SDGs. In this study, the developed framework is further used to assess the economic, social, and environmental value propositions of two clothing libraries and to examine, how SVC is realized.

Clothing library represents an interesting example of a new type of business model, advancing the transition of fashion industry towards sustainability – from fast fashion to more sustainable consumption. The case companies are built on the idea of sharing and optimizing underused assets through access-based transactions (Acquier et al., 2017). Sharing business models are seen as a potential new pathway to sustainability (Heinrichs, 2013) as they aim to maximize the utilization of resources, avoid over-consumption (Frenken & Schor, 2017; Parente et al., 2018), and change consumer habits towards collaborative form of consumption (Muñoz & Cohen, 2017). The sharing business models have the potential to create sustainable value, but it is not self-evident that sustainable value propositions are realized for SVC and these models advance sustainability (Laukkanen & Tura, 2020). Although there are multiple opportunities for SVC, such as increasing resource and cost efficiency, promoting responsible use of resources, and increasing social well-being, these business models may also have negative impacts reducing their actual sustainability performance, such as negative environmental impacts through increased customer transformation (Zamani et al., 2017). This study focuses on how clothing libraries create value downstream to customers, taking also into account the upstream perspective of designers/brands in building sustainable value propositions. Thus, the focus of the paper is to combine these perspectives to increase the effective management of sustainability performance of business models.

THEORETICAL BACKGROUND

Sustainable value creation through business models

Traditionally, business models are understood as combinations of the value proposition (product/service, customer segments, and relationships); value creation and delivery (key activities, resources, technologies, partners, etc., and the distribution of value among stakeholders); and value capture (cost structure and revenue streams) (Biloslavo et al., 2018; Osterwalder & Pigneur, 2010; Teece, 2010). From the sustainability perspective, it is a question of more than just the delivery of customer value and the realization of economic value, including also social and environmental value created by the company and its value network and perceived by multiple stakeholders (Hart et al., 2003; Figge & Hahn, 2004; Freudenreich et al., 2020; Stubbs & Cocklin, 2008). In a management literature, sustainable business models are defined as innovations that create significant positive impacts or significantly reduce negative impacts for the environment and/or society through changes in the way the organization and its value network create, deliver, and capture value or change their value propositions (Bocken et al., 2014). Compared to the traditional business model concept, sustainable business model has certain additional objectives and characteristics (Geissdoerfer et al., 2018) as it aims to align business goals with the needs of larger systems of stakeholders and society (Stubbs & Cocklin, 2008) building on an extended notion of value creation and integrated view of sustainable value (Evans et al., 2017; Lüdeke-Freund & Dembek, 2017; Freudenreich et al., 2020). These needs are translated into different value concepts such as decreased eco-footprint for users, increased stability, and financial resilience for value chain partners, and increased prosperity, happiness, and well-being at the societal level (den Ouden, 2012).

Existing studies share the view that SVC through business models includes multiple forms of value (Bocken et al., 2015; Breuer et al., 2018; Evans et al., 2017; Schneider & Clauss, 2019; Velter et al., 2020), i.e., economic, environmental, and social value and their combinations (Yang & Evans, 2019). Sustainable business models propose sustainable value, but in practice, the business model can be either realized for SVC or the value might be destroyed (Bocken et al., 2015; Roome & Louche, 2016). Sustainable value propositions do not always realize as positive value elements and increased benefits, but also negative effects, such as tensions, trade-offs, and value conflicts, which require consideration (Tura et al., 2019), might occur. Also, the forms of sustainable business models vary, as some focus mainly on profit creation, some aim to increase the well-being of the society and some prevention of negative environmental impacts (Lankoski & Smith, 2018). However, to categorize business model as sustainable, the net value should be positive (Dyllick & Rost, 2017), i.e., simultaneously resulting in potential economic value creation for the firm, the business model should create opportunities for wider net-positive benefits from the environmental and social perspective (Laukkanen & Tura, 2020).

Figure 1. is a summarized presentation of the process of SVC. The value proposition describes the value company aims to create and the targeted recipients of the value. Motivated by the SDGs, the sustainable value proposition should include the statements of the economic benefits for the customer (e.g., cost reduction, improved performance, and usability), but also communicate the sustainable value, i.e., the broader environmental and/or social benefits, of the offering (Kristensen & Remmen, 2019; Patala et al., 2016). Further, value creation describes the process of how the value proposition is put into practice through the activities, resources, and value network, and value outcomes refer to the value perceived by the beneficiaries and the actual impacts on the environment and society, i.e., the realization of value (Bocken et al., 2014; Upward & Jones, 2016). Thus, the measurability of economic, social, and environmental value requires a dialog between business and society (Boons & Lüdeke-Freund, 2013). As the value is seen as perceived benefits (such as in this study), i.e., perceived use value, the value is subjectively experienced (Bowman & Ambrosini, 2000).

In a management literature, SVC through business models is related to multiple stakeholders. The stakeholder theory perspective on SVC considers with and for whom value is created, but instead separating stakeholders into those who receive value and those who contribute to creating it, it considers mutual stakeholder relationships in which stakeholders are both recipients and (co-)creators of value in joint value creation processes (Freudenreich et al., 2020). SVC refers to positive environmental, social, and economic impacts (co)created by a company and its value network and perceived by a company and all stakeholders.

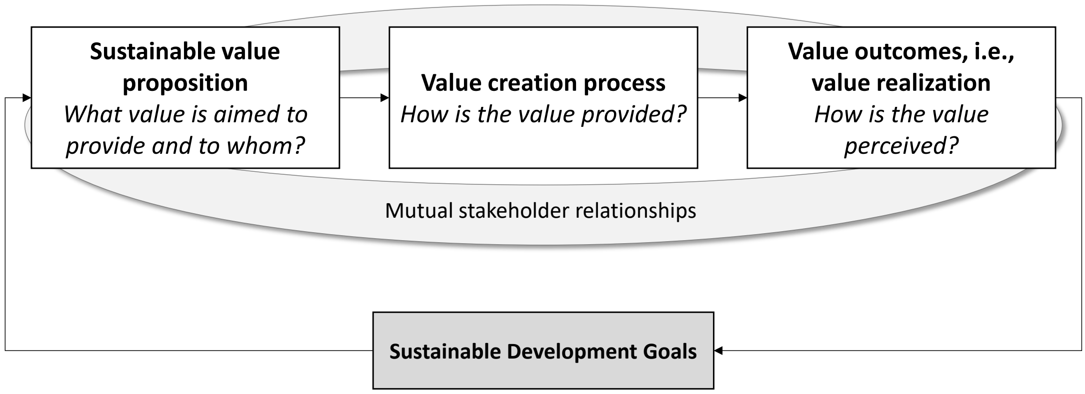

Figure 1. The process of SVC

The framework for assessing and managing the sustainable value proposition of a business model

Based on reviewing the existing literature on SVC through business models and the conceptual framework for analyzing SVC (Laukkanen & Tura, 2020), we formed a managerial framework for revealing how business model is realized for SVC through assessing the sustainable value proposition of a business model.

The conceptual framework for analyzing SVC by Laukkanen & Tura (2020) was built on the SDGs aiming to be used to estimate the upper-level sustainability impacts of business models from multiple perspectives. The aim of the framework was to provide a starting point for the sustainability assessment of business models. The summary of the framework is presented in Table 1. Creation of environmental value considers the business's impacts on the natural environment and natural capital (Stubbs & Cocklin, 2008) through an increase in resource efficiency and environmental well-being, responsible use of resources, and decrease in emissions and harmful environmental impacts. Social value creation instead considers the realization of the elements that individuals or society in general consider valuable, such as issues related to health, safety, individual rights, well-being, and happiness. Economic value relates to factors such as increased profit or cost-efficiency and financial resilience and increase in economic well-being. From business model perspective, economic value creation means the creation of customer use value, which is referred to as perceived benefits such as functionality, convenience, and increase in economic well-being, e.g., through cost-reductions. This value is further captured through transactions, such as money paid by customers, i.e., the exchange value. (Bowman & Ambrosini, 2000; Bocken et al., 2014) As the aim of a sustainable business model is to create value for a larger group of stakeholders, including the natural environment and society (Upward & Jones, 2016), economic value creation also refers to providing financial stability for the larger group of stakeholders and the creation of socio-economic welfare (den Ouden, 2012).

Table 1. Summary of the conceptual framework for analyzing SVC (Laukkanen & Tura, 2020)

Environmental	Social	Economic
Increasing resource efficiency Responsible use of resources No harmful environmental impacts and emissions Increasing environmental well-being	Safeguarding health and safety Respecting laws, regulations, and rights Respecting employee, stakeholder, and individual rights Ethical principles and no harmful social impacts Increasing social well-being	Increasing the cost-efficiency Increasing profits and business opportunities Operational stability and risk reduction Increasing attractiveness Increasing economic well-being

The proposed managerial framework in this study (Table 2) is aimed to reveal how the business model is realized for SVC through paying special attention to the value proposition and how it is realized, i.e., perceived by beneficiaries. The framework addresses the value proposition in detail from environmental, social, economic perspectives through different guiding questions that help in focusing on the key points of SVC. Considering the company's sustainable value proposition through the framework, helps not only in increasing the understanding of the value realization for the beneficiaries, i.e., customers (which is the view in this study), but in managing the SVC from company perspective. The framework is aimed to assess the sustainability performance but also reveal mismatches between sustainable value proposition and realized value, which are targets for development.

Table 2. The framework for assessing and managing the sustainable value proposition of a business model

	Motivation behind the value proposition		Value proposition (VP)	Realized value (customer perspective)
Environmental	What motivates environmental value creation?	*Resource efficiency and responsible use of resources*	How is the reuse of products, by-products and materials shown in the VP? How is the use of renewables and responsible use of natural resources shown in the VP? How is the reduction of waste shown in the VP? How is the elimination of rebound effects noticed in the VP?	How has the customer's consuming behavior changed? How has the customer's use of water/energy/natural recourses changed? How has the creation of waste by customer changed? How has the business changed customer's beliefs and values on the use of resources?
		Environmental impacts	How the VP considers the environmental impacts of the business and reduction of emissions? How are the concrete promises for the welfare of the ecosystem and the environment shown in the VP?	How has the customer's environmental footprint changed? How has the business changed customer's actions for the environment?
		Environmental well-being	How are the repairing previous environmental damages and solving environmental problems shown in the VP?	How has the customer contributed to solving environmental problems?
Social	What motivates social value creation?	*Health and safety*	How are the ensuring and/or promoting health and safety shown in the VP?	How has the customer's health promoted? How has the customer's safety ensured/promoted?
		Laws, regulations and rights	How are the respecting regulations and rights shown in the VP? How is the considering the employee, stakeholder, and individual rights shown in the VP?	How have the customer's individual rights ensured? How has the customer's privacy ensured?
		Ethical principles	How are the ethical principles shown in the VP?	How have the customer's beliefs, values, and moral standards changed?
		Social well-being	How is the increasing socio-psychological welfare shown in the VP? How is the creating happiness, joy, etc. shown in the VP? How is the promoting social cohesion shown in the VP?	How has the customer's everyday life changed? How has the customer felt happiness, joy, and good feeling? How has the customer lived new experiences and gained learning possibilities? How has the business affected to customer's social networks?

Economic	What motivates economic value creation?	*Cost efficiency*	How are the reducing costs and increasing efficiency (related to alternatives) shown in the VP? How is the saving money/time/effort shown in the VP?	How has the business saved customer's money and/or time? How has the business saved customer's other resources and effort?
		Stability and risk reduction	How are the reducing risks and creating stability shown in the VP?	How has the business reduced customer's risks? How has the business created stability for customer?
		Attractiveness	How is the increasing attractiveness shown in the VP?	How has the customer felt the attractiveness of the business compared to alternatives?
		Economic well-being	How is the increasing economic well-being shown in the VP?	How has the customer's economic well-being increased?

METHODOLOGY

The study follows a qualitative, empirical case study approach (Yin, 2014), focusing on the sharing business model of a clothing library. This research approach is followed to explain the relationship between the sustainable value proposition, which is created and delivered by the company and designers/brands, and actual value outcomes, i.e., the value perceived by customers. Thus, the case research strategy was selected to generate a deep understanding of the observed phenomenon in a real-life setting (Corbin & Strauss, 2015).

The study focuses on two clothing libraries operating in Finland: Vaatepuu and Vaaterekki. Both companies represent new, growing ventures, that are led by the entrepreneurs' visions of the development of fashion industry into a more sustainable direction. Vaatepuu is a sustainable clothing service founded in 2014 in Järvenpää. Today, it has also stores in Helsinki, Tampere, Turku and Jyväskylä, which belong to the group of Finland's seven biggest cities. Vaaterekki was established in 2015 and operates in Helsinki, the capital of Finland. Both companies follow the basic idea behind a book library and provide their customers a chance to loan clothes against a monthly fee, also providing a possibility to rent clothes on a one-time basis. Vaatepuu also has a second-hand market and additional services to help their customers repair and take care of their clothes, advance their knowledge related to sustainable clothing and customize their own wardrobes.

The data was collected from multiple sources and different data collection methods were used as shown in Table 3. The primary data includes insights from company representatives, designers providing sustainable products for the companies and customers/members of the clothing libraries. The data was collected by executing semi-structured phone interviews, e-mail inquiries, in-person and group discussions with customers reached through different Facebook(FB)-groups. The primary data was collected between July 2020 and March 2021. As a secondary data, we utilized company websites, published columns and blog posts by clothing library customers.

The data was analyzed by utilizing qualitative data analysis guidelines (e.g., Miles & Huberman, 1994) and content analysis (e.g., Eriksson & Kovalainen, 2016; Silverman, 2014). The data analysis was guided by the framework for assessing and managing the sustainable value proposition of a business model.

Table 3. Summary of the data collection

Source			Data type	Data collection period
Companies	Vaatepuu	CEO	Phone interview, 70 min	Jul 2020
	Vaaterekki	Co-owner	Phone interview, 50 min	Feb 2021
Designers/ brands	D1	CEO & designer	Phone interview, 22min	Feb 2021
	D2	Sales manager	Phone interview, 26 min	
	D3	Co-owner & designer	E-mail survey	
	D4	Sales manager	E-mail survey	
	D5	Brand manager	E-mail survey	
	D6	E-commerce manager	E-mail survey	
	D7	CEO	E-mail survey	
	D8	Sales manager	E-mail survey	
Customers	*Primary data*			
	C1	Member since 2019	Survey	Feb-March 2021
	C2	Member since 2015	Survey	
	C3	Member 2019-20 (12 months)	Survey	
	C4	Member 2018-19 (6 months)	Survey	
	C5	Member 2019 (6 months)	Survey	
	C6	Member since 2020	Survey	
	C7	Member since 2019	FB event/discussion	
	C8	Member since 2019	FB event/discussion	
	C9	Member 2019-20 (12 months)	FB event/discussion	
	C10	Member since 2017	FB event/discussion	
	C11	Member since 2018	Phone interview, 29 min	
	Secondary data			
	C12	Member (10 months*)	Interview	Nov 2019
	C13	Member (6 months*)	Interview	
	C14	Member (7 months*)	Interview	
	C15	Member (1 month*)	Interview	
	C16	Member (30 months*)	Interview	
	C17	Member (9 months*)	Interview	
	C18	Member (11 months*)	Interview	
	C19	Member since 2017	Magazine article	
	C20	Member since 2018**	Blog post 2019	
	C21	Member 2019 (6 months)***	Blog post (commercial cooperation) 2019	

*Duration of the membership at the time of the interview
**Blog post is made in commercial cooperation with Vaatepuu, but the author convinces the opinions are her own and she has had a total freedom to write about her experiences
***Multiple blog posts detailing hands-on experiences

RESULTS

The study's results are summarized in Table 4. According to the representatives of Vaatepuu and Vaaterekki as well as designers/brands, the goal of the clothing libraries is to be involved with the broader change towards more sustainable dressing habits. Besides offering customers a chance to try high-quality materials and finished designs, the aim is to get customers to consider what kind of clothes they should own and what kind of clothes they should borrow, i.e., thinking about their consuming habits. Companies put effort into instructing their customers to take care of their clothes and repair them if necessary. In their own words, all this happens in "a close community of people, which is led by the ideology of joy, cooperation, and respecting different people and the environment." Both clothing libraries favor domestic designers and pay special attention to ethical and sustainable manufacturing of clothes. Especially, Vaatepuu encourages clothing designers to design increasingly durable clothing and offers its expertise to help designers on the way towards more sustainable designs.

> *"It is thought that if consumers want to change their consumption in a sustainable direction, it means giving up on something. This is not the case. As a member of a clothing library, you get more for the same money than what you would use to buy cloth for yourself." (Vaatepuu)*

The clothing libraries' business models are guided by the motivation to maximize the benefit of the produced garment. The sustainable value propositions are much led by the promise of providing clothes from sustainable, domestic brands. However, companies see a narrow range of clothes suitable for clothing library purposes (designs and materials) and the relatively small number of domestic brands as a challenge. For clothing libraries, environmentally responsible production does not automatically mean that the sensitive, sustainable natural material is the best choice. Maximizing the use of a garment means that resources used for its production are not wasted but used efficiently. Thus, instead the most sustainable garment is the one that is most used and is interesting for customers. For example, ecologically produced silk or wool may be a more responsible choice from a production perspective, but as these materials do not withstand heavy use, they are no longer the most sustainable or the most sensible options in a clothing library use. The features that increase the number of uses are the most significant of all, and the right material for the right application brings its durability (e.g., sometimes it is justified to have plastic in sportswear). Thus, companies should cope with the challenge of balancing different aspects affecting SVC and the design of a value proposition from an environmental viewpoint. From an environmental perspective, the value proposition is also led by the motivation of offering an alternative to fast fashion and “single-use culture” and changing the clothing industry in a more sustainable direction. In the value proposition, this translates into increasing the understanding of sustainable dressing and environmental problems of fashion industry. In addition to using the latest collections of brands (to attract customers), clothing libraries promote circularity by taking clothes that would not otherwise be used, for example, unsold or last pieces of collections, prototypes, second-quality, and clothes used in fashion shows.

From a social perspective, the motivations behind the clothing libraries’ business models were identified to be the promotion of responsibility, transparency, and co-operation through the whole value chain. Selected partners (designers/brands) must be able to communicate openly, show the production chain and justify the choices they have made.

To the value proposition, this translates as a promise to have brands with socially accepted manufacturing. Furthermore, the value proposition is motivated by promoting human rights, inclusiveness, communality, and individuals' social well-being. From a value proposition perspective, the clothing libraries promise to provide tailored solutions for every woman with different needs and access to high-quality and even expensive clothes for everyone. The clothing libraries also promise to deliver joy and everyday experiences and increase social cohesion and well-being by providing access to a lifestyle and community of to be involved with.

From an economic perspective, the clothing libraries aim to support domestic brands and offer a cost-efficient model. To the value proposition, this translates offering access to broad selection of clothes and accessories by domestic designers and brands. Furthermore, the clothing libraries are motivated by declaring "less is more" and opportunity to change consumption behavior, particularly to reduce cheap fashion production. To the value proposition, this translates as a change to share (or borrow) clothes instead of buying. In addition, the provided possibility of using secondhand market allows consumers to get extra economic gains and get their clothes in circulation and thus increase their usage rate. However, the question of how to get customers convinced that there is no need to buy in addition to borrowing (avoiding rebound effects) is seen as a challenge.

Table 4. Summary of the results

	Motivation behind the value proposition	Value proposition	Realized value (customer perspective)
Environmental	To maximize the benefit from the products (clothes), i.e., maximize the use of the garment. The most sustainable garment is the one that is most used (high utilization rate and long lifecycle) and thus natural resources are not wasted. To decrease the clothes' carbon footprint To promote circular economy, sustainable consumption, and responsible use of clothes To change the clothing industry in a more sustainable direction	An alternative to fast fashion and "single-use culture" through sharing Sustainable and long-lasting clothes produced by responsible, domestic brands Promoting circular economy by taking surplus clothing into use (e.g. last pieces of collections, unsold pieces, prototypes, second quality, show pieces) Increasing the understanding of repairing and taking care of clothes Increasing the understanding of sustainable dressing and environmental problems of fashion industry	Higher use of the single garment Reduced purchase of clothing, no "failed purchases" New clothes for actual need and without filling the wardrobe Taking care of clothes and identifying sustainable clothes Increased awareness of their own consumption habits and broader perspective on clothing Avoiding the fast fashion business and promoting sustainable clothing Broader interest on sharing, responsible consumption, and sustainable living
Social	To promote responsibility, transparency, and co-operation through the whole value chain. Selected partners (designers) must be able to openly show the production chain and justify their choices. To promote human rights and inclusiveness To promote communality and individuals' social well-being To cherish the shared values regarding the responsible and sustainable fashion industry	Responsively produced clothes by domestic brands that communicate openly and have socially accepted manufacturing (e.g. respecting human rights) Tailored solutions for every woman with different needs Access to sustainable, high-quality, and quite valuable clothing for every woman Joy, fun and every-day experiences: lifestyle and community to be involved with (increasing social cohesion and well-being)	Wearing sustainable clothes without researching brands and their value chains Well-fitted clothes to different bodies (e.g., pregnancy time, weight variation) Having opportunity to wear clothes otherwise cannot afford those Having opportunity to try and play with different clothes (e.g. possibility to try new brands, colors and models) without having moral hangover through buying The joy of dressing, getting positive feedback on beautiful and personal clothing, and finding own style Increased self-confidence Belonging to supportive and trustworthy community, whose members share the same ideology and values

Economic	Cost-efficiency To support domestic brands "Less is more", decreasing consumption, especially fast fashion; For people, the aim is to "buy less but wear better"	Broad selection of products (clothes and accessories) by domestic designers and brands Versatility without buying continuously new clothes; sharing of clothes instead of buying Secondhand market: economic gains & promotion of circular economy	Enabling the versatile use of higher quality brands, opportunity to use clothes from several (expensive) brands without a need to buy Enabling variety to clothing, considering the seasons and personal mood Supporting domestic brands, getting to know new brands Economic opportunity to get access to clothes for different situations and customizing the service according to changing needs (e.g., pregnancy time, weight loss, special occasions) Saving money and time (no need to walking around shopping centers and scanning web stores)

The value of being a member of a clothing library included multiple different issues from the SVC perspective for the customers. Overall, membership was seen as an economic and ecological way to get variation to one's wardrobe.

> *"The membership helped me save my money and nature. … Generally, my relationship to ownership changed, and the membership made me wonder why everything should always be owned?"*

From an environmental perspective, the business was identified to increase the use of single garment and reduce the purchasing rate of clothes, especially from the fast fashion brands, leading to the cutting out the "failed purchases". Customers perceived they get access to new clothes for actual need and without filling the wardrobe. Many customers emphasized their personal desire to keep their wardrobes simple, consisting of only basic clothes. A clothing library provided them still a chance to use new and seasonal clothes. Furthermore, the membership was perceived to assist taking care of clothes, identifying sustainable clothes, and increasing awareness of their own consumption habits. Many members described membership as a "springboard" to broader interest on sharing, responsible consumption, and sustainable living.

From a social perspective, as one of the customers explained, determining the responsibility of clothing is difficult for an individual customer. Thus, it is especially valuable that the service provider has made responsibility reflections and choices on behalf of the customer. Customers perceived to get access to well fitted clothes to different bodies and high-quality clothes they otherwise cannot afford to. Furthermore, the realized value included the joy of dressing, getting positive feedback on beautiful and personal clothing, and finding own style leading to increase in self-confidence and well-being. Many customers identified the possibility to try new clothes, new colors, brands, and styles, and playing with clothes without having moral hangover through buying those as an important part of the membership. Clothing libraries were seen as meeting places, and belonging to supportive and trustworthy community, whose members share the same ideology and values, was also perceived as valuable.

From an economic perspective, clothing library's business model was perceived to enable the versatile use of higher quality brands in a cost-efficient way. The economic value was also realized in situations where the needs changed, e.g., because of a pregnancy or a weight loss or if there was a need to have a dress for a specific occasion. Supporting the domestic production was also seen as important. Domestic (Finnish) brands' products are often produced in Europe, where working conditions and the environmental impact of production are usually taken care well. The domestic brands were also identified as attractive but relatively expensive, which is why the membership in a clothing library provided an economical way to get access to these brands.

> *"I can afford to buy clothes, but I have long experienced that the acquisition of new clothes does not support my values. … I get the opportunity to use domestic, more responsible produced clothes versatilely. For me, another option would be to use only the existing ones and maybe rarely use a flea market to find something new to the closet."*

However, customers also identified challenges that reduced their perceived value. In addition to operational choices, such as borrowing schedule and the rules on how to loan clothes, the identified challenges were especially linked to clothes' maintenance. As customers are responsible for taking care of the loaned clothes by themselves, the problems occurred related to quality of clothes. For example, the used laundry detergent may not be suitable for people with allergy. Also, the maintenance of clothes, regarding the washing, ironing, and repairing, is seen to require much work, and thus causing extra stress. Furthermore, the high washing rate of clothes raises questions regarding the environmental effects such as water usage, but also color fading. As the clothing library business is still a relatively small business area, they have limited locations and opening hours. This also increases the need for extra traveling to a library instead of combining the visit with other everyday activities. The customers also identified challenges regarding the limited availability of sizes, models and styles meeting the own preferences and access to the most popular items.

DISCUSSION AND CONCLUSIONS

In general, this study addresses the important issue of how business models can support sustainable development and societal well-being through creating sustainable value. By applying a process perspective on SVC, this study helps companies in assessing and forecasting the sustainability impact of their business models but also in designing and managing sustainable value propositions to create sustainable value and increase sustainability performance. This study makes three main contributions to the existing literature.

First, this study introduces a managerial framework that guides the assessment and management of SVC through business model. The framework helps in examining the value propositions from different perspectives of SVC and thus assists to design sustainable value propositions and build understanding of the expected sustainability impacts (e.g. SVC to customers). Furthermore, the framework helps in revealing how sustainable value propositions are realized, i.e., perceived by beneficiaries (e.g. customers). Thus, the research increases the understanding of both ex-ante and ex-post impact evaluation of new business models. Through empirical cases of two clothing libraries, the proposed framework was successfully applied to form the sustainable value propositions from the mutual perspectives of the company (clothing library) and the suppliers (designers/brands). Further, the framework was successfully applied to concretize how sustainable value propositions were perceived by customers revealing also negative effects.

Second, this study provides empirical evidence of the actual sustainability impacts, i.e., the realization of sustainable value propositions, by sharing business models of two clothing libraries. SVC refers to the realization of a company's sustainable value proposition, i.e., the value perceived by the beneficiaries. The study reveals how sustainable value propositions are translated into perceived value by customers and shows that in practice, the new business model of clothing library realizes for SVC. However, a company's sustainable value proposition is not always realized as such. For example, environmental and economic value is realized through maximized use of garment; on the other hand, customers do not value scruffy and washed out clothes. Regarding the sustainable value, this study revealed that customers ideologically value sustainability aspects, but some contradictions between ideology and perceived use value might exist.

Thirdly, this study increases the general understanding of the stakeholder theory perspective on SVC and mutual stakeholder relationships. Gathering data from the company representatives of clothing libraries, but also from upstream from designers/brands and downstream from customers and applying the framework for assessing and managing the sustainable value proposition of a business model, this study shows that sustainable value propositions, motivated by SDGs, are co-created in joint value creation process.

For managers, this study offers insights into sustainable business model design though taking special attention to designing sustainable value propositions and further assessing the actual value realization. The framework highlights the multiple views on sustainable value to be considered in designing, assessing, and managing sustainable business models.

Limitations and further research

Naturally, this study has several limitations, which provide avenues for future research. Regarding the framework development, *the framework for assessing and managing the sustainable value proposition of a business model* is aimed to be generic, but so far, the framework is applied just in the context of sharing business model of two clothing libraries. Further, the perceived value is evaluated just from the perspective of the members of clothing libraries, i.e., customers, but the framework is aimed to cover the stakeholder perspective on SVC and mutual stakeholder relationships. For example, in this study, the data from designers/brands is taken into account in building sustainable value propositions, but it is possible to broaden the perspective and data analysis and investigate the realized value also from designer perspective. Further, the framework proposed in this study, covers the perspectives of sustainable value proposition and value realization, but lacks the perspective of value creation process, i.e., how is the value provided. Further study should cover the whole process of SVC, in which stakeholders are both recipients and (co-)creators of value. Thus, the focus will be stronger on a stakeholder theory perspective on SVC through business models. As the use of the framework also revealed the negative sides of value creation, the next step in the framework development should also cover how to manage SVC to eliminate negative consequences and turn negatives into business opportunities.

Regarding the concept of SVC, in this study, the sustainability impacts, i.e., value outcomes, are qualitatively assessed, and value is considered from a customer perspective referred to as perceived use value. Thus, the results of this study are based on subjective notions on value. Such view on value is central in sustainable business model development and in creating sustainable value propositions and further assessing the realization of the business model for SVC. However, to enhance sustainable development and ensure that businesses operate within planetary boundaries, also the environmental and socio-economic effects of new business models need to be measured using actual numeric data.

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Assessing the transformative potential of renewable energy initiatives: a framework based on business model and sustainability transitions literature

Proka A.[*,+], Hisschemöller M.[1], Loorbach D.[1]

[1]Dutch Research Institute for Transitions

*Antonia.proka@gmail.com

[+]Pursued her PhD at the Dutch Research Institute for Transitions

Abstract

As renewable energy initiatives mushroom around the world, plenty of novel business models take shape, manifesting an advancing energy transition. The question that naturally emerges is whether initiatives like these can transform the energy system as a whole. This paper explores as to whether enriching a business model perspective with insights from sustainability transitions theory provides a way to analyse the transformative potential of renewable energy initiatives. In order to systematically examine the initiatives' contributions, we suggest studying the business models they develop and implement and how they relate to their institutional context. For this, we propose examining niches as embryonic institutions that exhibit a dialectic relationship with the regime. This work embraces a broad orientation on value that allows, apart from financial, the consideration of social and environmental values and disvalues. The introduced framework enables to comprehensively assess and potentially improve the initiatives' contributions to sustainability transitions.

Keywords

sustainability transitions, niche, business model, energy transition, impact

1. INTRODUCTION

Renewable energy initiatives are rapidly developing in Europe and beyond. Community energy cooperatives, peer-to-peer energy providers or crowdfunding platforms for solar or wind, are all examples of a variety of new businesses that develop and represent an alternative way of organising the political economy of the current energy system. Notwithstanding many differences, their common point of departure is bridging the gap between energy production and consumption. This is amply illustrated by their preference for decentralized technical solutions and the discourse on 'prosumption', a concept that implies end user involvement and ownership of the energy produced. In Europe alone, more than 3400 renewable energy cooperatives, or as defined in the recent EU-directives “citizen energy communities”, were recorded at the start of 2019 (REScoop MECISE, 2019). As they flourish in numbers and increase their impact through additional projects and services the question that naturally arises is whether initiatives like these have the potential to transform the way the overall energy system works. It is uncertain whether the diffusing initiatives are *willing* and *able* to professionalise, challenge and eventually alter the system without being captured by it. And for this, our research focuses on the following question: “*How and under what conditions could the (self-)organisation of renewable energy initiatives contribute to desired transitions to sustainable energy futures?*”

This contribution argues that, for those interested in the transformative potential of renewable energy initiatives, i.e. their capacity to radically change the energy system and its underlying institutional framework, the primary question to be addressed is of a conceptual and methodological nature: how can their transformative potential be assessed? Obviously, assessing this potential is not making a prediction with respect to the upscaling of specific initiatives. After all, the energy transition is a complex, long term, and uncertain process (Verbong & Loorbach, 2012). Nonetheless, we do know enough about the current state of the energy transition as to make a meaningful analysis of the indicators by which the potential of renewable energy initiatives can be evaluated.

In order to develop a framework of analysis, this paper will explore and link two concepts. First, the concept of business model, which has been developed to assess the factors that contribute to the success of a company through value creation (e.g. Magretta, 2002; Doganova & Eyquem-Renault, 2009; Boons & Lüdeke-Freund, 2013; Schaltegger et al, 2015; DaSilva et al., 2018). Renewable energy initiatives, organized into cooperatives, are companies, which nevertheless differ from the transnational energy corporations that still dominate the global energy market and the publicly owned energy companies or public private partnerships that in many places still provide heat to local communities. For private companies, value creation has mostly been associated with monetary value, the ultimate goal being an increase of revenues. However, the literature on sustainable business models also points to the relevance of societal values, especially where social innovations are concerned, such as a decrease of Greenhouse Gas emissions or an increase of social coherence at local or neighbourhood level (Stubbs & Cocklin, 2008; Upward & Jones, 2016). Hence, notions from the literature on (sustainable) business models are expected to bear relevance for the topic of this paper. However, whereas the concept of business model is used to assess how businesses operate and relate to their immediate network (Mason & Spring, 2011), its focus downplays the influence of the wider socio-technical context (Schaltegger et al. 2016, p. 284). This wider context is especially relevant for sustainable businesses that have to deal with barriers at system level (e.g. Bolton & Hannon, 2016).

The second concept this paper will explore is that of niche in the context of the theory on sustainability transitions, i.e. long-term, non-linear processes that entail fundamental changes in multiple systems and scales (Grin et al., 2010; Geels & Kemp, 2000). In transition theories, the concept of niche has been used to highlight innovations that provide potential alternatives for the current (unsustainable) regime. In this view, radical innovations are potentially dangerous for the regime, i.e. the status quo of dominant institutions. Therefore, the regime hinders the growth of the niche by obstructing business models for radical innovations. Although niches are frequently associated with technological innovations, this concept may also apply to social innovations, i.e. new social practices with possible transformative impacts (Cajaba-Santana, 2014; Avelino et al., 2017). Renewable energy initiatives are good examples of social innovations that present radical new ways of doing, thinking and organising as compared to incumbent regimes.

Transitions are the result of increasing external pressures from a changing environment, internal tensions associated with the path-dependent regime development and increasingly competitive alternatives (De Haan, 2010). Transition governance literature explores how different types of agency influence the course, speed and direction of transitions (Loorbach, 2010, Brown et al, 2015). But so far, less attention has been paid to agency from within the niche.

This paper's main objective is to explore and discuss how linking the transition and business model perspectives can enable the analysis of the transformative potential of renewable energy initiatives. It does so by identifying the dimensions that may serve as indicators thereof. In what follows we first discuss how notions related to the concept of (sustainable) business models can help articulating the aspirations and vulnerability of renewable energy initiatives (Section 2) and then use the concept of niche to put these findings in an institutional framework (Section 3). Building on these insights we ultimately present our framework for the analysis of the contributions of renewable energy initiatives and their transformative potential (Section 4); we then summarise and conclude (Section 5).

2. THE MULTIFACETED CONCEPT OF SUSTAINABLE BUSINESS MODEL

Social innovations aspiring to contribute to transitions are almost by definition initially driven by idealism, entrepreneurship and experimentation. Yet, to move beyond the phase of local they inevitably face challenges of professionalization, upscaling and mainstreaming. To what extent can the concept of a sustainable business model help to better understand and support this process, especially when institutional settings constrain their space for action (Kern et al., 2015)? A critical exploration will reveal at least three functions of this concept for the framework to be developed in this paper.

The concept of business model is multifaceted and even contested. It originally emerged in the for-profit frame and spread by an extensive use of practitioners and academic scholars. The concept, residing somewhere between economics and business studies without possessing an established theoretical grounding in either field (Teece, 2010; Speith et al., 2014), has been criticized as fuzzy, as it "*seems to refer to a loose conception of how a company does business and generates revenue"* (Porter, 2001, p.73). Zott et al. (2011) found that business models are often studied without an explicit definition of the concept; yet several attempts have been made to cover this definition gap. Business models have been referred to as a statement, a description, a representation, an architecture, a conceptual tool or model, a structural template, a method, a framework, a pattern and a set (Ibid.).

It can be derived that the first critical function of the business model concept is that it refers to a (more or less specifically defined) approach or methodology to be employed by either the company or an observant: a business model may be understood as "*a tool to position the value proposition in the value chain"* (Sabatier et al. 2010, p.442), or as a strategic management tool to improve a company's value chain (Linder & Cantrell, 2000). By working towards a business model an organisation seeks its position in the market and finds out about barriers and opportunities. Teece (2010) argues that a business model reflects management's hypotheses about how a business could align its offerings with the needs of the customers in order to make a profit. Hence, a critical purpose of research into business models is a better understanding of "*how managers conceptualise, theorise and enact the modelled changes in organisations and market"*' (Mason & Spring, 2011, p.1033). However, it is not only the managers' vision that counts. Equally important for eliciting the business model are the organisation's daily activities (Mason & Spring 2011; Schaltegger et al., 2015).

And, indeed, the business model is *"both a cognitive phenomenon as well as built on the material aspects*" (Tikkanen et al., 2005, p.789). These material aspects involve the complex exchange relationships and resource configurations, "*based on contracts and organizing routines*" aimed at creating and capturing value within a value network (Doz & Kosonen, 2010, p.371 In Bidmon & Knab, 2018; Chesbrough, 2010; Teece, 2010; Zott et al., 2011). As a cognitive phenomenon, business models involve their collective cognitive representation; the "*causal links between the material exchange mechanisms of organizations and their environment which exists in managers' minds*", and reaches the minds and actions of employees and partners (Bidmon & Knab, 2018, p.905, citing Baden-Fuller & Mangematin, 2013; Baden-Fuller & Morgan, 2010; Doz & Kosonen, 2010). A business model has been described as a complex system, which comprises of sub-systems*,* *"each functioning with localized logics (or models), such as, a marketing logic, the logic of revenues, the logic of customer relationship management, etc" (*Massa et al., 2018 p.65). All these different elements comprising a business model are interconnected and interdependent. As a whole bigger than its parts, a business model can explain how organisations work facilitating the articulation of business ideas and processes of collective sense making for current and future actions (Doganova & Eyquem-Renault, 2009; Massa & Tucci, 2014; Massa et al., 2018).

The implication from this is that research into business models needs to do more than just echo a company's claim in this respect. It needs to critically investigate both documentation and practices, asking why things are happening as they do. The findings from this research may point to contradictions between what an organisation claims and what it practices. The case of renewable energy cooperatives shows such a contradiction where they claim that their membership consumes the energy they produce, the ideal of 'prosumerism', whereas, in reality, legal barriers exist that prevent cooperatives from selling or funnelling the energy produced (back) to their members. The distinction between a documented vision and practice corresponds to the distinction between "espoused theory" and "theory-in-use" (Argyris & Schön, 1974). The former refers to the claims that an organisation makes as regards its behaviour, whereas the latter refers to the implicit theory that governs its practice. Articulating the theory-in-use can be helpful to assess the accuracy and/or truthfulness of business models (e.g. Amit & Zott, 2001). Especially in case of a niche organisation, like a renewable energy cooperative, it can shed some light on both the initiative's strengths and its vulnerability. Interventions could enhance a dialogue within and among organisations with a similar sustainability goal, thereby encouraging learning.

Indeed, it has been argued that a business model perspective is about learning. It underlies the awareness that adaptations or radical changes might be needed due to changes internal or external to the organisation (Wirtz et al., 2016). Business models have been associated with securing and expanding a company's "*competitive advantage"* (Ibid). This means that business models become themselves subject of strategic innovation in order to leverage resources as knowledge, managerial and entrepreneurial skills, or to enable reconfigurations of the underlying value chain or value network for organisations to flourish (Schaltegger et al., 2012 cf. Schweizer, 2005; Wirtz, 2011). And as DaSilva et al. (2018) note, it is due to a failure to adapt or create new business models to incorporate disruptive technologies, for instance, that companies collapse, and not due to the disruptive technology *per se.* Any company has at least as much value to gain from business model innovation as from technological innovation (Chesbrough, 2010).

The notion of learning implies that business models are performative in that they can be understood as a set of interconnecting ideas and practices that co-evolve with the context within which they are practiced (Mason & Spring, 2011). In other words, business models describe and encompass a number of practices, in which actors engage, as regards value creation, delivery and capture, which in turn influence and shape their context**.** Business models can be seen as "*as a reference point for communication*" for the creation, maintenance and transformation of markets; they may be understood as 'market devices' for enabling the emergence of innovations (Boons & Lüdeke-Freund, 2013, p.10; Doganova & Eyquem-Renault, 2009). This is the second critical function of the concept: business models are often launched as inspiring narratives with the purpose to circulate across different actors and fields and attract customers (Magretta, 2002). Combined with a sustainability orientation, business models function as catalysts for awareness of the need for system-wide transitions. Impact driven business models enable social entrepreneurs to create and further develop markets for innovation with a social purpose, shifting the market they operate in (Boons & Lüdeke-Freund, 2013; Loorbach & Wijsman, 2013). Once they are carried by a stakeholder network, sustainable business models act as catalysts to creating and transforming markets towards sustainable development (Boons & Lüdeke-Freund, 2013; Schaltegger et al., 2015).

In case of narratives, too, it is critical to articulate the explicit and implicit assumptions and expectations of the company, because the company can be misguided with respect to both the message content and the addressees. Hence, interactive development of a sustainability strategy is advisable (Stubbs & Cocklin, 2008).

The third critical function of the business-model concept, within the scope and focus of this paper, relates to its content. Theories-in-use may articulate three types of relationships: (1) cause-effect relationships, (2) goal-means relationships and (3) relationships among norms and values (Hoogerwerf 1990). A typical business model articulates the relation between the company's goal, most often referred to as value creation, and the means to realize it. As Wirtz puts it, a business model "*captures the way the firm functions and creates value*" (2010, p.274). Osterwalder (2004) argues that business models explain how organisations create, deliver and capture value. While in the for-profit sector value is almost synonymous to financial value and profit maximization, for sustainable business models this differs. What distinguishes business models with a sustainability focus from other business models is the explicit articulation of normative claims and assumptions. The focus is deliberately extended towards a plea for considering social and ecological values, or in other words, the internalisation of social and environmental externalities (Schaltegger et al., 2015; Boons & Lüdeke-Freund, 2013).

The manifold discussions on sustainable business models imply the question into the relationship between the goal of realizing profits for the company and its contribution to the realization of sustainability values. Stubbs & Cocklin (2008) suggest ideal types of business models on a continuum from "for-profit" to "strongly sustainable". The typology is presented as a tool for businesses to find points of leverage for change towards a more sustainable business model. However, this typology appears to suggest a contradiction; the more sustainability focus, the less revenues, and vice versa. Yet, many companies today, big and small, convey the message that their sustainability orientation allows the company not only to stay in business but even to increase its revenues. This claim may be based on the observation that many customers are willing to pay more for sustainable than for unsustainable products. Local energy cooperatives in many European countries have been able to produce renewable energy thanks to feed-in tariffs or tax exemptions. As a representative from a German renewable energy company phrased it: "*The EEG (Erneuerbare-Energien-Gesetz, 2011) is our business model*" (Sühlsen & Hisschemöller, 2014, p.218). Indeed, government grants and subsidies enable companies to do sustainable business. This not with high revenues but with sufficient income to keep the volunteers in the cooperative going.

These observations are interesting in two ways. First, next to goal-means and norms-values relationships, the valuation part of a business model articulates cause-effect relationships, such as: willingness to pay for a sustainable product on the side of specific consumer groups or governments causes a specific amount of income needed to cover company costs or to realize benefits. A sustainable business model reveals an attempt to identify an innovation's market potential. Its facts and figures point to the vulnerability of the business and specify the need for specific support to realize a responsive cost-benefit ratio. Second, the above observations illustrate that companies with sustainable business models address segments of the market, where a specific group of customers is expected to pay for their product (niche market). The transformative potential of renewable energy initiatives, or in other words, the potential to have systemic impact, depends on their willingness and capacity to address a much broader public than only the relatively small part of attentive citizens; this involves a systematic articulation of their envisioned contributions. Yet sustainability-oriented business models are constrained and may conflict with their overall institutional framework. This would mean that next to the immediate context of the business, systemic factors must be taken into consideration (Schaltegger et al., 2015, p.6).

In conclusion, the concept of transformative business model is introduced as a multi-faceted concept that refers to a reflexive tool to reveal how a company best pursues its interests in the context of sustainability transitions. Research into the business model requires that a company's claims and practices are to be analysed and, in so far they are implicit, need articulation. Following the literature in this section, a business model can be laid out into four components:

- The *Value proposition* that clarifies what value (i.e. benefit) is embedded in the offerings of the organisation towards specific target groups (e.g. Doganova and Eyquem-Renault, 2009, Schaltegger et al., 2016);
- The *Product or Service*, which fulfils the value proposition and generates the promised benefit offered to customers (and indirectly to other stakeholders) (e.g. Stahler, 2002);
- The *Architecture of value* that lists the partners and channels through which value creation and delivery is accomplished (e.g. Doganova and Eyquem-Renault, 2009), and,

- The *Value capture*, which encompasses the cost and revenue flows that determine the value (including but not limited to financial value) captured by the organisation and define its viability (e.g. Upward and Jones, 2016; Schaltegger et al., 2016).

These components comprise together a whole, i.e. a business model, which is more than the mere sum of its parts and is characterised by non-linear interdependencies (Simon, 1996; Forrester, 1961; Sterman, 1994; Casti, 1986 cited in Massa et al. 2018).

3. TOWARDS A PLURALIST NICHE CONCEPT

Transformative business models should be conceptualised as transforming existing (market) contexts or helping to build up new ones. To do so we need additional elements and a better understanding of the dynamics of transitions, for which we turn to transition theory. Central in transitions literature is the idea of the co-evolution of material and social structures, like technologies, markets, routines or discourses, which over time turn into a stable system that enables the fulfilment of a societal function like energy provision (Kemp, 1998; De Haan, 2010; Fuenfschilling & Truffer, 2014). "Regimes" account for the system's stability, as dominant vested interests and path-dependent processes of incremental optimisation have resulted in prevailing "institutions", i.e. "*formal and informal (explicit and implicit) rules of the game that shape the behaviour of actors involved*" (Hisschemöller & Bode, 2011, p.14). Yet, transition research, in line with Giddens (1984) structuration theory, suggests that just as actors' behaviour is shaped by structure, structures are maintained and adapted through actors' individual or collective will (i.e. agency). In fact, transition theory allows for the existence of "niches" described as the protected *places* where (radical) innovation emerges (Kemp et al., 1998). Niches embody the *conditions* that allow potentially disruptive innovations to grow and reach the momentum to ultimately transform the system within which they operate.

Concerning energy, next to laws and regulations, pillars of the regime are its physical infrastructures (e.g. a natural gas grid in a fossil regime) and technologies (e.g. gas heaters), as well as passive consumer routines disconnected from production. Next to formal institutions, a regime relates to informal rules that can be just as powerful in shaping the behaviour of persons: the privatized energy market has influenced consumer behaviour (Switch to cheapest provider!). Of special interest is the knowledge infrastructure of the energy regime and the knowledge it (re)produces, such as the notion of energy hierarchy (Trias energetica) that served as a paradigm for the improvement of energy efficiency as a critical step towards more sustainability (Hisschemöller & Sioziou, 2013).

Noteworthy, transition scholars have used the notion of regime to refer to both rules and the actors behind them. In the words of Kemp et al. (1998), Geels (2002) and Smith (2007), regimes comprise of a complex structure of artefacts, institutions *and agents*, and are characterised by path-dependency and lock-in. They involve specific material and technical elements, *networks of actors and social groups* as well as formal normative and cognitive rules that guide the behaviour of actors (Smith, 2007; Geels, 2002) (authors' italics). This broad understanding equally applies to the notion of niche, which is interchangeably used to denote the space where innovations can develop, the innovation itself, together with the person(s) involved in the innovation (e.g. Smith, 2007). This ambivalence in the use of the notions is considered problematic, especially in times of advanced transitions when actors reposition discursively and through their coalitions (Bosman et al., 2014). Such shifts manifest changing power relations typical for transitions, and our use of concepts should allow tracing such phenomena (Avelino & Wittmayer, 2016).

The concepts of regime and niche are increasingly used to conceptualize the dialectics between stability and change rather than two separate competing entities (e.g. Hoffman & Loeber, 2016). Niches can emerge within regimes and regimes may develop within niches. The concept of "capture" is problematised; in analogy with Trojan Horses research suggests that niche-capture may turn out favourable to the "victims" and their envisioned transitions (Pel, 2015). There is discussion on transitions as a result of interactions between regimes from different sectors like mobility, ICT and energy (Konrad et al, 2008), and attention for mechanisms of diffusion of transformation through multi-niche dynamics, such as local energy cooperatives engaging with car-sharing and sharing economy (Gorissen et al. 2016). Still central though is the core idea in transitions research that incumbent interests, institutions and actors will predominantly seek to stimulate optimisation and prevent disruptive changes. From a transitions' governance research perspective, this leads to emphasizing the need for protecting, nurturing and scaling radical innovations (Smith & Raven, 2012).

The Strategic Niche Management (SNM) approach was developed with the aim to serve the management of socially desirable radical innovations oriented towards sustainability, typically facing a mismatch with existing infrastructure, user practices, regulations, etc. (Schot & Geels, 2008). Central to SNM is the distinction between the "*market niches"*, on the one hand, and the "*technological niches"*, on the other (Kemp et al., 1998; Schot & Geels, 2008). The former, in line with Levinthal (1998), imply different selection criteria within the existing regime, e.g. users who have special demands and are willing to support specific innovations for their unique characteristics, allowing them to compete and survive in the (niche) market (Geels & Kemp, 2007). In the case of so-called technological niches, however, it is argued that protection is needed from outside the market because for these types of innovations no available user demand exists yet (Ibid). Evolutionary economists and management scholars stressed that technological niche-innovations must be kept outside the realm of the regime (e.g. Saviotti 1996; Windrum & Birchenhall 1998; Frenken et al., 1999, cited in Schot & Geels, 2008) because of the concern that the regime would otherwise be able to usurp the niche-innovation and use it for its own benefits. While one might expect that SNM would be helpful in addressing the question into the transformative potential of renewable energy initiatives, the literature on SNM is disappointing for three reasons.

First, approaches aimed at studying the governance of sustainable innovation such as SNM and the Technological Innovation Systems (TIS) approach (Hekkert et al., 2007) imply that, among the supportive actors, government is critical for niche protection. This fits the broadly shared view that for innovations to pass the so-called Valley of Death governments (must) act as “launching customers” (Agostini & Naggi, 2009). Above all, government is supposed to guarantee a level playing field and, where this is absent, to support those who cannot compete on the terms of the fossil-based energy regime. Yet, this notion of protection is inherently problematic. From the perspective of an antagonistic relationship between regime and the more radical niches it sounds oxymoronic: the wolf protecting the sheep. Given that incumbent policies are by definition part of the regime, this risks the danger of policy creating niches not to accelerate but to control and potentially delay transitions (Loorbach, 2014).

Beyond dispute, governments facilitate in many ways R&D, experiments, demonstration projects, and market entrance for renewable energy innovations. At the same time, though, governments worldwide benefit from fossil-based energy (in the form of tax revenues) and financially support it. A study by Coady et al. (2015) reveals that fossil fuel companies benefit from global subsidies of about $5.3tn a year, an amount that exceeds the total health expenditure of all states. Hence, it would be naive to expect government protection of energy innovations would come naturally.

The role of government is critical and probably distinct from the role of any other societal actor. However, this is not because governments have an exceptional role to play in niche protection. In fact, Transition Management (Loorbach, 2010, Rotmans & Loorbach, 2010) points to the critical function of ‘frontrunners’ from niches or even regimes for the speed and direction of sustainability transitions. If we look at renewable energy initiatives, which have to compete with market forces that benefit from an externalization of environmental costs, the role of government appears to be critical; what makes it critical, is that all social, economic and political contradictions related to the energy transition cling together in public decision-making. Government action affects financial schemes, research agendas, physical planning, infrastructure etc. It can thus be expected that the business models under development within the energy niches reflect the institutional settings within which they emerge and articulate specific needs for public policies, beyond financial schemes, which may enable them to eventually surpass niche conditions.

It is worth mentioning that the very idea that niches benefit from protection has been criticised too. It was found that technological niche-innovations may benefit more from a confrontation with incumbent market forces in a relatively early stage, so that they can engage in practical learning with respect to their own strengths and weaknesses (Hommels et al. 2007).

This brings us to a second issue. By focusing on specific *technological* solutions and being principally interested in their emergence and diffusion, the focus of SNM loses sight of innovations that go beyond (socio-)technical developments that occur in a market economy. This has also been pinpointed by grassroots innovations scholars, who begun to apply the niche concept to social innovations occurring in civil society (e.g. Seyfang & Smith, 2007; Seyfang et al., 2014). What is important here is that unlike SNM, grassroots innovation literature emphasises collective agency as a force towards a more sustainable society (Middlemiss & Parrish, 2010).

Niche-innovations are indeed not passive in their interaction with societal actors: they have agency. In other words: they have a capacity to mobilize the support they need. In shaping their identity, they develop storylines and strategies (Seyfang et al., 2014; Smith & Raven 2012). This is especially true for social innovations, the energy cooperatives or the Prosumer movement: they have increased their membership, have actively built their support networks, they have developed narratives on the benefits of Prosumerism and strategies for receiving recognition through policies and regulations at national and EU level[17]; they even compete with regime actors in tendering procedures for renewable energy projects. In short, in shaping their identity vis-a-vis a hostile regime, initiatives in fact produce, evaluate and reproduce business models. These business models articulate both its specific need(s) for support as well as the innovation's (anticipated) potential.

The third issue, most important for addressing the transformative potential of energy initiatives, relates to niche categorizations. First of all, concerning the already-mentioned *technological* and *market* niches, what is referred to as a technological is almost synonymous with a *market* niche without a (niche) market. Avelino (2011) distinguishes between so-called "*moderate*" and "*radical*" niches; the former being embedded in existing institutions and the latter (possibly) embedded in new institutions, exhibiting antagonistic relationships with the regime. Social niches for grassroots innovations like energy-based currency or time banks are seen as radical, given their antagonistic relationship with the regime. Still, it is in regime's interest to create its own (moderate) niches and to experiment with new structures, technologies and institutions, which do not challenge the dominant trends (Avelino, 2011).

Without doubt, the energy transition witnesses many examples to substantiate the categories cited. Within the realm of technology development, a typical example of an innovation developed within the energy regime is the micro Combined Heat and Power (CHP). This micro-CHP uses natural gas, yet it involves big efficiency improvements, as it delivers both heat and electricity. A competitive development outside the natural gas-based energy regime in countries such as the Netherlands, has been the electric heat pump. This innovation uses electricity combined with a heat source (either air, water or thermal). The market penetration of electrical heat pumps across Europe triggered another innovation aligned with the fossil regime: the so-called hybrid heat pump

[17] Specifically, the recast Directive 2018/2001 (Renewable Energy Directive II, or REDII), recast Directive 2019/944 (the Internal Electricity Market Directive, or IEMD) and recast Regulation 2019/943 (the Internal Electricity Market Regulation, or IEMR) contain provisions that establish a supportive EU legal framework for community ownership. The Clean Energy Package defines two new concepts labelled "renewable energy communities" and "citizen energy communities". It also requires Member States to secure certain rights of energy communities and establish enabling frameworks to ensure a level-playing field and promote their development.

combining a heat pump using outdoor air with a gas boiler. This innovation was presented as a big step towards renewable heating, but it is also considered an attempt to delay the transition away from natural gas. The realm of social innovations, too, has witnessed active attempts of the regime to appropriate niche innovations. The appeal of the cooperative energy movement has led incumbent energy companies to also establish energy cooperatives, although the membership is by contract part of their clientele. However, where the distinction between two types of niches, radical and less radical, at first sight appears to make sense, it turns out to be confusing when it comes to the question of the transformative potential of niche-innovations. The more radical the niche-innovation, the more constraints it faces in its attempts for expansion, the more protection it needs, the less it receives. It could even be concluded that innovations strengthening path dependency would have more potential for sustainable system transformation than radical niche-innovations, because the former are more acceptable to the regime. Smith (2007) highlighted this paradox pointing that while niche success improves with better regime compatibility, the latter implies lack of significant divergence from it, which in turn limits regime transformation.

A transition comes nevertheless with a paradigmatic shift. Transitions suppose system destabilization, featured by tensions and conflicts, which, in the case of the energy transition, affect system boundaries and even the very existence of the system itself (Loorbach, 2010). A (socio-)technical innovation like an electrical heat pump could enable a shift from natural gas-based residential heating to electricity, but this is not a transition. However, combined with a very low-temperature heat infrastructure in ownership by the end users, it could become part of the emerging institutions of a decentralized renewable system that links renewable energy to the management of fresh water, waste (water), local agriculture and the like, shaping a system completely different from the existing energy system. In other words: the system in the sustainability transition is defined and redefined by the social contradictions and struggles that make up for it.

Transitions relate to the parallel breakdown and building up of institutions. A niche or a combination thereof is in fact an embryonic regime, as it has not (yet) attained a strong degree of institutionalisation: niches imply "*nuclei for future (radically different) regime structures*" (Fuenfschilling & Truffer, 2014, p.773). They thereby articulate different dimensions, technological as well as social. However, rather than assuming niches are either "*moderate"*, "*mildly antagonistic*" or more *"radical"* and even "*revolutionary"* (Smith et al., 2010; Avelino, 2011), Fuenfschilling and Truffer (2016) suggest that the potential of a (socio-technical) innovation to bring about institutional change depends on the institutional work required given its *reconfiguration capacity*.

In some respects, the niche and the potential institutional reconfiguration it embodies could be quite similar to features of the incumbent regime, in other respects it could be quite different. This observation is in line with Laclau and Mouffe (1985), who argue that social contradictions are pluralistic in character rather than bipolar. Actors operating within the niche shape their identity, and in turn the niche in which they operate, in an "*antagonistic"* way, as this identity is pursued by differentiation from other identities. However, it cannot be taken for granted that the antagonisms are similar for all niches alike, as it cannot be assumed that actors with an interest in the incumbent regime would pursue similar strategies to maintain their position.

So, instead of bipolar niche categorizations, this section concludes that a pluralist niche concept is preferable for the evaluation of the contributions and the transformative potential of innovations. In an era of system destabilization, more radical innovations gain social acceptability where lock-in options have failed. Specific features of niches, associated with just one or a cluster of innovations, can make a difference where a niche-innovation's transformative potential is at stake. More relevant than a niche's alleged "radicality" vis-a-vis the regime is the match between specific niche features and its base for social support through which the niche can increase the pressure on the energy regime and political decision-makers.

4. THE ANALYTICAL FRAMEWORK

The main purpose of our framework is to help understand and analyse the transformative potential of renewable energy initiatives; that is, the value they bear to transform the system within which they operate. For this, we revisit the work of Smith and Raven (2012). The scholars addressed the questions of how the protective space is created, maintained or expanded. Having derived from the literature the different selection pressures regimes exercise on niche-innovations, they mapped the regime dimensions. Then, they suggested that the dynamics that play out between technological innovations and the broader process of transformation should be understood through processes like *shielding* (protecting an innovation against mainstream selection environments), *nurturing* (improving an innovation's performance) and *empowering*. The latter refers to multi-dimensional work to "*fit and conform"* or "*stretch and transform"* the regime. In the first case empowerment means that after a short period of protection the innovation will be able to successfully compete under mainstream selection pressures. In the second, the work aims at altering the mainstream selection environments in a way that parts of the shielding becomes institutionalised, as new norms in a transformed regime: the innovation does not conform to but instead transforms conventional selection criteria in ways favourable to the innovation (Smith & Raven, 2012; Verhees et al., 2013).

Of interest to us is the "stretch-and-transform" process, where the actors seek to reform institutions, or in other words, reframe the rules of the game that define the prospects of mainstreaming their innovation (Raven et al., 2016). Our work addresses the recommendation of Kern et al. (2015) to amend the framework of Smith and Raven (2012), which in its current form over-focuses on actors, their networks and the narratives they articulate, failing to sufficiently capture the influence that the surrounding institutional settings have on empowerment work. Building on Fuenfschilling and Truffer (2014) who suggest that niches can be considered as embryonic regimes, we argue that practically the same dimensions can be used to describe both regimes and niches. This allows us to capture the niche in its dialectical and antagonistic relationship with the regime context. The dimensions work in a twofold way: on the one hand, they represent the new institutions the initiatives build in their attempt to be *self-empowered*. On the other, the same dimensions depict the institutional settings within which the initiatives operate, which are the ones they aim to influence to their favour. In other words, the dimensions enable the study of the innovation within its context and the investigation of enabling or inhibiting factors regarding its growth and expansion.

In what follows, the framework of Smith and Raven (2012) is used to create a framework that helps to assess the transformative potential of (social) innovations, enabling a hybrid understanding of system change and how the transformation unfolds. This will be illustrated by examples from the field of renewable energy initiatives in the Netherlands. The framework has the following seven dimensions:

1. Sector structure

Sector structure involves the expertise and networks addressing a societal function, like energy or health. Renewable energy initiatives, by engaging stakeholders who were not active in the energy sector before, blur the boundaries between different sectors. This may have a significant impact on the power relations between regimes and niche-level innovations. For instance, NDSM energie is a prosumer initiative of 60 companies located in the port of Amsterdam.

2. Technologies and Infrastructures

Technical standards along with the associated infrastructure of technologies lead to path-dependence. Although some largely fossil fuel-based incumbent energy utilities invest in RES technologies too, the types and scales they opt for differ from what energy cooperatives do. While the former prefer large-scale centralised solutions like big off-shore wind, the latter go primarily for (rooftop) solar and (mainly) onshore wind. This in turn, has implications on the necessary supporting infrastructure and partnerships (e.g. electric heat pump vs. hybrid heat pump).

3. Knowledge base

Knowledge base involves formal and tacit knowledge that guides the behaviour of people. Knowledge claims are used to make space for transformation to happen or to consolidate the existing system. Regime knowledge base for instance is featured by energy savings; hence consuming less but remaining fossil. In contrast, niche knowledge base relates to the attempt to avoid fossil, i.e. transitioning to a 100% CO_2 emissions reduction, encompassing considerations about the environmental and social implications of fossil fuels.

4. User practices

User preferences and routines are also critical. Becoming members of a cooperative people turn from passive energy consumers to energy prosumers, producing their own energy and acquiring ownership and control of their utilities. Joining a cooperative people become more interested, even temporarily, in monitoring (and reducing) their energy consumption (Hargreaves et al., 2013; Sifakis et al., 2020). Moreover, in the case of energy neutral or positive houses, where the gas related infrastructure is replaced by the respective electricity options, the shift to electric cooking might be met with resistance, and thus more work is needed for its diffusion.

5. Cultural significance

Symbolic meanings, guiding principles and related values of a system, influence the diffusion of innovations, through mechanisms of appreciation, for instance. Different actors, thus, engage in aligning with or reframing concepts rooted in culture to the benefit of their innovation. Solar energy for instance, is communicated with bright images of the sun: a bright, clean future for the coming generations. Sustainability and people's wellbeing become central, while the notion of *security* is interpreted in a broader way, in terms of long-term viability of the energy system, the planet and all life on it.

6. Policies and political power

As already discussed, policies like national or municipal regulations are critical. Local energy cooperatives anticipate entirely different policy frameworks from the dominant ones. Through their umbrella organisations, they try to, on the one hand, strengthen the community energy sector (in-ward orientation) and on the other, influence the framework within which they operate through lobby (out-ward orientation) (Raven et al., 2016). Although actors within the niche do not have the capacity to design policy like actors linked to the regime, they may engage in institutional work influencing its direction, through official structures, like their umbrella organisations, and unofficially, through ad-hoc appointments, that may eventually result in disruption of the existing institutions (and the creation of new) (Lawrence & Suddaby, 2006). At times, niche favouring actors have the opportunity to directly co-design policy affecting them, especially at municipality level.

7. Organisational logic

Lastly, the dimension on organisational logic relates to processes, routines and activities such as task allocation and coordination across the value chain, as well as, ownership issues and relationships between investors, producers and users. Smith and Raven (2012) considered issues like user-producer interaction, shared routines and capabilities as part of the industry structure (for us sector structure). We choose to disentangle the organisational logic of an initiative from matters concerning its broader (umbrella) networks, platforms for interaction and their collective capabilities. This, because our focus on social innovations brings to the fore the importance of scrutinising the so-called "best organisational practice"; the way business is organised. We share the impression with Bidmon and Knab (2014, 2018) that these issues are not adequately captured in the framework of Smith and Raven and we, thus, suggest treating them separately through a distinct dimension, as this type of issues may be critical for the diffusion of innovation. For instance, cooperative principles as democratic control, open membership, participation and independence conflict with the dominant organisational paradigm in the energy system.

Figure 3.1 presents our framework. The business model is placed at the centre of the niche dimensions to exhibit the centrality of the concept, as it is through the coordination of different actors and activities, that business models keep the seven dimensions together. Said differently, niches may be shaped by establishing alternative ways of thinking and organising within one social system, like the energy system.

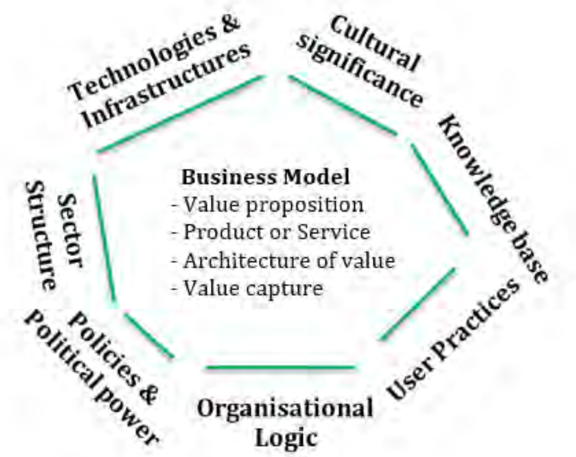

Figure 1. Analytical framework

These dimensions constitute the relationships between niche and regime. Niche-innovations may be considered as such because they differ from existing (regime) features in certain aspects but not so much in others.[18] In other words: a niche may be radical on certain dimensions, but not on others. The plurality of niche-innovations becomes, therefore, easier to grasp. For some, the implications for all aspects maybe clear from the outset, for others this may be less obvious.

This in turn, has an impact on the innovation's transformative potential. Not only can the dimensions be used to analyse the selection pressures that constrain the niche in its expansion, they can also be used to analyse the variety of the work required for its growth. In fact, the extent of the lines of the niche dimensions represent their (possible) degree of institutionalisation. Their length may rise through institutional work, whose type is determined by the respective dimension, and it may involve, among others, advocacy,

[18] Our approach could raise the question of the extent in which a niche should differ from the regime (e.g. number of dimensions), as to deserve to be considered a niche. This paper does not have the ambition to formulate an opinion on this matter. What we consider more important is the observation that there are different dimensions to determine how niches can be similar and different from the regime.

changing normative associations, or constructing normative networks where practices become legitimised and spread (Fuenfschilling & Truffer, 2016).

We look into these processes from a business model perspective. Business models play the role of coordinating and giving direction to the actions undertaken by the actors who wish to diffuse the innovation beyond its niche context. The business model encompasses both in-ward oriented action for the institutionalisation of its alternative niche features, as well as out-ward oriented action that problematizes the incumbent regime (Raven et al., 2016).

In what follows we wish to illustrate how business models help shape, maintain and upscale niches using examples of social innovations in the Dutch energy transition. Through the study of the initiatives' business models, we can examine their main struggles and the actions they take to circumvent them.

1. Value proposition

The value proposition of one energy cooperative, might relate to climate protection, air quality, social inclusion or local employment, among others. Such offered benefits influence system aspects like principles associated with its functioning (cultural significance), and create new practices oriented towards a future envisioned system. Typically, energy initiatives claim that they turn consumers to prosumers, meaning that they enable them to produce their own energy. A critical researcher should assess whether this is materialised in practice, as in certain occasions the business models of the initiatives do not provide their members with their own, locally produced renewable energy, and only collaborate with them in the production.

2. Service/Product

In the case of consumers' cooperative, the product embodying the benefit put forward by the organisation is the renewable energy, electricity and/or heat, or e-mobility; most of the initiatives focus on the former, and only few on the latter, while some also focus on energy saving measures (see e.g. Proka et al., 2018b; Proka et al., 2021). In the case of a producers' cooperative, the product does not reach the member of the cooperative but is sold to other customers. This building block enables thus the distinction among members, clients and other stakeholders. This, in turn, has certain implications concerning the extent in which an initiative influences its context, like for instance, its sector structure, the associated technologies and infrastructures or the user practices.

3. Architecture of value

A cooperative might be organised in subdivisions, like organisation branch, responsible for the overall administration, and project development branch. Typically, energy cooperatives, entrust part of their value creation and delivery to actors from the local community, like local installers, or the cooperative movement (see e.g. Proka et al., 2018a; Proka et al., 2018b). This relates to the fact that the value generated is designed to diffuse and be shared among different actors, often in its direct locality. Interestingly, when thinking about their partnerships the initiatives might consider specific (local) actors as significant partners, missing opportunities that different sort of coalitions would offer. This could be attributed to a dominant organisational logic within the sector or certain policies and regulations designed by the regime. The creativity of the initiatives, though, may shape new rules and structures, exhibiting the organisations' agency therein, like in the case of the wind park Krammer, whose direction arranged a direct Power Purchase Agreement with four multinational companies and "cut out the middle man" (i.e. energy utility) (Proka et al., 2018a).

4. Value capture

Energy cooperatives build on local community involvement. Apart from people's financial support, along with that of local authorities, members' investment in time and effort is central for their growth. At first, the voluntarily invested time compensates for the lack of revenues in financial capital, as volunteers undertake most of the administration in their spare time. Similarly, the costs for growth and expansion are initially low, as cooperative members spread the initiative's value by word of mouth. To that, the local scale and trust plays an important role. A cooperative might diversify its value capture method; it is possible to have independent cost-revenue streams running. For example, often the Board of directors is (partly) run by volunteers and fuelled with members' fees or other funds coming from subsidies, or donations, while the Executive director or Project managers are (at least partly) paid through the income generated by the energy production (e.g. Proka et al., 2018b). Such value capture challenges dominant system patterns in dimensions like organisational logic, sector structure, as well as user practices. It may thus result in tensions that require multifaceted, extensive institutional work.

All in all, we argue that the transformative potential of an innovation should be assessed empirically in relation to the degree of institutionalisation of its systemic features, and the dialectic interactions between niches and regimes. Herein, the business model perspective is critical as it enables us to systematically study the actors' contributions and the actions they take in order to further develop their contributions and transform the system.

5. DISCUSSION AND CONCLUSIONS

This work sets the basis to understand and (potentially) support the transformative potential of social innovations that advance sustainability transitions. Rather than focusing on the constraining mechanisms implied by regimes, the introduced framework shifts the attention to specifying how actors within the niche promote through their business model their innovation in the face of a hostile regime and, in doing so, shape the conditions that may eventually lead to system transformation.

By using the business model as a methodological device to understand the strategic and operational behaviour of renewable energy initiatives, this research may be positioned in the interface between sustainability transitions and (sustainable) business models. So far, business model research has neglected the developments at the macro- systemic level, while transition research, in turn, has paid little attention to the dynamics at micro-level (Bidmon & Knab, 2018)**.** Only recently scholars started to refer explicitly to both business model and transition theory; our paper contributes to the literature at this interface between business model (innovation) and sustainability transitions (Hansen, et al., 2009; Hannon, 2012; Hannon et al., 2013; Bidmon & Knab, 2014; Foxon et al., 2015; Huijben et al., 2016; Schaltegger et al., 2016; Bolton & Hannon, 2016; Wainstein & Bumpus, 2016; Bidmon & Knab, 2018). In contrast to scholars who take a narrow approach assessing business models as market devices for the commercialisation of sustainable technologies in the context of socio-technical transitions (e.g. Bidmon & Knab, 2014; Wainstein & Bumpus, 2016), our approach is wider, as we examine the role of business models in far-reaching sustainability transitions. And, in contrast to Hannon et al. (2013), we take a strong sustainability perspective wherein beyond economic, environmental and social value are also considered (e.g. Upward & Jones, 2016).

Our understanding of the concept of niche brings more nuance to the niche assessment. Considering niches as embryonic regimes, a niche can be captured in its dialectical and antagonistic relationship with the regime context and its influence on the empowerment work (see Kern et al., 2015). Our framework offers a fine-grained understanding of the actions the initiatives take regarding regime transformation, through the creation of new institutions and the parallel de-legitimisation and destabilisation of the institutions associated with the regime.

We propose examining the initiatives' agency by looking at their business models, as the latter articulate the vulnerabilities and the specific context of support the innovations need; the business model functions as a knot that keeps the niche dimensions together. Mirroring an initiative's strategy vis-à-vis its ambition and reflecting the institutional framework within which it operates, the business model is central in the assessment of the transformative potential of an innovation. And for this, this paper challenges researchers to seek and examine the real practice of practitioners beyond their claims. An explicit emphasis on organisational practices and routines, which have often been overlooked by scholars, is valuable for the understanding of the potential tranformative (Massa et al., 2018).

Specifically, we argue that the inspection of an initiative's business model vis-à-vis its institutional context enables to systematically assess what value the initiatives contribute and how, and whether they strategize in order to increase it. This perspective enables a comprehensive investigation of the critical conditions that define the initiatives' contribution to sustainable transitions.

This framework facilitates the study of how different initiatives interact with each other and with a shifting regime context (see Proka, 2021). Rather than a checklist for the assessment of whether an initiative is transformative or not, (something that can only be demonstrated in hindsight, after the transformation has taken place), our framework aspires to help comprehend and potentially support the initiatives' contributions to sustainability transitions by developing strategies to either confront, synergize or play into specific dimensions in order to increase their transformative potential. As the framework has been designed with a focus on the energy transition, adaptations might be required when applied in other domains.

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Assessing future 5G business models by their expected performance: scalability, replicability, and sustainability perspectives

Petri Ahokangas[1], Marja Matinmikko-Blue[2], Seppo Yrjölä[2,3] Heikki Hämmäinen[4] , Marika Iivari[1]

[1]University of Oulu, Oulu Business School, Finland; [2]University of Oulu, Center for Wireless Communications, Finland; [3]Nokia, Finland, [4]Aalto University, Department of Communications and Networking, Finland

*petri.ahokangas@oulu.fi

Abstract

The assessment of future business models' performance deviates from that of existing business models. This paper investigates and develops a framework to approach the assessment of future business models by looking at the expected outcomes of business models: scalability, replicability, and economic, environmental, and societal stainability. The framework is applied to a single case study of a port that is developing, based on 5G connectivity and data platform, novel digital business models. The analysis indicates that scalability and replicability stemming from data and the use of artificial intelligence influence especially economic and environmental sustainability. The paper contributes to our understanding on the relationships between and emergence of scalability, replicability and sustainability in the context of future business models.

Keywords

Business model, 5G, Scalability, Replicability, Sustainability.

Introduction

In extant research, business model assessment, evaluation, appraisal, measurement, and calibration are examples of terms used for finding out how business models perform. Business model performance has proved out to be as debated and multifaceted challenge—with various dimensions and quantification problems—as the concept of business model itself (Zott & Amit, 2008; Teece, 2010; Massa et al., 2017; Lüdeke-Freund et al., 2017). The performance-related discussion, however, has several streams that are yet to converge. Heikkilä et al. (2016) collected an open repository of tens of different metrics related to business model elements and performance, seen from various perspectives. Similarly, the topic of business model innovation has triggered scientific discussion around its measurement (Clauss, 2017; Foss & Saebi, 2018). As a short characterization of extant research, the business model performance discussions cover the whole business model lifecycle from business model foresight, creation, transformation, and continuation/extension, covering internal and external perspectives.

Recently, business models have become a means for researching futures and future alternative business models (Zott & Amit, 2010; Spaniol et al., 2019). Indeed, the business model can be seen as a means for planning, communicating and mapping for the future operations due to its dynamic characteristics—as the future is dynamic by nature as well (Duin, 2006). Prior to its operation, a business model can be used as an *ex-ante* representation of the possible outcomes of the business model (Baden-Fuller & Morgan, 2010) and as a device to articulate and depict what a company does or plans to do. Ardichvili et al. (2003) argue that business opportunities are made to create and deliver value for stakeholders (Sorri, Seppänen, Still & Valkokari, 2019), and that a business model matures from a business opportunity to a business model through experimentation (Sosna et al., 2010). Realizing a future business opportunity implies thus designing and implementing the desired future business model (cf., George & Bock, 2011), thereby *ex-post* creating (hopefully an unfair) competitive advantage to capture value. For example, Demil and Lecocq (2010) see business model innovation as a proactive process of anticipating and responding to the changes in the external circumstances. In other words, business model innovation is conceivable as a form of foresight and its innovators as practical futurists with an intention to enact a desired future.

Recent business model performance research (e.g., Bivona & Cosenz, 2019; Snihur, Zott, & Amit, 2020; Climet & Haftor, 2021) does not focus on futures as a specific research theme. Assessing the performance of future business models is problematic from several standpoints. Traditionally, properties such as novelty value to customers, potential for customer lock-in, synergy with complementarities, efficiency, potential for value appropriation i.e., (capture), adjustability and ability to mitigate risks have been highlighted in the business model literature when discussing the assessment (Teece, 2010). However, in emerging, disruptive and futures-oriented contexts, the assessment of business model is even more challenging than normally as it requires visioning the future business context to which the designed business model needs to be calibrated (Teece, 2010; Yrjölä et al, 2020; Costa Climet & Haftor, 2021).

For analyzing the performance of future business models, this paper goes deeper than just to look at future or anticipated business models created by the traditional business model templates. This paper uses the antecedent concepts and processes of business models: *opportunity* exploration and exploitation, *value* co-creation and co-capture, and (competitive) *advantage* exploration and exploitation (Ahokangas & Myllykoski, 2014), and it looks at the expected outcomes of the business models: *scalability*, *replicability* and *sustainability* as potential performance indicators. Accordingly, the aim of the paper is to create a futures-oriented assessment framework for business model performance by focusing on scalability, replicability and sustainability dimensions as part of expected performance indicators of a business model. The paper will apply the developed framework to analyze business model alternatives in a single case study of a port that is generating and experimenting with alternative business models for sharing of data between stakeholders for improving port area operations with the help of forth/fifth generation (4G/5G) mobile communication networks. Related future 5G business models within mobile communications are expected to disrupt many of the traditional and currently dominant mobile communications business models (Ahokangas, Matinmikko-Blue, Latva-aho, Seppänen, Arslan & Koivumäki, 2021), providing thus a suitable research context for the present study.

In the empirical part of the paper the alternative future business models of a port case as a single case study are analyzed from the performative perspective by looking at the three key concepts of the paper. The paper contributes by a) providing a conceptual framework for analyzing scalability, replicability and sustainability in practice; b) identifying the dependencies and connections between the three concepts, and c) providing managerial implications for practice when alternative business models are created by companies. For reaching the aims, this paper is structured as follows. We will start by providing a conceptual basis for research regarding business model performance and future-orientation. This is followed by presenting the research approach, the case context and the empirical analysis. The paper is concluded with discussion, conclusions, limitations and suggestions for future research.

BUSINESS MODEL PERFORMANCE AND FUTURE-ORIENTATION

Business models and performance

Profit generation has been part of business model discussions since the beginning of the concept (Peric, Durkin and Vitezic, 2017). However, most business model performance as a research topic has its roots in early 2000's discussion on business models (Zott & Amit, 2007, 2008), and it is strongly related business model discussions in the context of strategic management (Demil & Lecocq, 2010). Also, a bibliometric analysis of 500 most cited business model articles in Web of Science database (Cuc, 2019) showed that the keyword performance was one of the central themes of the business model literature.

The performance-related research indicates of a positive relationship between business model innovation and performance (Aspara, Hietanen & Tikkanen, 2010; Cucculelli & Bettinelli, 2015; Lanzolla & Markides, 2021). Two kinds of research approaches are visible in this stream of research. First, the relationship to performance has most often been examined at the features, themes or variables level of the business model (e.g., Zott & Amit, 2007). This stream has dominated the business model performance literature up to date. Second, a need for a more strategic approach—where the business model literature is integrated with strategic management and its notions of performance—was argued by Lanzolla and Markides (2021). The authors' scope was to find out how the interdependencies between internal and external factors (of the business model) could be related to performance. However, this kind of approach can be criticized by the fact that given the heterogeneous nature of business models, an appropriate level of analysis is needed.

Following Pentland (1999), three levels of business model "theories" can be identified: 1) process- or phenomenon-specific that work under specific conditions; 2) descriptive or instrumental that show connection between elements; and 3) explanatory that show causality. Most business model canvas or template-based research can be characterized as belonging to the first two categories. A step toward the third category may be exemplified by Amit and Zott's (2001) argument that business models comprise three elements, transaction content, structure, and governance or Onetti, Zucchella, Jones, and McDougall-Covin's (2012) argument that business models need to have focus, modus, and locus related activities. Both Amit and Zott (2001) and Onetti et al. (2012) theorizing may then be related to different performance measures, such as profit in the former case or internationalization in the latter one. Using the transaction content, structure, and governance conceptualization, Snihur, Zott, and Amit (2020) coin the performance challenge of business model innovation as the appropriation dilemma.

Sutton and Staw (1995) claim that strong theories need neighboring concepts to work. Einhorn and Hogarth (1986), in turn, argue that theory is an explanation of how antecedents and consequences are connected via various events. Similarly, at the managerial level, Casacesus-Masanell and Ricart (2011) outlined business models in terms of choices and consequences. Thus, neighboring concepts are needed to enter the domain of explanatory theories. Extant research identifies three antecedent concepts to business models: opportunity exploration and exploitation (Zott & Amit, 2010; Ahokangas & Myllykoski, 2014), *value* (co-)creation, delivery, and (co-)capture, even sharing (Foss & Saebi, 2017; Bengtsson & Kock, 2000; Verstraete & Jouison-Laffitte, 2011), and (competitive) *advantage* (Ahokangas & Myllykoski, 2014). At the managerial level opportunity, value, and advantage are choices that the management of a firm need to make. Similarly, three outcome concepts—the managerial consequences—to business model can be identified: scalability, replicability, and sustainability. *Scalability* relates to the business model as it can be something that "provides exponentially increasing returns to scale in terms of growth from additional resources applied" (Nielsen & Lund, 2018, p.

4). *Replicability* refers to "the innovator firm's learning about and refining its (new) business model, by choosing the necessary components to replicate that model in suitable geographical locations, by developing capabilities to routinize knowledge transfer, and by maintaining the model in operation once it has been replicated" (Aspara et al., 2010, p. 43). *Sustainability* has three elements, often referred to as the triple bottom line of economic sustainability, societal sustainability, and environmental sustainability (Elkington, 1988). Sustainability "helps describing, analyzing, managing and communicating (i) a company's sustainable value proposition to its customers, and all other stakeholders, (ii) how it creates and delivers this value, (iii) and how it captures economic value while maintaining or regenerating natural, social, and economic capital beyond its organizational boundaries" (Schaltegger et al., 2016, p. 6).

Business models and futures-orientation

Extant literature depicts the business model as a universally adaptable, boundary-spanning, multi-purpose, and futures-oriented vehicle for designing, doing, and discussing [especially] digital business concepts. Furthermore, many of today's business contexts can be characterized as fast-changing VUCA environments—volatile, uncertain, complex, and ambiguous (Bennett & Lemoine, 2014), making business model innovation increasingly important (Foss & Saebi, 2017) and challenging. Prior to its possible implementation, a business model can be used as an *ex-ante* representation of the possible outcomes of the business model (Baden-Fuller & Morgan, 2010) and as a device to articulate and depict what a company does or plans to do. Realizing a future business opportunity implies thus designing and implementing the desired future business model (cf., George & Bock, 2011), thereby *ex-post* creating a competitive advantage.

Futures-thinking incorporates the pull of the future with the push of the present and the weight of the past when managers are trying to figure out what is possible (or probable), plausible, and preferable for the company regarding its future (Inayatullah, 2005). At the practical level of analysis, Inayatullah (2005) distinguishes between horizontal and vertical spheres when solving futures-related problems. By the horizontal sphere he refers to the identification of the problem to be solved, identification of alternative solutions, and identification of the solvers, as well as the sources of information related to the problem, i.e., reframing. For the horizontal spheres, the key concern is that they do not support inquiring further and deeper futures—for that one needs to start pivoting vertically, i.e., going to upframing and downframing. As a consequently, futures-oriented business model innovation shares the characteristics of a "wicked" problem (Rittel & Webber, 1973). Related to the discussion on choices and consequences, or antecedents and outcomes, choosing a solution to a problem is largely a matter of judgment. Every solution is kind of "one-shop" operation as in the opportunities to learn by trial and error, every attempt counts significantly and every implemented solution as consequences that cannot be undone afterwards. Therefore, one cannot tell when a solution has been reached and the search for solutions never stops in the ever-changing environment.

Moreover, as solutions also generate unexpected consequences over time, a future-oriented perspective in business models in the context of disruptive technologies such as 5G mobile communications (Ahokangas, Matinmikko-Blue, Latva-aho, Seppänen, Arslan & Koivumäki, 2021) is particularly relevant.

Any attempt to explore and exploit future opportunities, uncertainties or trends through business model innovation contains thus an element of wickedness that needs to be dealt with. Using the business model with a view to the future requires, however, consideration of several interrelated aspects. First, since the business model has been conceptualized in a variety of ways in the extant research (Zott, et al., 2011; Amit & Zott, 2015), attention needs to be paid to the definition of the business model concept or approach. It is evident that our choices regarding how we see or approach the concept have a fundamental influence on how the business model suits futures-oriented thinking. In the extant research, the suitability of the business model concept for that purpose has not been discussed in any systematic manner. Second, the context-space (Graves, 2015) where business model innovation takes place, or where it is targeted to, plays an important role. Teece (2010) argued that a business model needs to be "calibrated" to the business context/environment and its changes. Since the concept itself often reduces the context—especially so if the various business model canvases are utilized—it is important how we relate the business model to contextual change and complexity in time. Recent business model literature (Amit & Zott, 2015; Martins, Rindova & Greenbaum, 2015) has started to pay more attention to the context and to the processes of how business models come to be.

Third, the problem of agency has not been addressed within the business model research (Atkova, 2018). Traditionally the business model has concerned the managers, entrepreneurs, and possibly consultants in the business model innovation, but so far few researchers have focused how business models have been created or transformed in practice, or what future business models might be like (Zott & Amit, 2010). Fourth, related to the aspect of agency, the business model innovators' intents need to be understood. The business model innovators' intention, not only to anticipate and evaluate alternative futures but also to enact and build desired futures with business models, may strongly influence the process and outcomes of the futures-oriented thinking that utilizes business model concept as the unit of analysis. Fifth, again related to the question of agency, the timeframe, planning horizon, and the view on or perspective to time of the business model innovators needs to be considered. As the uncertainty and risk levels increase, and the value of experience decreases, the further and farther futures the business model innovators seek to understand, the role, creation, and assessment of alternative business models may gain in importance. Finally, the process of how a business model comes to existence needs to be unfolded. Business model creation has usually been regarded as a complex and dynamic process that is characterized by uncertainty, experimentation, and learning (Chesbrough, 2010; McGrath, 2010). Also, the activities and logic related to the created new business model can be incompatible with the status quo that is reached by the established business model (Snihur et al., 2021).

The prevalent perspective on time as moving from past, to present and future has changed recently. The traditional perspective overlooks the unpredictability of some events that might influence and change the course of the history or an organization. The quantum approach to time (Lord et al., 2015) addresses the challenge of how to foresee also highly improbable events. The quantum theory can exhibit multitudinous ways of interacting through time; accordingly, it can display the complexity of change in a way that is different from the conventional models. This approach to time emphasizes that the future is different form the past and present qualitatively. It improves the understanding of dynamism and life cycle in different contexts and helps understanding “how different presents are actively created” (Lord et al., 2015), indicating that futures can be assessed through a continuum of alternatives that are brought to the present.

RESEARCH APPROACH AND EMPIRICAL CONTEXT

Building on the discussion in the preceding section, and to support achieving the aims of the paper, an exploratory conceptual framework was created for the research (Figure 1). Specifically, this research is exploring first how performance, scalability, replicability and sustainability are approached or understood, and then delving to analyze the possible interconnections between business model performance, scalability, replicability, and sustainability. From methodological point of view, the futures-orientation of business models, especially in the 5G context, has been discussed by Moqaddamerad, Ahokangas and Rohrbeck (2017) and Moqaddamerad (2020). The key argument of these articles is that the business model can be used as a vehicle for futures-oriented research. In addition, practical, futures-oriented research of 5G and 5G business models has been conducted in the engineering management context (e.g., Ahokangas et al., 2019, 2021; Hutajulu, Dhewanto, & Prasetio, 2020)

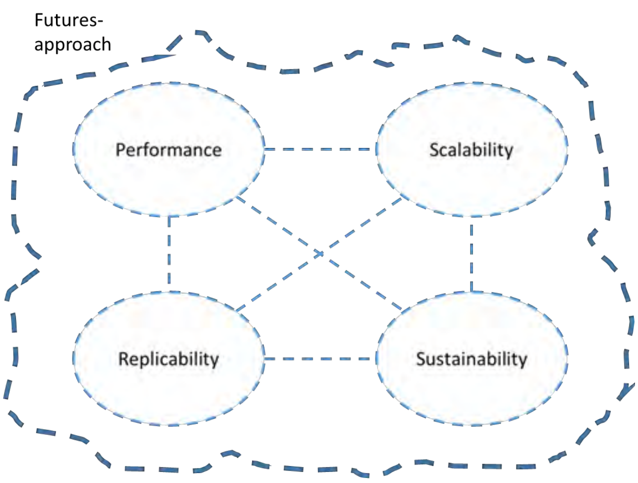

Figure 1. Futures-oriented conceptual frame of the research.

Research approach

As literature suggests, realizing business opportunities and anticipated competitive advantages (George & Bock, 2011; Demil & Lecocq, 2010), planning and designing a desired future business model prior to its operation can be utilized as means to anticipate its future performance. Especially in the context of disruptive technologies such as 5G, anticipating future outcomes for business becomes the more challenging the more future oriented we seek to be. Therefore, experimenting and analyzing alternative business models can be used to evaluate the future scalability, replicability and sustainability potential of different strategic choices made in present time.

As the goal of this research was to grasp a future-oriented logic of business model performance in a volatile, uncertain, complex, and ambiguous environment (Bennett & Lemoine, 2014), a single qualitative case study methodology was applied. Qualitative research suits best for capturing emergent and changing properties (Hartley, 2004). Furthermore, single case studies are suitable especially for the study of cases that are revelatory, unique, or extreme (Yin 1994). The empirical case of this study, described in the following sub-chapter below, as an emerging digital platform, is identified as such.

The data for the analysis is based on workshops and interview rounds as a part of a Business Finland 5G-Viima research project during the period of 2019-2021. In addition, other publicly available materials on the port were utilized. Data collection comprised the following sources:

- Two workshops, held in June and August 2019, with the port ecosystem members to map the port ecosystem, its' stakeholders and digitalization activities, and business models
- Two interview rounds of the port management in April and May 2020
- One interview round of the port management in April 2021
- Publicly available materials (documents, website) of Port of Oulu.

The collected data was in the form of researcher's notes, ppt-slides generated during the workshops, documents collected during the workshops and interviews, and video recordings of the interviews. The data analysis was based on thematic content analysis of the coded data. In the coding and analysis process we followed Saldana's (2021) codes, categories, concepts approach.

Empirical context

The single case study selected for research is the Port of Oulu, Finland (https://ouluport.com/en/home/). Generally, the port can be considered as a transport hub and ecosystem that serves mainly local industries. As a multi-stakeholder environment with a variety of roles and goals, the port has started to build an integrated connectivity and data platform in which the 5G network plays a key role. The current business model of the port is based on bundling four key digital business models as components based on platform business model thinking: connectivity, content, context, and commerce. Additional information of the port of Oulu can be found in Iivari et al. (2021), Golzarjannat, Ahokangas, Matinmikko-Blue, and Yrjölä (2021) and Ahokangas, Matinmikko-Blue, Yrjölä, and Hämmäinen (2021).

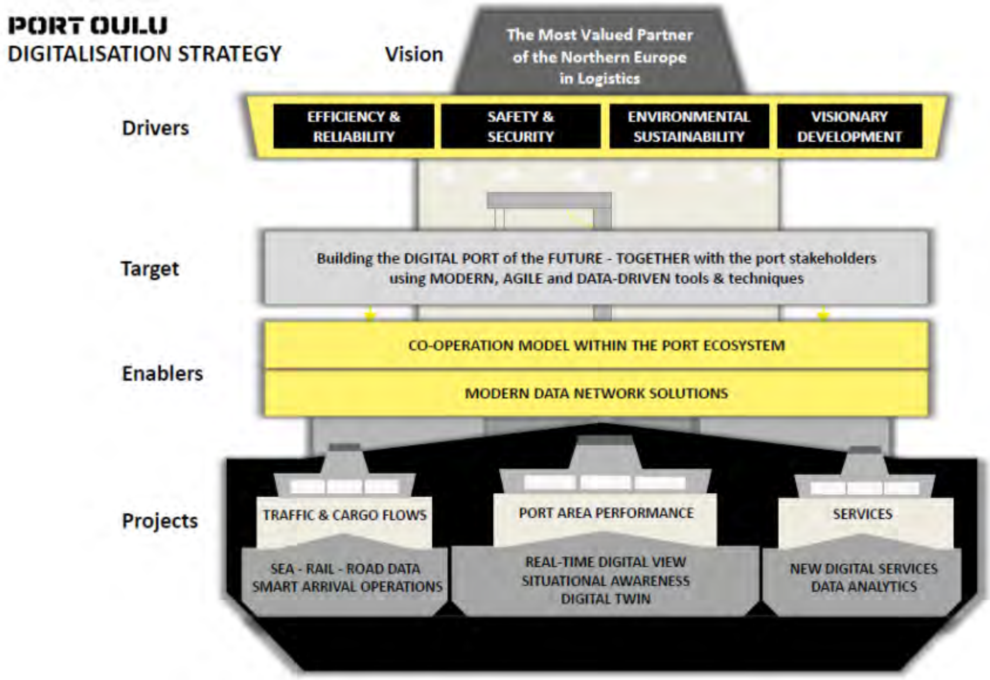

Figure 2. Port of Oulu digitalization strategy.

Figure 2 above depicts Port of Oulu's digitalization strategy. The strategy provides the key drivers of the strategy that comprise efficiency and reliability, safety and security, environmental sustainability and visionary development of activities focusing on digitalization of the core activities in a customer-oriented way and lists the key development project areas for the port ecosystem orchestrated by the port.

The core of the port platform business covers the following elements (based on Yrjölä, Matinmikko, Ahokangas & Mustonen, 2016):

- Connectivity: high-capacity secure connectivity network infrastructure and platform comprising local area network and private 4G/5G network forming the basis for data collection and sharing within the port ecosystem. The port operations rely also to external mobile network operators' services
- Content: collecting, refining, and sharing data on port activities in two categories, a) real-time and b) history data on a c) data network services. Ownership, access, and security level of the data may vary
- Context: digital twin to organize the data from different sensors and from partners to create situational awareness of the port activities, including e.g., navigation services and virtualization services to increase safety and efficiency within port ecosystem

- Commerce: a multisided cloud platform, marketplace and app to collect and provide data of and for the port activities among key stakeholders. Packetized services within the port ecosystem with the aim to extend functionality and add new users/customers.

CASE ANALYSIS

The port sees itself as a part of the global logistics chain. Currently the port's business model is based on traditional brick and mortar type business model, where the key revenues come from physical services such as cargo fees, visitor and visitor service fees, and rental services for premises and equipment. All these are dependent on the volume of transportation through the port. However, the port has set ambitious targets for increasing the revenue share of digital services in its business model. The first step in this regard has been the development of digital twin of the port—comprising the private mobile network based on 4G/5G connectivity platform and data platform that collect data from several sources and creates digitally enhanced real-time situational awareness of what is going on in the port area. Digitalization of the port activities and the development of the digital twin have enabled the port to become a local operator for mobile services and rent the network to its customers working within the port area, but also to provide value-add services within the port for the different customer-stakeholders of the port to enhance efficiency, safety, and transparency in the port. Additionally, the port is building the first steps of a two-sided platform, aiming at having later a multisided platform. The visioning process for the novel two-sided and multisided business models has been started (see Figure 3).

Beyond revenues and profitability, the port's performance aspirations regarding the future business models are directed by the drivers mentioned in its digitalization strategy: efficiency and reliability, safety and security, environmental sustainability, and visionary development indicating of the goal to be a first mover in the field of digitalization of ports. Digitalization strategy has been used as vehicle to influence the efficiency, transparency, and safety of activities in the port. Increasingly, environmental concerns have entered the discussions with port's customers, making these concerns a potentially pivotal factor regarding business model innovation, but also boosting further the digitalization of the port.

The key factors influencing the envisioned future business models of the port are data and artificial intelligence (AI) that are built on 5G connectivity. These two factors were seen to influence scalability, replicability, and sustainability aspects of port's performance. The port has started at the path to collect and share the data to those who could benefit from it. At the beginning of the year the port launched a mobile app (application) that is regarded as the first step of data collection and data sharing business. The functionality of the app is that the port collects for a port operator and major customer located next to the port data from transportations arriving on wheels to the port area. The app serves the customers directly by the information provided and helps indirectly to increase safety and transparency at the port premises by providing information of the app users and for the app users. For the safety purpose, the app comes with and integrated safety and security training feature that is mandatory for the truck drivers. This feature serves the port directly and increases the transparency about who are coming to the port area. The app is a result of jointly developed data integration, and it is easy to add on functionality later. The port's plan is to replicate the offering to other stakeholders and wants to centralize data collection so that to be able to create new (integrated) services and receive relevant information. The mobile app is the vehicle to enable this in the future.

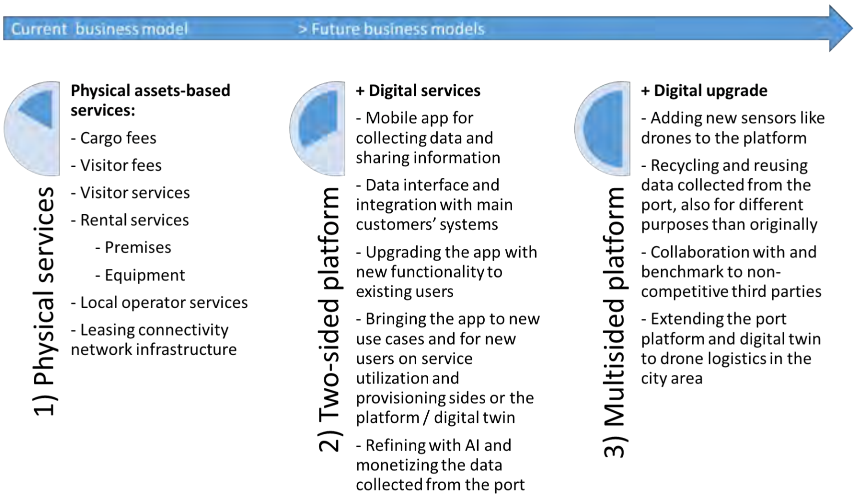

Figure 3. Envisioned future business models of the port.

For the port, data is the primary source of value as it enables to create new value and new services in the future. The combined and enriched data that the port has creates a combo for packetized services for which customers are willing to pay in the future. In all its services, the port aims at tying digitalization and environmental responsibility together, although earlier the focus was more on enhancing internal efficiency. The new services and information/data/processes created should add value to all customers, i.e., be replicable. Customization or development of customized services are not an option due to the few resources of the port. The potential for replication may be limited by the existence of various forms of cargo or treatment of cargo. However, there are generic rules in logistics that apply to all forms of transportation, giving room for internal scalability of data and replicability of services, but replicating something to other ports brings in regional competition that is avoided. The port collaborates with and benchmark European ports that are selected based on their advancement in the field of digitalization. The key in benchmarking is replicability of data and practices as the industry is global, thereby making the challenges of the ports similar. One example of these is the need for situational awareness of port activities.

The port has utilized the idea of scalability within the industry—stemming from the similarity of challenges in the industry—to attract partners to collaborate with them and then scale the business to other ports. The port communicates with the collaborators and say that the partners scalability ambitions are not going to be realized with the port, but as the ports are all part of a global phenomenon digitalization of logistics, scalability opportunities exist. Collaborative scaling is something that the port is aiming at with others, and as a small player the port thinks this is the only way to work, and the results have been very good.

The data collected is seen as reusable and renewable; data can be utilized for long after it has been collected and generated—how long, that is not known. The port has history data that can be used as heat maps for example to plan the future of the port. Also, real-time data is generated for improving safety and bringing situational awareness. The more data the port has, the more it can apply AI to plan, optimize, and predict things better. From AI perspective, the value of data does not disappear. Although data collection and storing is cheap, but there are limits. The data needs to be validated during the process, used for triggering needed actions, so information needs to be identified. Raw data can later be used for different purposes, e.g., for training AI.

The port appears to have local and boundary-spanning services. The port still sees that is has data in silos and depending on the type and content of the data, it can be in stored and processed in a private or public cloud. The app of the port is in public cloud as the customers are outside the port area, too. This brings the need to spread the data accordingly. In addition, localized data is needed for local services, and due to security reasons, it cannot be shared in a public cloud, making edge computing necessary for certain services. A good example of data challenges comes from container logistics. In container logistics problems are often recognized days or weeks after the incident, creating a need for historical data that go back the logistics chain to trace what happened and who might responsible—and making any photos or videos from the container valuable. Also, the increasing use of drones is bringing more real-time data in the future that is monetizable.

Increasingly, the port and its customers are motivated by environmental factors; there has to be clear and shared understanding of the environmental facts. Environmental requirements have to be met, and it is expected that in a few years' time environmental reporting becomes mandatory. For example, CO_2 emissions of the logistics chain need to be known. For the port and its ecosystem, economic and environmental aspects go hand in hand and need to be balanced. Discussion on common standards for the measurement of e.g., CO_2 emissions, has started, but digitalization as a theme is still more advanced in the port context than finding common standards for the measurement of environmental aspects. Standards, such as GHG protocol, and appropriate measures are sought now in the logistics chain, and how the port could contribute to these measures with its activities is being discussed.

The port, as an administrational unit and as a subsidiary of the city, sees it value coming from the value that it provides to customers. Monetizing of digital services is a challenge associated with uncertainty, as digitalization does not necessarily mean direct money flows for the port, but indirectly via the other stakeholders of the port ecosystem. This leads the port to seek network effects and pay attention to value sharing and exploration. A new initiative is to participate an EU project that focuses on air corridors for drones in the city area to create novel local multistakeholder drone services. This is an extension for the port to utilize the platform and the data, equipment, and logistics of the port as an "UAV airport," and motivated by not only by efficiency improvement and customer retention, but also with the need to find new customers. As a part of city, the port has also to consider the societal sustainability perspective as its activities have impact on the functionality of the whole city.

DISCUSSION AND CONCLUSIONS

This paper has focused on exploring how future business models performance could be analyzed, and has used the business model outcomes scalability, replicability and sustainability as a starting point in the analysis. The specific context of the research is the port of Oulu and its future business models driven by connectivity and data. The theoretical framework of the paper comprised the perspectives of business model performance and futures-orientation and indicated that future performance could be approached by looking at the outcomes of the business model.

Our case indicates that all the selected key concepts are related to future performance of business models and provide an approach for making sense of futures-oriented business model innovation in the digital context. To keep the futures-oriented business model innovation manageable in the port case, the envisioned future business model elements were analyzed over the time continuum to create a sequential classification of the alternative business model. The idea to move from physical assets-based business models to increasingly platform-based and data-based models was clear in the data, as indicated by the two envisioned future models, two-sided and multisided platform business models.

Figure 4 depicts the modified conceptual model based on the analysis of the port empirical data. The starting point for performance in future business models was the scalability loop stemming from data collected and shared in the port ecosystem. As the volume of the data was seen as dependent on the number of retained and acquired customers and cargo, and that extending the services could also support scalability, the port was already focusing on building systems that could support scalability of data by enhancing data collection and storing the data for later use. In this the connectivity platform and data platform of the port were crucial. Artificial intelligence was seen as a key technology enabler for creating a replicability loop by recycling, reusing, and renewing data for upgraded services provided as a part of the digital twin. There is also a two-way connection between the scalability and replicability loops, as replicability may influence opportunities to serve customers and extend services.

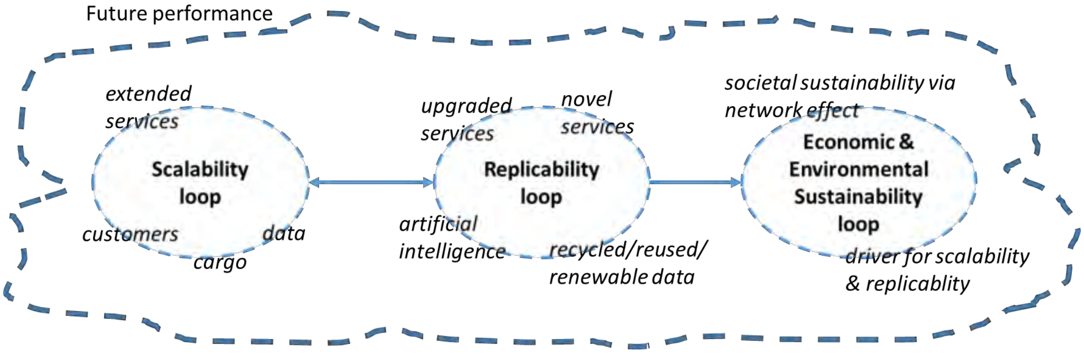

Figure 4. Modified conceptual model.

Platform business models have been discussed in previous literature especially in the context of digital business (Sorri et al. 2019; Hagiu, 2014). Our findings extend future performance of digital business models also for the physical ecosystems, where 5G network acts as an enabler for digitalization of the port (see also Ahokangas et al., 2021). However, in the case of the port's pursued future business model, environmental sustainability on top of economic sustainability were seen as the key drivers for investing in scalability and replicability enhancing activities. The success of platforms can be explained by sustainable and repeatable interactions and inherent network effects (Sorri et al., 2019). In this case, in the sustainability loop, the societal sustainability could be considered to take place through the network effect, as it provides a feedback loop to trigger the development of novel services and collaboration relationships and projects. Overall, performance as a specific theme was not clearly present as related to scalability, replicability, or sustainability. Instead, performance was seen related to futures-approach, leading to the idea that future performance is collectively embracing the development of scalability, replicability, and sustainability development for the envisioned future business models.

Although literature has identified that the anteceding concepts of opportunity, value and advantage impact the outcomes of business models, these outcomes of scalability, replicability and sustainability also depend on the strategic goals of organizations. From this perspective, this research contributes to bridging the streams of business model and strategic management especially in the platform/multi-stakeholder context. In the field of business models, this study contributes to both futures-orientation in business model innovation as well as to the discussion on business model performance. The paper provides a conceptual framework for analyzing scalability, replicability, and sustainability in practice. It also identified the dependencies and connections between the three concepts of scalability, replicability and sustainability. The key implications of this study hence addresses especially how scalability and replicability in the creation of digital services and the use of technologies intertwine sequentially as the degree of digitalization progresses. These outcomes together impact the overall sustainability of the future business model, while strategic goals related to sustainability also drive replicability and scalability. The overall future performance of business models hence needs to acknowledge how these outcomes develop and affect each other. Hence, this research provides a transformational perspective to exploring business model performance (Demil & Lecocq, 2010).

The limitations of this study relate to the chosen research approach. Qualitative single case studies are rich in terms of collecting data to build understanding of a certain research phenomenon, however, replicating the findings to other research contexts is naturally challenging (Yin, 1994). As often stated in qualitative studies, limitations also lead to future research directions. Further research is recommended to further examine the interrelationships and co-emergence of scalability and replicability, and their influence on the different aspects of sustainability.

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Good to go? Life cycle sustainability impacts of mobility product-service systems

Verse, Björn[1,2,*,+]; Günther, Edeltraud[2,3]

[1]Technische Universität Dresden, Boysen-TU Dresden-Research Training Group 'Mobility in Transition';
[2]Technische Universität Dresden, Faculty of Business and Economics, Chair of Sustainability Management and Environmental Accounting;
[3]United Nations University, UNU Institute for Integrated Management of Material Fluxes and of Resources

*bjoern.verse@tu-dresden.de

[+] Corresponding author

Abstract

Business model innovations like shared, pooled, on-demand, smart mobility and mobility-as-a-service concepts, which are emerging in the transport sector, can be assessed as product-service systems (PSS) from a life cycle perspective. Employing a systematic review, this paper synthesizes the findings on the life cycle impacts of mobility PSS and critically reviews the methodological choices. The paper discusses to what extent life cycle assessment can be employed by start-ups and new ventures to steer the PSS' performance towards sustainability.

Keywords

Mobility business model innovations, Product-service systems, Life Cycle Sustainability Assessment, Mobility transition, Systematic review

1. MOTIVATION AND RESEARCH AIMS

The transport sector is in a state of transition. The push towards decarbonisation and local emission reduction underlines the need for significant innovation efforts to be made by the transport industry in the decades to come (SLoCaT, 2019). Megatrends like digitalization, platform economics, artificial intelligence, as well as the emergence of smart technologies entail disruptive potential for companies from the transport sector (Creutzig *et al.*, 2019). In response to these developments, the transport industry has increasingly brought forth business model innovations. Apart from technological innovations around electrification and (semi-)autonomous driving technologies, the proliferation of the circular economy and the push towards servitization across the transport sector has opened up business opportunities for shared, pooled, on-demand, multimodal, and smart mobility concepts (Cohen-Blankshtain and Rotem-Mindali, 2016; Dhawan *et al.*, 2019). In particular, start-ups and joint ventures have built upon these business innovation opportunities (Holland-letz *et al.*, 2019).

This has been amplified by the diffusion of ridehailing and ridepooling services, customer subscriptions to free-floating carsharing in major cities and the roll-out of micromobility like electric scooters. Mobility-as-a-service and other business model innovations, which focus on promoting multimodal mobility, are now leaving the market niches and bring together still very distinct branches of the transport sector like the automotive industry and public transport (Sochor *et al.*, 2018). Moreover, new ventures from other sectors, like the electricity industry, are now entering the transport sector, as business model innovations around the smart charging of electric vehicles and vehicle-to-grid applications illustrate.

In view of this plethora of business approaches and concepts, these mobility business model innovations can be essentially conceptualized and assessed as product-service systems (PSS) (Annarelli, Battistella and Nonino, 2016; Boehm and Thomas, 2013; Reim, Parida and Örtqvist, 2015; Tukker, 2015). Both start-ups and established companies are increasingly being faced with concerns regarding whether the upscaling of these PSS will contribute to a more sustainable development of the transport sector. The common assertion is that these mobility PSS would lead to more environmentally efficient provision of mobility and shift consumer demand to transport modes with less negative environmental impacts (Valsecchi Ribeiro de Souza, Marotti de Mello and Marx, 2019). These business model innovations would provide more socially equal and inclusive access to mobility and better meet the mobility needs of diverse societal groups.

Hence, empirical assessment methods are crucial for measuring the sustainability impacts and to steer the performance of these mobility business model innovations along their whole life cycle. Building upon the proposition by Rauter *et al.*, 2019, life cycle management and assessment approaches, which are also partly internationally standardized, are powerful tools to foster an evidence-based business model impact assessment for start-ups and established companies alike. Therefore, the paper centres upon the three research questions:

(1) How are the sustainability impacts of mobility PSS empirically measured by life cycle management and assessment methods?

(2) Which methodological choices and considerations are taken to assess the life cycle sustainability impacts of the mobility PSS?

(3) How can life cycle management and assessment methods be employed to manage and steer the performance of mobility PSS towards sustainability?

2. METHODS AND MATERIALS

Employing the method of a systematic review (Fink, 2020; Zumsteg, Cooper and Noon, 2012), the objective is to synthesize the empirical findings on the life cycle performance and impacts of mobility PSS and to critically review the underlying methodological choices. Moreover, the paper aims to critically discuss the managerial feasibility and practical relevance of the life cycle management perspective and their assessment methods, particularly for mobility start-ups and joint-ventures that innovate and offer PSS.

The databases Web of Science Core Collection, Emerald Insight, ScienceDirect/Scopus, EBSCO Host, and the Transportation Research Board database TRID, which covers studies from transportation sciences, were consulted in order to compile the final sample of academic studies between 2000 and 2020. Several search string notations regarding the life cycle management and assessment and the various mobility PSS were used. The inclusion criteria for the journal articles and studies to be included in the systematic review were (1) academic peer-review, (2) English language as primary language, and (3) primary studies only (no systematic reviews).

Afterwards, a four-step selection process was conducted, which consisted of

(1) identification of relevant studies in the fore-mentioned databases,

(2) practical screening for duplicates,

(3) methodological screening regarding the relevance for the life cycle assessment, and finally

(4) systematic synthesis of the final sample of selected studies.

The results of the systematic review were triangulated with practice reports. Finally, the sample consists of the systematic review consists of 38 empirical studies, which were considered for further analysis.

3. RESULTS AND DISCUSSION

Apart from the technological innovations such as electric drive engines and autonomous technologies, social innovations centring upon the move towards servitization and the emergence of product-service systems (PSS) are profoundly affecting business models in the transport sector. As figure **Fel! Hittar inte referenskälla.** illustrates, several of these business model innovations in the transport sector can be typified as PSS.

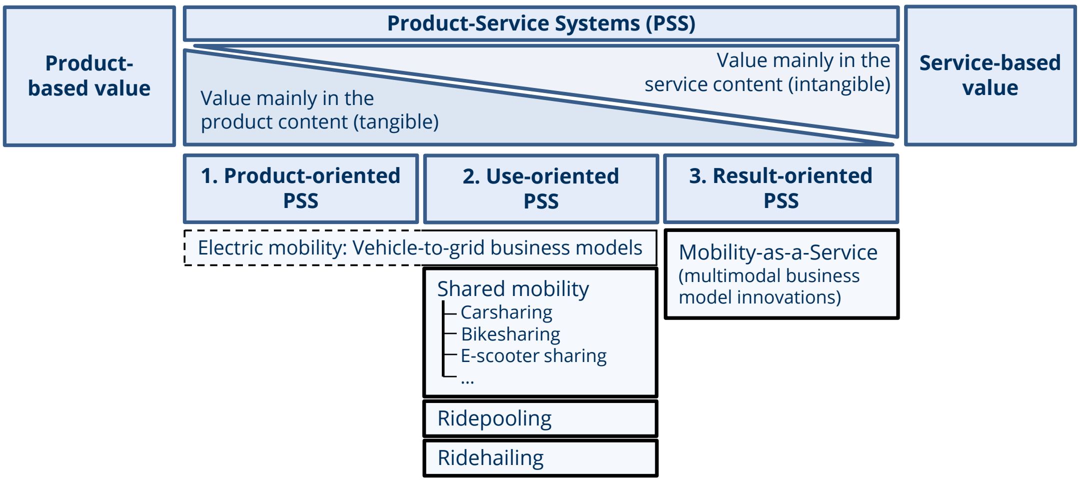

FIGURE 13: TYPOLOGY OF MOBILITY BUSINESS MODEL INNOVATIONS AS PRODUCT-SERVICE SYSTEMS (PSS) (OWN ILLUSTRATION; BASED ON TUKKER, 2015

Most of the studies, which we selected for systematic review, analyse the PSS of stationary-based and free-floating carsharing. Other mobility PSS have been less analysed from a life cycle perspective, such as bike and electric scooter sharing and Mobility-as-a-Service business models.

PSS are one of the distinctive types of sustainable business models (Geissdoerfer *et al.*, 2018; Yang *et al.*, 2018). Their sustainability performance and impacts are based on two key features: First, PSS are aimed at optimizing the whole *life cycle.* Use-oriented PSS, like shared and pooled mobility offers are targeted at changing consumption patterns , which may lead to intensified usage and thus greater resource efficiency. Result-oriented PSS such as Mobility-as-a-Service concepts are based on the idea that the PSS provider has to deliver its previously product-based value proposition by a functional result, which may result in a completely dematerialized solution, with respective positive sustainability outcomes. Hence, life cycle management and assessment methods are suitable tools to undertake impact assessment of product-services, since their methodological steps also overlap and are congruent with the established business model building blocks (Cavalcante and Gzara, 2018).

Secondly, PSS are built upon the idea of *customization* or even *co-creation of value* between the PSS provider and the end-consumer, because businesses offer additional services (use-oriented PSS; shared, pooled, rented mobility concepts) in addition to their products. In the case of result-oriented PSS (mobility-as-a-service and other multimodal mobility business models), companies even move to a solely service-based value proposition to better meet changing or even new individual mobility needs (Firnkorn and Müller, 2012). Therefore, the usage and operations phase and the behaviour of PSS consumers are thus vital to take into account in order to evaluate the impacts and steer mobility business model innovations towards sustainability. Because of the recent progress in modelling use phase-related life cycle impacts of complex ICT-based product-services (Pohl, Hilty and Finkbeiner, 2019), life cycle assessment (LCA) methods are also suitable in the case of mobility PSS such as shared and pooled mobility services.

3.1 Poor triple bottom line assessment perspective

While initial attempts are underway, both in academia and industry, to perform environmental LCA (E-LCA) studies of mobility PSS (OECD/ITF, 2020), empirical findings on the life cycle impacts of mobility PSS often vary considerably because of the lacking consideration of the underlying methodological issues of these studies, such as determining system boundaries, consequential or attributional impact attribution, functional unit and the handling of qualitative indicators in social life cycle assessments (S-LCA). But these methodological considerations are particularly critical for the sustainability assessment of PSS (Kjaer *et al.*, 2016). In addition, impacts caused by the PSS consumer during the usage and operations phase are not always appropriately modelled or sometimes even neglected in the selected studies, even though they considerably impact environmental performance in the long-run. Individual transport demand, which is induced by carsharing, is a prime example of such use phase effects and other direct and indirect rebound effects, which impact the sustainability performance profile of new ventures' business models in the transport sector (Amatuni *et al.*, 2020).

In fact, there is to date no study, which considers all triple bottom line impacts of mobility PSS following the methodological approach of Life Cycle Sustainability Assessment (LCSA) (Ren and Toniolo, 2019). There are few studies that aim at integrating findings from environmental LCA, social LCA, and life cycle costing (LCC), as proposed by Kloepffer, 2008 and others. The overall methodological approach of LCSA is to integrate ecological, economic, and social impacts in a comprehensive manner by weighing and balancing different effects that may reinforce or counteract each other (Costa, Quinteiro and Dias, 2019). This would enable companies to take management actions on such sustainability impacts of their PSS in their decision-making. However, these mobility PSS may lead to trade-offs for sustainable mobility, as there are risks of burden-shifting and of omitting certain sustainability impacts in view of the triple bottom line. As an example, a new venture offering a ride-pooling service that decides to operate in remote suburban or even rural areas outside of the inner-city area in order to be more societally inclusive may not be economically viable and trigger negative ecological impacts due to unnecessary deadheading trips.

3.2 Neglected S-LCA of mobility PSS

The majority of the selected studies focus on the ecological impacts of mobility PSS using environmental LCA techniques, which have been internationally standardized. For example, the studies compare sharing and pooling mobility services with traditional transport modes such as motorized vehicles, subways, or buses based on the functional unit of passenger kilometre travelled across different mobility modes. They show the ability of free-floating carsharing to assess the reduction of greenhouse gas emissions. Other studies use the capacity factor of different types of vehicles in order to investigate the environmental impacts of ridepooling services on the availability of public space and the reduction of sealed surfaces in urban areas. The use of S-LCA to analyse the social impacts of PSS is often problematic due to poorly operationalized indicators and functional units that do not match with the functional unit chosen in the E-LCA (Sousa-Zomer and Cauchick-Miguel, 2019). This further complicates a holistic life cycle management of these business model innovations based on the LCSA approach.

Societal impacts are less prominently operationalized and discussed in the sample of the selected studies, although the societal repercussions of mobility PSS may be substantial (Pangbourne *et al.*, 2020). Even though the method of social life cycle assessment (S-LCA) has been widely applied and further developed in recent years (UNEP, 2020), societal impacts of mobility PSS, like the exclusion of certain consumer groups from barrier-free access to such mobility product-services, are not considered in the selected studies. As many mobility PSS depend on the availability of digital devices among end-consumers, social impacts on the consumers of these mobility PSS, such as social exclusion, can be negative and further aggravate the digital divide across the society.

Moreover, very few of the selected studies address social impacts on other relevant stakeholders, such as the employees of these mobility PSS. The impact on social security and the contested working conditions of the drivers of ridepooling and ridehailing services have been a controversial social impact of PSS that was already prevalent in other digital platform markets. The shortage of social life cycle impact assessments regarding the effect of working conditions and the overall structural changes on the employees and the labour markets in these mobility PSS is another evident social impact, which is poorly considered in the reviewed sample (Gies, Wolf and Stein, 2019).

3.3 Problematic setting of system boundaries

Defining the system boundaries is key in all of three assessment techniques—E-LCA, S-LCA, and LCC—if they are to arrive at results that are meaningful for decision-makers. These system boundaries are not clearly defined in some of the selected studies. In others, they are set at the geographical area of the mobility PSS operations over a certain, usually short-term oriented timeframe. However, assessments of sustainable business models need to consider long-term oriented impacts over larger spatial and time scales and at levels beyond the actual product-service level. In fact, the value proposition and capture of sustainable business models lies in their ability to trigger system-wide changes at the level of markets and society (Bidmon and Knab, 2018). As these mobility PSS are seen as primary levers to promote a mobility transition towards more sustainable transport systems in many countries, this methodological issue of setting system boundaries is becoming even more relevant.

Moreover, the selected studies highlight the considerable amount of primary data and technical capacities needed to carry out impact assessments from a life cycle perspective. The studies are predominantly carried out ex-post after the launch of the mobility PSS, potentially limiting the practical feasibility and relevance for managers and decision-makers. This is particularly problematic for start-ups and smaller businesses from the mobility branch, which are dependent on ex-ante impact assessment tools and metrics (Roukouni and Homem de Almeida Correia, 2020; Trautwein, 2021). While it has been demonstrated that life cycle management and assessment techniques can be also effectively rolled out in the early technology development and novel business models (Judl *et al.*, 2015), start-ups and smaller businesses face considerable barriers to implement life cycle thinking and assessment into their business models (Kurczewski, 2014; Niemistö *et al.*, 2019; Testa *et al.*, 2017). Witczak *et al.*, 2014 highlight that even those small- and medium-sized enterprises (SME), which appreciate the opportunities offered by LCA and their usefulness in daily business practice, often lack the human and financial resources to manage the sustainability performances of new products and services with life cycle management approaches. In fact, SMEs would generally regard LCA as an sustainability assessment tool for larger corporations or external organisations and institutions such as stakeholders from public policy. This is ever more surprising, because environmental LCA has been well established in the transport sector to compare the ecological impacts of various transport means and vehicles.

Lozano, 2018 has critiqued that conceptions and assessments of sustainable business model miss often the systemic and holistic perspective on societal impacts, time and spatial context dependency, and the influence of external stakeholders beyond the company. In the selected studies, the public policy and regulatory framework conditions are often not adequately recognized, although the impacts of certain analysed PSS and their contribution to sustainable mobility highly depend on the regulatory setting and business eco-system.

4. CONCLUSION AND OUTLOOK

The systematic review of the selected studies reveals that the life cycle management perspective and assessment techniques are useful tools to assess and steer mobility PSS towards greater sustainability. They not only enable businesses to increase the performance of their business models onto sustainable mobility, but also provide empirical evidence to policy-making in the highly regulated transport sector with vested interests. Transport policy has become politicized, contested, and intertwined with other policy considerations in many countries, affecting the transport industry and its business models dependent on stable and predictable regulatory conditions. Although urban development and transport planning increasingly shift away from the car-friendly paradigm to a more human-centred approach, leading to conflicts over the congested and limited public and infrastructure space in major cities worldwide (Curtis *et al.*, 2019). Mobility start-ups and new ventures may struggle to advocate for changes to the existing transport regulatory framework to open up further business opportunities for shared, pooled, on-demand and mobility-as-a-service concepts.

Furthermore, the empirical insights from the selected studies vary due to methodological choices made. The existing life cycle analysis studies often do not adequately consider effects beyond the environmental dimension such as social impacts, although these impacts during the usage and operational life cycle onto consumers or employees of such PSS phase of such PSS are considerable. These impacts are particularly important to consider, as mobility behaviour and demands of individuals - particularly in highly urbanized areas and more than ever during the current global COVID-19 pandemic - have changed. To cater for these methodological issues, case studies of mobility PSS are needed, which follow and employ a LCSA approach. These assessments could balance and weigh potential social and environmental trade-offs and model impacts during use and operations phase.

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A Typology of Sustainable Banking in Turkey

Burcin Hatipoglu[1,*], Bengi Ertuna[2]

[1]University of New South Wales; [2] Bogazici University

*b.hatipoglu@unsw.edu.au

Climate change is one of the most important risks that organizations face today. The scale and long-term nature of the problem make the situation uniquely challenging and cause investment decisions to become complicated. Many assume climate change and global warming will have implications in the long term and do not concern the decisions made today. However, the continued emission of greenhouse gases will instigate further warming of the planet, which will have physical, economic, and social consequences (Sachs, Woo, Yoshino, & Taghizadeh-Hesary, 2019). And these will have both near-term and long-term effects on all organizations.

In December 2015, as part of the Paris Climate Agreement, 196 countries agreed to accelerate the transition to a lower-carbon economy. Reducing greenhouse gas emissions entails using less fossil fuel energy and cleaner and energy-efficient technologies. This transition offers promising opportunities for organizations and sectors, along with risks associated with these new technologies. Globally there is an urgent need for massive public and private investment in the transition towards the green economy and the achievement of sustainable development goals (SDGs). Even the developed nations are struggling to steer investments into low carbon energy projects at the necessary scale, which leads to a green finance gap (Hafner, Jones, Anger-Kraavi, & Pohl, 2020). In addition to governments and intergovernmental organizations, financial institutions play a significant role in directing investments into clean energy and efficiency projects. However, the lower return rate of investments into these technologies and higher risks compared to fossil fuel projects refrain many financial institutions from investing in these new technologies (Sachs et al., 2019). How financial institutions reconcile the demands of their shareholders and assume this role is a significant challenge.

There has been an ongoing debate about the changing purpose of business from shareholder primacy to a multi-stakeholder approach (Harrison, Phillips, & Freeman, 2020). Recently, a large group of business leaders from the US acknowledged this shift and committed to all company stakeholders (Business Roundtable, 2019). How the business will address these multiple stakeholders (e.g., customers, suppliers, employees, communities, and shareholders) and contribute to sustainable development is a continuing challenge (Agarwal, Gneiting, & Mhlanga, 2017). International development agencies and business groups are working on guidelines, tools, and best practice insights for increasing the impact of business engagement with SDGs (GRI & UN Global Compact, 2018).

Compared to other businesses, banks are in a unique position for engaging with the SDGs, as they can promote the adoption of sustainable practices to their borrowers and contribute to disseminating responsible business practices (Forcadell & Aracil, 2017). Banks can directly contribute to SDGs by managing their operations responsibly and indirectly contribute by integrating environmental and social (ESG) criteria into their products and services. Besides doing good, when banks examine ESG risks for credits, loans, and mortgages, they also avoid possible financial risks (Weber, 2012) and improve their reputation (Nosratabadi, Pinter, Mosavi, & Semperger, 2020).

In practice and the literature, responsible and sustainable banking is an emerging field. Thus, the policies and practices regarding how banks address sustainable development and how they define sustainable banking differ from one bank to another (Bouma, Jeucken, & Klinkers, 2017). To offer guidance, UN Environment Program Financial Initiative (UNEP FI) (2019) provides a framework for banks to become more sustainable. More than 200 banks have so far committed to the six responsible principles set by UNEP FI. However, the newness of the concept creates a gap in frameworks for evaluating the sustainability impacts of banks' business models (Nosratabadi et al., 2020).

In addition to organizational differences in engaging with responsible business and sustainable development, context is a significant external factor. Social responsibility is stated to be institutionally bound and context-specific (Frynas & Yamahaki, 2016; Jamali & Karam, 2018). Social responsibility challenges are different in developing nations than in the developed nations (Jamali & Karam, 2018; Visser, 2008). Even though Turkey has signed international conventions on climate change, it lags in making the required infrastructure investments (International Energy Agency, 2021). For example, Greenpeace records 28 coal-fired thermal powers in the country and mentions the plans to invest in more than 40 new facilities (Greenpeace, 2021).

In this study, we analyse how banks respond to climate change (SDG 13) in a developing country context with different manifestations of CSR. Turkey's business context presents a useful setting for such an analysis with both an established tradition of business-society relations and a recent exposure to global CSR norm, which results in specific responses of competing CSR logics prevailing in the context. We identify the different institutional logics prevailing in companies' business objectives considering the inter-institutional ideal types (Thornton, Ocasio, & Lounsbury, 2012) to operationalize a local CSR logic, and based on its interface with the global CSR logic; we define different CSR orientations. Using four CSR dimensions compiled from the literature (integration to core business, collaboration with external partners, scope of reach, and instruments for implementation) (Agarwal et al., 2017; Jamali, Karam, Yin, & Soundararajan, 2017; Mühle, 2010), we investigate the relationship between CSR orientations and addressing of climate change through sustainable banking strategies, policies and practices.

Table 1: Sample banks Borsa Istanbul Stock Exchange (BIST)

Bank	Estab. Year	Mrkt Value (mil.USD) 2020	Ownership Structure 2020	First Year of Sust. Reporting	Sustainability Reporting* 2019	CDP Reporting** 2019, 2020
Akbank	1948	4,530.8	Sabancı Holding 40.75%, Fleefloat 59.25%	2009	GRI, SDG, WEP	C, B-
Albaraka Bank	1984	389.0	Albaraka Bank. Group 38,02%, Dallah Albaraka Holding 15.38%, Islamic Dev. Bank 7.84%, Freefloat 38.76%	2019	GRI, UNGC, TCFD	B, A-
QNB Finansbank	1987	31,110.4	Qatar National Bank 99.88%, Freefloat 0.12%	2018	GRI, SDG	F
Garanti Bank	1946	5,340.1	Banco Bilbao Vizcaya Argentaria 48.85%, Freefloat 50.15	2011	IR, GRI, SDG, TCFD	B, A
Halkbank	1933	1,777.0	Turkey Wealth Fund 75.29 %, Freefloat 24.71%	2013	GRI	B, B
ICBC Turkey Bank***	1986	863.2	Industrial and Commercial Bank of China 92.84%, Freefloat 7.16%	n.a	n.a.	F
Is Bank	1924	3,773.4	Iş Bank Sos. Sec. Found. 37.08%, CHP Party 28.09%, Freefloat 34.83%	2012	GRI	C, A-
Sekerbank	1953	370.9	Şekerbank Pers Found. 30.01%, Samruk-Kazyna Invest 12.06%, Şekerbank Pers. Sos. Found. 6.44%, Freefloat 51.49%	2013	GRI, SDG	B, B
TKYB	1975	6,878.7	Ministry of Fin. And Treasury 99.08%, Freefloat 0.12%	2009	GRI, SDG	B, A-
TSKB	1950	692.1	T. İş Bankası 47.23%, T.Vakıflar Bankası 8.38%, Freefloat 44.39%	2008	IR, GRI, SDG, TCFD	B, B
Vakıfbank	1954	2,309.6	Ministry of Fin. and Treasury 37.45, Turkey Wealth Fund 35.99%, Vakiflar Retir. Found. 10.67%, Freefloat 15.89%	2014	IR, GRI, SDG	B, B
Yapı Kredi Bank	1944	3,287.8	Koç Financial Services 40.95%, Unicredit S.P.A.20%, Koç Holding 9.02%, Freefloat 30.03%	2010	IR, GRI, SDG, TCFD	B, B

*GRI= Global Reporting Initiative, SDG=Sustainable Development Goals, IR= Integrated Reporting, TCFD= Task Force on Climate Related Financial Disclosure, UNGC=United Nations Global Compact, WEP=Women Empowerment Principles.
** CDP= Carbon Disclosure Project
***Shows the establishment date of Tekstilbank, the former name of ICBC Turkey Bank.

We utilize a sample of 12 publicly listed banks from Borsa Istanbul Stock Exchange (BIST) (Table 1). These are all the listed banks in the BIST. To study sustainable banking strategies, policies, and practices, we considered all documents in which companies communicate their initiatives to the stakeholders. We used annual, CSR, and CDP reports for three years (2017-2019), controlling owners' CSR disclosures and company websites (e.g., mission and vision statements and other strategy reports) as key documents for our thematic content analysis. Our data structure formed to include fifteen second-order themes under the three aggregate dimensions of the greening of the in-house practices (e.g., energy-saving technologies and digital technologies), responsible financing and environmental risk-rating (e.g., green banking products), and social responsibility projects (e.g., stewardship role) (Gioia, Corley, & Hamilton, 2013).

We contribute to the theme of *"performance and impacts of organizations' business models"* by presenting the best-case examples of banks addressing climate change by changing their operational models and products and services. We interpret that these banks transformed their business models and are using their new business model as a tool for implementing sustainability strategies and inclusive value creation for multiple stakeholders. Thus, based on our findings, we define best-case banks as those banks that respond to the competing logics of the context by attending global expectations on the use of international guidelines and local expectations on filling the state's social policy gaps, blending elements of both, and adapting them to the local environment. This group of banks aligns sustainable development with their core business and aims for developmental social goals beyond their business. We demonstrate that they engage in technological innovations, manage their environmental footprint in their operations, develop ESG risk assessment, implement effective organizational structures and corporate governance, collaborate with the sector, and display leadership.

Furthermore, the results confirm that these banks address through their banking operations not only climate change but also extent beyond their operations to tackle locally salient issues of clean energy (SDG 7), education (SDG 4), and gender equality (SDG 5). We discuss the results in light of the sustainable business models literature in the financial services industry (e.g., Nosratabadi et al., 2020; Yip & Bocken, 2018). We compare our findings with studies from other countries (e.g., Forcadell & Aracil, 2017; Julia, Rahman, & Kassim, 2016; Kumar & Prakash, 2020; Masud, Bae, & Kim, 2017).

We contribute to the literature by taking a context-sensitive approach to CSR, define different forms of CSR and their implications for the banks' involvement and CSR progress with climate change, and specify the challenges and enablers for addressing SDG 13.

Keywords

Climate Change, CSR, Renewable Energy, Sustainable Development Goals, Banking.

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Bringing individual water innovators into joint exploitation pathways to enable circular economy implementation

The case of the ZERO BRINE Task Force

D. Xevgenos[1,2,*], G. Korevaar[3], D. Hartmann[3], P. O'Callaghan[4], M.C.M van Loosdrecht[2]

[1]SEALEAU B.V., The Netherlands; [2]Applied Sciences faculty, TU Delft, The Netherlands; [3]Technology, Policy and Management faculty, TU Delft, The Netherlands; [4]BlueTech Research, Vancouver

*d.xevgenos@sealeau.com / d.xevgenos@tudelft.nl

The process industries account for a large part of the industrial brine releases in Europe. According to the European Pollutant Release and Transfer Register (E-PRTR) database, in 2016, a total of 578 facilities have been recorded, reporting the release of 16,602,080 tons of chlorides (Xevgenos et al, 2018). These saline impaired effluent releases are called brines and represent an environmental challenge, since they are harmful for aquatic ecosystems, but also an economic opportunity, since they contain valuable materials that can be recovered and put back on the market (Xevgenos et al, 2020). As such industrial brine flows need proper treatment before discharge to the environment is possible. The composition of industrial brines varies across sectors, for example from chemical industry, food industry, steel industry etc. Since the composition varies from sector to sector and even from site to site, the treatment and possible recovery of salts, water and other materials are almost unique. To deal with this variety for recovering both the materials and the water requires combinations of different technologies. These technologies are supplied by different companies, often SMEs, spread around Europe. Although often being complementary innovations, the technology suppliers tend to compete or develop markets individually resulting in insufficient market growth and thus market failure. This comprises one of the main obstacles for enabling circular economy to be implemented in the (waste)water treatment sector today.

Our work falls within, and contributes to, the domains of Innovation Management (IM), and Sustainable Business Model Innovation (SBMI). Scholars from the former recognize that innovation management often fails to solve social problems, as the role of networks and the values and interests of actors involved are being neglected (Breuer et al, 2017). Within the SBMI field, scholars generally agree that although there is recently strong academic interest, this research is currently under a consolidation phase (Lüdeke-Freund et al., 2018). Recent research suggests that sustainable business models are rarely implemented on the market and even if they do, they fail; despite its importance, this research topic is underexplored. This research gap has been recently described by Geissdoerfer et al (2018) as the “design-implementation gap”. Xevgenos et al (2020) have shown a practical example of how Circular Business Modelling theory can be applied in the context of collaborative projects to address this gap, through a business experimentation process applied in the industrial wastewater treatment sector. Scholars studying the water technology innovation field, have recently showed that water innovations demonstrate low rates for successful market deployment, and even when adopted typically they need more than a decade (from 11 to 16 years) to reach commercialization and market diffusion (O’ Callaghan, 2020). In this work, we aim to address these research gaps by introducing a theoretical framework that supports the consensus-building process for the joint exploitation of water innovative technologies that are developed within research projects. To develop this framework a 2-step approach is followed.

In the first step, the suppliers of the innovative technologies needed to deliver the integrated circular economy solution are contacted. Ten (10) innovative technology suppliers are identified and are asked to describe their technological solution, their company profile and interest to participate in the formation of a group aiming at the exploitation of the project results, what we have called “ZERO BRINE Task Force”. The Task Force has the main objective to provide solutions that are adaptable to different pre-requisites and thus reach a sufficient market size that will enable market penetration (first industrial application) and replication. The Task Force comprises entities which supply innovative technologies that were developed in the framework of European- and National-funded projects. These technologies are in different stages of development, but all have now reached at least demonstration stage. Following signature of individual Letters of Intent (LOIs), a joint framework agreement is signed among all parties. The process of the framework agreement signature was led and facilitated by the Innovation Manager of the project, a dedicated person seeking on how the innovative and exploitable outcomes of the project are further taken-up for commercial (or other type) exploitation, after project completion. As the main aim of the framework is to align the interests of the individual water innovators and as consensus-building is a social process, the final signature of this agreement involved several meetings on an individual, but also in a group setting.

From the application of the ZERO BRINE Task Force, it follows that the main obstacles are in building trust and consensus between various different technology suppliers. This leads to the research problem of how to identify and assess the different (intellectual) assets of the contributing parties in a way that can be considered objective, transparent and thus accepted by the involved stakeholders. This research question is addressed **in the 2nd step** of our research approach; a work that is currently ongoing. Currently, the members of the ZERO BRINE Task force define their intellectual assets, including information about proprietary knowledge, patents/copyrights, partnerships, customer database, software and experience, as well as physical assets (e.g. manufacturing facilities, vehicles, distribution network), human assets (experienced researchers, skilled sales force) and financial assets (financial guarantees, cash, lines of credit, stock option pool, access to funding). An Intellectual Asset Management methodology is being used to develop and apply a knowledge management approach for better collaboration between the Task Force partners, building upon previous work (van der Aa, 2018). We are currently expanding our assessment framework to enable the assessment of externalities and strategic sustainability, topics that have been identified by scholars and experts in the field of sustainability-oriented business model development as often neglected (Kuruczj et al, 2017; Lüdeke-Freund, F., 2017). To enable the assessment of the sustainability impact of the ZERO BRINE Task Force, parameters such as contribution to Sustainability Development Goals (SDG) - especially SDGs relevant to the activities of the Task Force (namely SDG6, SDG7, SDG9, SDG12 & SDG13), contribution to other key EU and global sustainable goals (e.g. related to decarbonization, renewables and climate targets), as well as access to finance that promote sustainable project developments (e.g. Impact Funds) is currently being assessed.

Our paper presents a tool that supports the consensus-building process for the joint exploitation of innovative technologies that often are developed within research projects and end up to compete and develop markets individually thus failing to reach market penetration. This work adds to sustainability-oriented business model development and Circular Business Modelling theory and practice, as it shows how a framework based on the assessment of intellectual assets and sustainability impacts can be applied in the context of collaborative projects with the view to the commercialization and exploitation of project results through new venture creation. Within ZERO BRINE a Task Force was developed, comprising various water technology innovators. This Task Force is already operational creating Circular Economy solutions in the water treatment sector, exploiting the results generated within the EU funded project called ZERO BRINE.

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Keywords

Sustainability-oriented business model development, Circular Economy Business Modelling, Wastewater treatment, Framework agreement, Business Model Innovation.

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Technological innovation in circular business models

Measuring the impact of patenting activity on material flow improvements for circular economy transitions

Anne Rainville[1*], Magnus Buggenhagen[2,3]

[1]Copernicus Institute of Sustainable Development, Faculty of Geosciences, Utrecht University, The Netherlands

[2]Chair of Innovation Economics, Technical University Berlin, Berlin, Germany

[3]IPlytics GmbH, Berlin, Germany

*a.m.rainville@uu.nl

Abstract

Supported by new circular business models, technological innovation may play a critical role in transitions to a circular economy (CE). Recognizing the sustainability benefits offered by a CE, nations such as Europe, Japan, and USA have introduced a “3R strategy” for circularity, focusing activities on reducing, reusing, or recycling. It has been widely agreed that firms play a leading role identifying and pursuing new economic opportunities and in implementing CE solutions under these strategies. However, the novel ways in which many (types of) actors are engaged in CE, how value is created and distributed, and uncertainties regarding appropriability regimes for CE mean that the role for technological innovation in CE transitions is unclear. This may deter the formation of new circular business models and thereby hinder CE progress.

This paper empirically investigates patenting activity in resource reducing, reusing, or recycling technologies for its influence on material flows in order to better understand the role of innovation in circular business models. Patenting activity is an indicator for eco-innovation in a sector or technology field, also indicating economic viability. Contextualizing the analysis in an industrial ecosystems framework, this paper conducts correlation tables of the effect of knowledge flows, focusing on patenting activity, on changes in material flows at the national and sectoral levels for countries with CE policies. Data is considered from sources including EUROSTAT, WIPO, and OECD. By connecting innovation activities to material impacts, findings provide a unique contribution into the relationships between circular business models and progress toward CE.

Keywords

Circular economy, transitions, technological innovation, patents, raw materials

Tracking Environmental Impacts while Experimenting with Circular Service Business Models

Ankita Das[1,*], Jan Konietzko[1], Nancy Bocken[1]

[1]Maastricht Sustainability Institute, School of Business and Economics, Maastricht University, Tapijnkazerne 11 Building D, P.O. Box 616, 6200 MD Maastricht, The Netherlands

*a.das@maastrichtuniversity.nl

Background: As the world moves towards circularity, companies are increasingly trialling new business models to meet the needs of the circular economy (H&M Group, 2020; Inter IKEA Systems, 2020; Philips, 2020; Swapfiets, 2020; Volvo, 2020). To do this, they conduct "business model experiments" (Bocken, Weissbrod and Tennant, 2016; Antikainen *et al.*, 2017; Bocken, Schuit and Kraaijenhagen, 2018; Aminoff and Pihlajamaa, 2020; Baldassarre *et al.*, 2020). Business experiments can help to reduce uncertainties, decrease operating costs, validate ideas and help companies better understand customers' needs (Blank, 2013; Bocken, Weissbrod, *et al.*, 2016; Konietzko, Baldassarre, *et al.*, 2020). With the "Lean Startup" approach of "build-measure-learn" gaining popularity, more resources are being made available within larger organisations for business model experimentation (Ries, 2011; Blank, 2013; Bocken and Snihur, 2020). Circular service business models such as rental, subscription or offerings around leasing refurbished and second-hand products, have the potential to significantly reduce environmental impact if the business models are designed as such (Tukker, 2004, 2015). Indeed, companies, large and small, are increasingly experimenting with such circular service business models. However, it is not yet clear how companies can keep track of the environmental impact of their business models when they are in this early experimentation phase (Bocken, Miller and Evans, 2016; Kravchenko et al., 2019; Manninen et al., 2018). There is a lack of empirical studies that map the environmental impact assessment methods currently being used by practitioners (Bocken et al., 2016; Pieroni et al., 2018).

It is estimated that 80-90% of the environmental impact of products are determined in the design phase (Millet *et al.*, 2007; Bocken, Schuit and Kraaijenhagen, 2018; Konietzko, Bocken and Hultink, 2020). Drawing on this and for example the work by Tukker (2004, 2015) and Mont (2002, 2004), the same logic may apply to the design of new circular service business models. Thus, it is crucial to keep track of the environmental impacts during business model experimentation. If companies can forecast the impact, they will be able to adjust early on for more sustainable outcomes.

Previous studies (Harris *et al.*, 2021; Kravchenko *et al.*, 2019; Manninen *et al.*, 2018; Moraga *et al.*, 2019; Walzberg *et al.*, 2021) have shown that while many environmental impact assessment methods exist, they lack a focus on the use phase (Harris *et al.*, 2021), and the ability to support decision-making during experimentation (Bocken, Miller and Evans, 2016; Kravchenko *et al.*, 2019). While extant tools can be adapted for measuring impacts of circular service business models, the studies conclude that there is no method that is aptly suited to encompass all aspects of sustainable circularity yet (Pieroni *et al*., 2018; Walzberg *et al*., 2021). There is a lack of a targeted tool for the different steps of the life cycle of a service-based business model. This study aims to fill these gaps. The first step is to identify the impact assessment tools currently used in practice through a survey and interviews with key innovators. These findings have helped develop a streamlined environmental impact forecasting method to be used during business experimentation. By addressing these gaps, the authors aim to help practitioners by nurturing experimentation towards circular service business models.

Methods: A short literature and practice review was conducted to map existing environmental impact assessment tools. The word “tool” was used quite generally to refer to frameworks, methods, canvases, typologies, gamified methods, etc., to identify as many types of environmental impact assessment tools as possible. Google Scholar and SCOPUS search queries were used to identify academic studies using a combination of keywords such as “environmental impact assessment” AND "circular service business models" AND “tool OR method OR framework”. This was supplemented by information from grey literature including materials from previous workshops, conference and course materials that the authors had attended.

Second, a grounded theory approach was taken. Exploratory interviews and a corporate survey were conducted with practitioners in the textile, food, mobility, energy-using appliances, construction, and furniture industries. This revealed information on their experimentation processes, the environmental impact assessment methods and tools that currently used, and the strengths and weaknesses of these tools. These learnings were used to develop a streamlined tool geared for experimentation. This new tool will be further optimized through empirical tests on business cases.

Results: This research study presents learnings about environmental impact assessment methods used in practice, from empirical interviews and a corporate survey. As this is ongoing research, the following are some of the initial themes emerging from the practitioner interviews:

- Currently, most impact is measured around greenhouse gas emissions. Environmental impact assessments should be about more impact categories than only global warming potential;

- Current methods are time-consuming and therefore not fit for the rapid experimentation process;
- Current methods are not made to forecast impacts and are therefore not fit for an innovation context of high uncertainty about possible outcomes.

These early findings have led to the development of a new impact forecasting tool, streamlined for the business model experimentation phase.

Conclusions: While business model experimentation and circular service business models are relatively new concepts (Weissbrod and Bocken, 2017; Bocken, Schuit and Kraaijenhagen, 2018), there is a fast-increasing interest in them from the private sector due to their practical relevance. Identification of which methods are being used by practitioners in practice, can greatly benefit researchers studying this topic area. Further, the new impact forecasting tool, best suited to foster experimentation towards circular service business models can support the decision-making process for practitioners. This study also identifies gaps and opportunities in academic research on environmental impact forecasting of business model experimentation. Future studies can work on optimizing the tool further through empirical testing with practitioners in different sectors.

Keywords

Circular Economy, Circular Business Models, Environmental Impact Assessment, Business Model Transition, Business Model Experimentation.

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Measuring and Communicating the Impacts of Sustainable Business Models

An empirical study of two entrepreneurs supporting UN Sustainable Development Goals

Veleva Vesela[1]

[1]University of Massachusetts Boston

*Vesela.Veleva@umb.edu

The coronavirus pandemic and related global recession have increased the urgency of addressing the United Nation's Sustainable Development Goals (UN SDGs). Yet, progress towards sustainability has been slow. Many large corporations have embraced sustainability goals and reporting, but have not changed their business models, which continue to prioritize economic aspects. Research has found that existing business model frameworks tend to exclude natural and social aspects of the organizational environment (Biloslavo et. al. 2018). Even internationally recognized sustainability frameworks such as the Global Reporting Initiative (GRI) can lead to inconsistent reporting and lack of effective indicators to measure societal impacts which is key for managing for sustainability (Veleva et. al. 2017). Advancing the 2030 SDGs requires developing new frameworks and indicators to better measure the *impacts* of business models (both the positive and the negative) and recognize different types of value created or co-created: public, partner, and customer (Biloslavo et. al. 2018). Such performance assessment is crucial for helping companies refine their business models for sustainability. While some theoretical frameworks have been proposed in the literature (Lüdeke-Freund et. al. 2017; Biloslavo et. al. 2018), there is limited empirical research about how companies are assessing and managing the sustainability performance of their business models.

This presentation and related research aim to address this research gap and provide empirical data from two entrepreneurial companies – Seeding Labs (non-profit) and myTurn.com (for-profit), whose business models aim to advance UN SDGs. Sustainability entrepreneurs are often seen as key for launching innovative business models to address social and environmental challenges (York & Venkataraman, 2010; Veleva, 2021). Their business models are typically based on co-creating value with a variety of partners, and delivering both economic and social/environmental value. Their success often depends on their ability to effectively measure and communicate this value to a variety of stakeholders (Veleva & Bodkin, 2018; Veleva 2021). This performance measurement also allows them to obtain key information to refine their business models, and better manage for sustainability.

By selecting two B2B entrepreneurial companies with a global focus, a similar level of maturity but different business models, the author aims to compare the way they measure and communicate the value created or co-created, their key social, environmental, and economic impacts, and how they use this information to refine their business models. The goal of the study is to build on existing research (Biloslavo et. al. 2018; Lüdeke-Freund et. al. 2017; Veleva et. al. 2017) and propose a new framework for measuring the impacts of business models on UN SDGs.

The study aims to explore the following questions: How do entrepreneurs currently measure and communicate the sustainability impacts of their business models? For whom and why have they chosen to measure these impacts, and do they openly communicate potential tradeoffs/negative sustainability impacts? What is the role of other stakeholders in advancing effective impact measurement?

The study is based on interviews with the two companies, and a review of publicly available information, such as websites, press releases, reports, and case studies. **myTurn.com** is a for-profit Public Benefit Corporation founded in 2013 that helps organizations radically increase the reuse and value of products while reducing consumption and waste (myTurn.com, 2020). The company offers a cloud-based platform that allows for physical asset tracking, product rental, and subscription services, which helps customers to track and increase utilization of products internally, rent underutilized products to consumers, and/or offer innovative product-as-a-service/product subscription-based business models. Equipment managed by myTurn is often reused 10 to 100 times compared to individual ownership. Its most significant impacts relate to three SDGs – Sustainable Cities and Communities (Goal #11), Responsible Consumption and Production (Goal #12) and Climate Action (Goal #13), although indirectly it helps advance several other SDGs (myTurn.com, 2020). As of 2021, it had customers in 15 countries, including manufacturers and retailers, universities, cities, industry associations, and NGOs.

Seeding Labs is a Boston-based nonprofit organization, also established in 2003, which takes used medical and biotech laboratory equipment and sends it to scientists in developing countries. In addition, it offers training, mentorship, and opportunities for developing countries' scientists to collaborate with experts in their field. Over the years Seeding Labs has developed partnerships with large companies, such as MilliporeSigma, Takeda Pharmaceuticals, Sanofi, and Eisai, which are a key part of its business model. In January 2021 the Access to Medicine Foundation recognized Seeding Labs' Instrumental Access program as a Best Practice for R&D Capacity Building (Access to Medicine Foundation, 2021). Its business model helps address several SDGs, most importantly Reduced Inequalities (Goal #10), Responsible Production and Consumption (Goal #12), Quality Education (Goal #4), and Good Health and Wellbeing (Goal #3). Both myTurn.com and Seeding Labs measure a variety of social and environmental impacts, which are important for their partners and other stakeholders. Over the years they have refined their business models to ensure financial viability and greater sustainability impacts (e.g., Seeding Labs began charging recipients a flat fee for the lab equipment based on the country income).

Based on the study findings, the author will propose a new framework for measuring the impacts of sustainable business models on UN SDGs, which will include: a) the different types of value created, b) the role of stakeholders in measuring impacts, and c) how to leverage performance assessment to improve sustainability management. The proposed framework will incorporate stakeholder and translation theory perspectives (Freudenreich et. al. 2020; Viciunaite, 2020) and aim to be flexible to allow for wider use by different companies. Previous research has found that the assessment of social and environmental impacts is challenging because it is based on personal values, beliefs, and priorities (Veleva, 2021). Effective metrics must be defined and constructed in an open dialogue with all relevant stakeholders; there is no single "gold standard" of measurement but instead a variety of metrics that reflect local goals, needs, and stakeholder demands (Costa & Pesci 2016).

The main contribution of the proposed presentation is to provide empirical research on how entrepreneurs currently measure their contribution to UN SDGs, and propose a framework for measuring and communicating the sustainability impacts of business model.

Keywords

Sustainability entrepreneurs, business models, sustainable consumption, UN SDGs.

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Track 3.2.

Sustainable Business Model Patterns for a Decade of Action

Track 3.2. Business Model Patterns for a Decade of Action

Track chairs: Florian Lüdeke-Freund[1], Tobias Froese[2]
[1]ESCP Business School, Germany; [2]ESCP, Germany

This track explores the status quo and future avenues for research on business model pattern typologies, taxonomies, and languages. This recently emerging research stream includes consolidating the available knowledge about business model patterns with the potential to contribute to sustainable development, particularly, with regards to the conference theme, contributions to the UN SDGs in a Decade of Action. We are therefore specifically interested in studies on 'patterns in action,' i.e. how and under what conditions business model patterns can serve as practical tools for organisational design, analysis, communication and further purposes.

Submissions to this track must have an explicit link to pattern theory. It is recommended that prospective authors familiarise themselves, for example, with the works of Christopher Alexander, Takashi Iba, and other pattern pioneers. Current approaches to studying patterns in the field of business model research can be found, for example, in the works by Abdelkafi and Täuscher (2013), Remane and colleagues (2017), and Lüdeke-Freund and colleagues (2018, 2019).

The purpose of this track is to explore the status quo and future avenues for research on business model patterns with the potential to contribute to solving diverse ecological, social, and economic problems as framed by the UN SDGs. Conceptual and theoretical papers are welcome, case studies and reports about pattern tools in practice will as well be accepted:

- How to consolidate the available knowledge on sustainable business model (SBM) patterns, and how to convert it into 'knowledge for a Decade of Action'?
- What kinds of pattern theory and pattern template are well-suited to describe and archive SBM patterns?
- How to identify and systematise the various connections between different SBM patterns to create an overarching structure, or 'pattern language'?
- How to define normative guiding criteria for the application of patterns to increase the likelihood of effective contributions to sustainable organisational design, and finally to the UN SDGs?
- Which methods are best suited to develop SBM classifications, both typologies and taxonomies, or even whole 'Alexandrian' languages?
- How to test the effectiveness of SBM patterns as an additional element of business model innovation tools?
- How to turn pattern repositories into effective tools for business development?

Further topics are welcome.

This track is linked to a call for papers for a special issue in Journal of Cleaner Production. Further details can be found here.

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Value Proposition Patterns for Smart Service Innovation

Tackling Sustainable Development Goals Through Digital Servitization

Martin Ebel[1,*], David Jaspert[1], Jens Poeppelbuss[1]

[1]Ruhr-Universität Bochum

*martin.ebel@isse.ruhr-uni-bochum.de

Abstract

Manufacturers are digitally upgrading their products in the course of digitalization. This is opening up new and enriching possibilities for smart services that can yield added value for customers, or changing complete business models from product- to service-centric offerings. Such digital servitization is described as a viable path to a more sustainable future, as resources are longer used, operated in an optimized manner, or shared between organizations. But which value propositions are really accomplished by today's smart services? With this study, we explicitly investigate different value propositions manufacturing companies are promising their customers through smart service. A qualitative online survey with 30 experts resulted in 116 smart service offerings. The descriptions of underlying business models were coded for similarities in their value proposition. This led to an aggregation of twelve value proposition patterns of smart services. We discussed these patterns in relation to recent business model patterns, as well as environmental goals. We see a great advantage regarding our clear focus on the value proposition and could confirm the completeness, meaningfulness, and usefulness of the patterns in a first evaluation. The deliberate restriction on the value proposition helps to classify and delimitate our patterns from related works. We encourage the use of the value proposition patterns to support ventures on the path towards a more servitized, and thereby sustainable, economy. At the same time, we call for a clearer classification of business model patterns in order to facilitate their application for practitioners to support the development of smart services.

Keywords

Smart Service, Value Proposition, Business Model, Pattern, Digital Servitization.

Main text

INTRODUCTION

To secure and strengthen their competitive position, manufacturing firms increasingly strive to come up with novel smart service value propositions for their customers (Allmendinger & Lombreglia, 2005; Porter & Heppelmann, 2014). Such transition can lead to a transformational shift of the common industry logic, named digital servitization (Coreynen et al., 2017). Servitized businesses can positively affect sustainability by challenging the linear value chain of produce, use, dump (Bocken et al., 2014; Tukker, 2004). In addition to the usually profitable service business (Baines & Lightfoot, 2014; Neely, 2008), such an aspect can further contribute to the success of companies and their competitive advantages (Doni et al., 2019; Laszlo & Zhexembayeva, 2017). Product-oriented industries in particular, have the advantage that opportunities arise along the life cycle of their products, especially in the case of durable industrial goods. (Spring & Araujo, 2017). The change from being a pure product supplier to a provider of added value with maintenance, repair, and overhaul (MRO) services all the way to operating the equipment as a service can have positive effects on the service life and efficiency of machines (Baines & Lightfoot, 2014; Sharma & Singh, 2017). Hence, digital servitization can also make a huge contribution to the achievement of sustainable development goals by assisting in operationalizing two of the six required transformational actions, e.g., sustainable industry and digital revolution (Sachs et al., 2019). Even if ecological factors play a very important role, and will probably become even more present in the future, social and economic perspectives must not be neglected for sustainable development, especially in product-service development (Tukker & Tischner, 2006) and smart service development (Cedeño et al., 2018).

Due to their growing relevance for business, a systematic development of smart service value propositions is reasonable. In particular, customer-centric development approaches are recommended that focus on the value proposition as a key element of business models (Neuhüttler et al., 2018). So far, academia has acknowledged the strategic importance of value propositions for companies to point out the particular value of their offering (Payne 2018). As regards the value proposition of smart services, research remains on an abstract level, e.g., as “removing unpleasant surprises” (Allmendinger & Lombreglia, 2005, p. 2), or it is described by the quite same examples like predictive maintenance (Beverungen et al., 2019; Dreyer et al., 2019) over and over again. A comprehensive and empirically grounded overview of potential smart service value propositions is still missing. Therefore, we propose the following research question for this study: *Which value propositions can be provided through smart service, and how can they be conceptualized as patterns?*

In this article, we present our findings from an inductive and qualitative-empirical study. Through an online survey, we gathered descriptions of 116 smart service offerings from

30 experts and conceptualized a set of twelve value proposition patterns from this data. We also conducted a first follow-up survey to evaluate their usefulness, meaningfulness, and completeness. In our next steps, we will further evaluate the practical usefulness of the patterns in innovation workshops.

The remainder of this article is structured as follows. First, we introduce related works essential to our study. In a second step, the methodology and coding procedure to search for the similarities in value propositions are laid out. In the results section, twelve patterns of smart service value propositions are presented. Finally, the results will be discussed in view of the current state of research and opportunities, and finally, the implications of our study will be highlighted.

RELATED WORK

In 2015, the United Nations established 17 sustainable development goals (SDGs) as a call for action in a global partnership (United Nations, 2015). An open question is how these SDGs can be operationalized and implemented by organizations. Sachs et al. (2019) transferred these goals into following six SDG transformations as modular building blocks of SDG achievement: (1) education, gender and inequality; (2) health, well-being and demography; (3) energy decarbonization and sustainable industry; (4) sustainable food, land, water and oceans; (5) sustainable cities and communities; and (6) digital revolution for sustainable development. For manufacturing companies, the two transformations *energy decarbonization and sustainable industry* as well as *digital revolution for sustainable development* appear particularly relevant. In this article, we want to pick up the thought of sustainable transformation and give an insight into the transformation from product provider to service provider as a prime example that refers to the two transformations.

In academia, the corresponding change processes of organisations have been characterized by various terms. For example, there are articles on product-service systems (PSS) (Tukker, 2004) and servitization (Baines & Lightfoot, 2014). In the course of digitization, these terms have mostly been expanded, and today you will find articles on smart PSS (Chowdhury et al., 2018) or digital servitization (Paschou et al., 2020) as well as smart service systems (Beverungen et al., 2019). Since such a service orientation is also closely related to sustainability aspects, even the term sustainable smart product-service systems (Li et al., 2020) can be found in the literature. We argue that through servitization, manufacturing can become more sustainable (Bocken et al., 2014; Sharma & Singh, 2017; Spring & Araujo, 2017), and digitization accelerates this process or even makes new and more sustainable offerings possible (Coreynen et al., 2017; Ranta et al., 2020).

Smart services can be a prime example of such novel offerings. A smart service is “the application of specialized competences, through deeds, processes, and performances that are enabled by smart products” (Beverungen et al., 2019, p. 12). Manufacturing companies increasingly extend their offerings by including smart service. For this purpose, they utilize the opportunities of the advancing digitalization and connectivity of the products they manufacture as well as the growing interconnection of organisations along the value chain. Data from the increasingly smart products is gathered and processed into information and added value for customers. This can range from simple data processing and visualization services to risk-sharing and performance-based contracting.

Smart services contribute to sustainability, as service orientation leads to a better utilization of resources and a dematerialization of industry (Sharma & Singh, 2017). An important factor here is that the value is decoupled from the material consumption (Armstrong & Lang, 2013). Even if smart services promise to contribute to sustainability, such can only be realized by a careful design. Such challenges were already contributed in research on PSS, where a bias towards sustainability was detected (Tukker & Tischner, 2006).

While the technical implementation of smart service systems can be challenging, priority should be put on the customer as the beneficiary of smart service value propositions (Beverungen et al., 2019; Dreyer et al., 2019). A similar approach can be found in the sustainable business model innovation, which is why we will first look at the value proposition for the customer (Baldassarre et al., 2017).

The notion of *value proposition* is commonly used but not always consistently defined and understood in academia. Payne et al. (2017) provide a detailed study of the conceptualization of this notion developed so far and define the value proposition as a strategic tool which facilitates the communication of "an organization's ability to share resources and offer a superior value package to targeted customers" (Payne et al., 2017, p. 472). In recent years, the notion of value proposition has become increasingly well known, particularly thanks to research on business models and the value proposition as one of their integral components (Osterwalder, 2004; Richardson, 2008). Defining value propositions that meet customer needs is of utmost importance for successful innovation. Innovation activities should therefore especially focus on "what customers truly value" (Lindič & Marques da Silva, 2011, p. 1704), putting the customer-centric development of value propositions into the focus of innovation projects (Lindič & Marques da Silva, 2011; Osterwalder et al., 2014) and more specifically of smart service innovation (Anke, Ebel, et al., 2020; Neuhüttler et al., 2018; Poeppelbuss & Durst, 2019).

It is precisely through digitalization that opportunities for new smart service value propositions can emerge, and such opportunities should be managed strategically (Burmeister et al., 2016). Following accepted theoretical conceptualizations of dynamic capabilities, this requires manufacturing organizations to proactively sense market developments and changes in customer demands, seize these impulses by developing innovative value propositions, and finally implement the value propositions through reconfiguring and transforming the organizational resource base (Plattfaut et al., 2015; Pöppelbuß et al., 2011). In this regard, business model patterns have already proven to be efficient as a means to support the seizing part (Bocken et al., 2014; Lüdeke-Freund et al., 2019; Mettler & Eurich, 2012). Through the use of patterns, it is recognized that innovations are usually a recombination of existing solutions or elements (Beverungen et al., 2018; Gassmann et al., 2014). The use of patterns can ease and speed up business model innovation processes (Gassmann et al., 2014).

Originating from architecture (Alexander, 1977) *patterns* are used to communicate "insights into design problems, capturing the essence of recurring problems and their solutions in a compact form" (Chung et al., 2004, p. 233). They can be composed and illustrated in different ways (Lüdeke-Freund et al., 2019). As per Remane (2017) patterns can be combined and are reused in different contexts and domains. A simplified and reduced pattern form is the Alexandrian one (Lüdeke-Freund et al., 2018). It consists of a pattern name, problem statement, context description, solution statement, and an example (Leitner, 2015). We understand patterns as aggregated and abstracted design knowledge which is based on experience or empirical observations. They offer working solutions that are reusable to different problems. Business model patterns in particular, have gained growing interest over the last years. Remane et al. (2017) offer a comprehensive database with existing business model patterns. A recent study provides a detailed classification of business model patterns and identifies the value proposition as a key class (Weking et al., 2018). Amshoff et al. (2015) point to another important feature of patterns, which can refer to different granularity levels. On the one hand, they can represent complete frameworks with interconnected components (e.g., the patterns of Gassmann et al. 2014 or Amshoff et al. 2015). On the other hand, patterns can also just describe similarities in specific components or dimensions (e.g., the value proposition). In the following, we will particularly focus on the value proposition as we consider this a key component of a business model that a manufacturing company has to get right if it wants to succeed with smart service innovation. We currently see a lack of a manageable number of corresponding patterns which address the value proposition of business models as a key concept in smart service innovation. The purpose of this paper is, therefore to empirically derive patterns of smart service value propositions.

METHODOLOGY

Our empirical research is based on qualitative data and follows an inductive approach. In order to identify a large and diverse set of smart service offerings, we conducted an online survey with experts from practice. To assure the required level of expertise, all participants had to deal with the topic of smart service during their professional life. We identified suitable experts from our own industry contacts and approached additional people on the basis of their job descriptions on social media profiles like LinkedIn.

We invited the identified experts to take part in an online survey which was finally accessed by 101 potential participants. In the end, 35 decided to take part and completed the questionnaire. In the online survey, the participants were asked to provide smart service offerings they are familiar with. A minimum of three was required, and the maximum number was limited to eight per participant. Further, the participants were asked to describe each service in their own words and to define what makes them special compared to other service offerings. For the answers, the online survey provided free text boxes without length restrictions. After reviewing the completed surveys, 30 questionnaires were finally evaluated. Outliers in the form of questionnaires that were only clicked through were removed. The average processing time per participant was 39 minutes. A total of 133 smart service offerings were recorded. 116 of these were described in a way that was understandable to the authors and could thus be included in the subsequent coding process.

As our research goal was to find similarities between value propositions, we compared the described smart service offerings and searched for similarities in their description by following a two-level coding manual (Saldaña, 2013). Both coding cycles were carried out by the three-author team. During 1st level coding, we mainly used descriptive coding, summarizing each mentioned service description in a short phrase and merging very similar offerings under the same code. This reduction was mainly achieved by the aggregation of similar offerings. For example, predictive maintenance services were named and described repeatedly in our survey. We captured them all under one descriptive code. In addition, very similar offerings that only differed in the asset under consideration were combined. Thus, for example, the described service offering of a "*self-ordering refrigerator"* and *"printers [that] order automatically required consumables"* were subsumed as: *"[..] having consumables for the machine/systems procured automatically"*. The resulting codes served as a basis for the following 2nd level coding, which was more interpretative. Here we focused on assigning pattern codes. Pattern codes "pull together material into a smaller number of more meaningful units" (Punch & Oancea, 2014, p. 175) and can be understood as a "more abstract concept that brings together less abstract, more descriptive codes." (Punch & Oancea, 2014, p. 175). We joined the codes of our first cycle into overarching categories that represent distinct value propositions of smart service offerings. In sum, this procedure enabled us to identify a number of categories. Ultimately, we were able to conflate those into broader patterns. For example categories such as *Automated/Proactive Procurement, Control, and Automation,* or *Administrative Support* were subsumed under the pattern *Automize* (Figure 1). An illustration of the procedure with quotes from the survey, descriptive codes as well as the categorization and final patterns is given in Figure 1. For the presentation of our patterns we decided to transfer our findings into the Alexandrian form. For this we described the problem-solution combination and examples for each value proposition pattern.

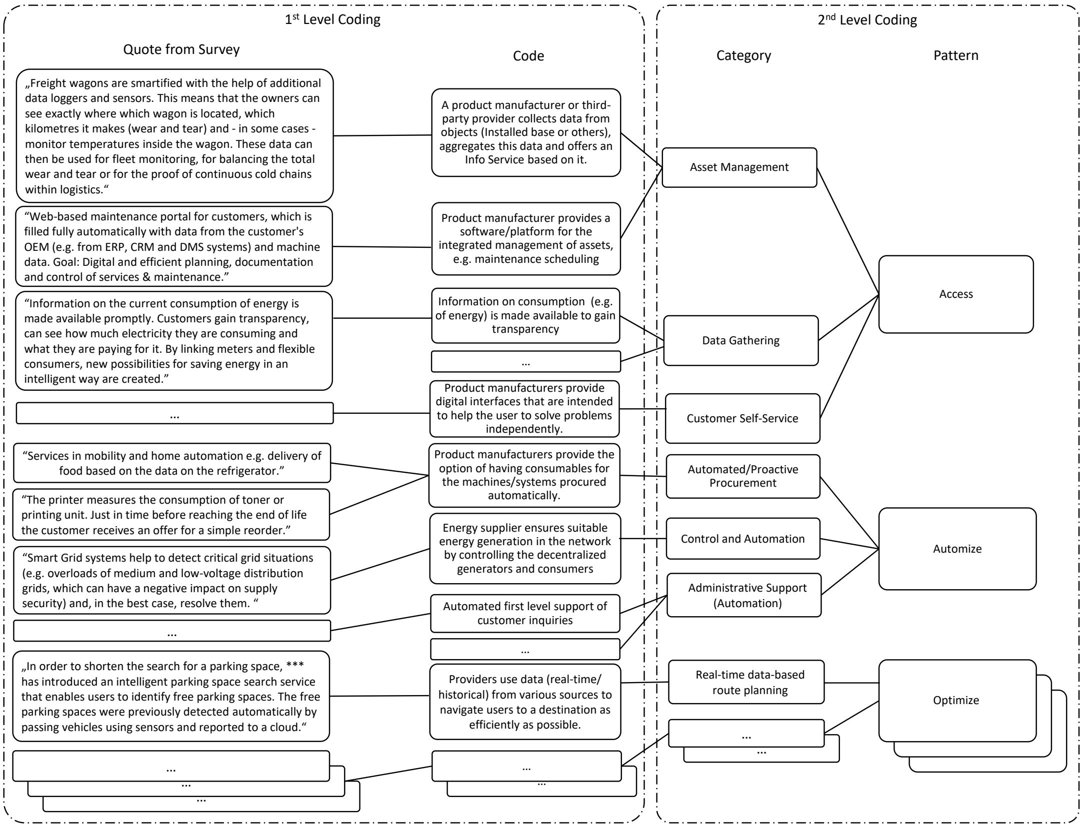

Figure 14: Two-level coding scheme

Finally, we conducted an online follow-up survey for evaluation purposes, in which 22 of the 30 participants from the first round took part. We asked if the twelve patterns that we had derived were considered meaningful, useful, and complete by the original informants. Here, we used a structured survey with five-point Likert-scales to allow the participants the possibility to express their agreement with corresponding statements (i.e., that the set of twelve patterns appear meaningful/useful/complete).

FINDINGS

Through our online survey, we were able to generate 116 descriptions of smart services in the industrial engineering setting. The first coding cycle led to over 50 descriptions of distinct smart service offerings and corresponding value propositions. As a result of our second cycle coding, we extracted 30 different value proposition categories. Ultimately, we were able to summarize those 30 categories in twelve broader patterns. The complete list of value proposition patterns that resulted from our study is presented in Table 1.

We describe the problem of the potential customer and how each smart service value proposition addresses the problem. We further provide the number of mentions of each smart service offerings that were finally assigned to a specific pattern.

The patterns range from the pure provision of data in condition monitoring systems to virtualized processes in support processes with the help of augmented reality applications or virtual conferencing tools. For instance, the value proposition pattern *Access* describes a firm's promise to make data and information accessible and useable to customers. This can be achieved through specific services such as maintenance scheduling or condition monitoring. In both ways, the provider grants digital accessibility to information that the customer is interested in. In addition, added value can be promised by in-depth data analyses (pattern *Analyze*), or the assumption of risk on the basis of service agreements (pattern *Assist* or *Operate*), which can only be implemented or invoiced if the underlying data is collected and monitored. Further, smart services can also strengthen the position or create and involve new potential market participants along the value chain. This is illustrated by the *Match* pattern and the example of the two-sided platform, in which the service provider acts as an intermediary between customers and suppliers and brings together supply and demand.

Table 1: Value proposition patterns of smart services

Pattern	Value Proposition
Access (15/116) Accessibility of data and information.	**Problem:** Lack of information about the status or condition of machinery and equipment.
	Solution: Data is made accessible by installing sensors or providing access to existing interfaces. Furthermore, the data can be aggregated on a platform and may be visualized as part of condition monitoring applications and dashboards. Information about machine conditions, usage behavior or maintenance schedule plans help customers acquire transparent and timely information about their assets.
	Examples: Energy metering, maintenance schedule, condition monitoring, asset tracking
Analyze (05/116) Analysis of data and processes.	**Problem:** Data from machine and/or systems needs to be transformed into actionable information
	Solution: Data streams and event logs are continuously monitored and analyzed. Information about energy wastage, changing machine conditions and capacity utilization are used to reduce default risks and increase productivity.
	Examples: Status analysis, efficiency reports, risk analysis
Assist (05/116) Assistance of customers in their value creation.	**Problem:** Inefficiencies due to non-value-adding activities/processes.
	Solution: Non-value-adding activities are taken over or streamlined through digital channels. Customers spend less time on secondary processes, allowing them to focus on their core activities.
	Examples: Safety documentation, maintenance ticketing, spare part suggestion/ ordering
Automize (17/116) Automation of processes up to autonomous systems	**Problem:** Errors and inefficiencies in recurring tasks.
	Solution: Recurring tasks or complete processes are automated. No or less human intervention is required, which relieves personnel and/or reduces the risk of error.
	Examples: Chat bots in 1st level support, smart grid, proactive procurement
Match (05/116) Connection of suppliers with demanders of certain assets or services.	**Problem:** Time consuming and complicated ways of interaction and/or exchange between two or more different partners. Missed business opportunities.
	Solution: Demand and supply for various interest groups like drivers and commuters, hosts and travelers, employers and employees are brought together on a digital platform. The platform provider becomes an intermediary and operates the platform.
	Examples: Booking platform, two-sided platforms, ride-sharing service
Operate (09/116)	**Problem:** High capital expenditures and risks with regards to operating assets

Operation of an asset on behalf of the customer	**Solution:** The asset is operated by the provider, who is remunerated for the output. Capital expenditures decrease while operational expenditures increase for the customer. The risk is minimized through low capital commitment and full-service contracts.
	Examples: Performance-based contracting, power-by-the-hour, output-based pricing

Table 1 (continued)

Optimize (14/116) Optimization of assets, processes or procedures.	**Problem:** Efficiency loss over time or due to contextual factors.
	Solution: The provider focuses on the improvement of predefined values of a machine, process, or procedure. Inefficiencies are uncovered and eliminated by comparison with target values or contextual factors and suggestions for parameter optimization or decisions are given.
	Examples: Asset optimization, route planning, setpoint adjustment, benchmarking
Personalize (06/116) Individually adapted services	**Problem:** Individual solution is needed.
	Solution: Based on recognized and monitored behavioral patterns, services are individualized for the customer. In this way, offers can be adapted to the respective customer and are tailored to the individual's own preferences and interests.
	Examples: Buying recommendations, behavior-dependent insurance
Predict (13/116) Predictions about future events.	**Problem:** Unplanned breakdowns or late noticed issues that require quick response.
	Solution: By evaluating historical data and comparing it with real data, a forecast of possible future events can be made. Recurring or evolving problems which can be attributed to data are foreseen and anticipated. This allows early intervention, which prevents failures and minimizes consequential costs.
	Examples: Failure forecast, predictive maintenance, predictive quality
Recognize (08/116) Recognition of patterns in data.	**Problem:** Anomalies leading to unsatisfactory outputs and/or complex component recognition
	Solution: Data retrieved from machines, products or processes might exhibit patterns or correlations that can support root-cause analysis as well as component and failure recognition. The detection of these, the monitoring of limit values or the comparison with known values and available information can facilitate decision making.
	Examples: Parts identification, quality control, security network scan, anomaly detection
Share (11/116) Share assets among stakeholders and monitor usage	**Problem:** Assets are not procured due to high costs or capacity of assets is not fully used
	Solution: To achieve the best possible capacity utilization, assets are shared among various stakeholders. Operating time is maximized by avoiding downtimes through use and sharing between different users. Customers can thus avoid expensive capital investment.
	Examples: Free floating carsharing, asset on demand, capacity sharing, pay- per-use
Virtualize (10/116) Virtualization of processes and work steps via digital channels.	**Problem:** External competence is required which is time consuming and costly or real-world environments are dangerous.
	Solution: Physical components of a service can be virtualized for customer's personnel with instructions provided remotely from experts. Besides, the savings potential of travel and personnel costs, certain things can be simulated in a safe environment to avoid risks.
	Examples: Remote support, virtual training, augmented reality applications

The results of our brief follow-up evaluation survey indicate that the patterns were both perceived as useful and meaningful (Figure 2). Most respondents also considered them as complete in terms of covering the plethora of smart services (Figure 2).

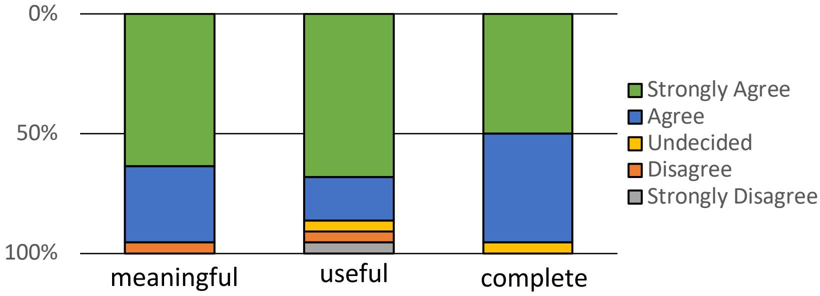

Figure 15: Evaluation results (n=22)

DISCUSSION AND CONCLUSIONS

This article addresses smart service innovation which represents a highly relevant topic for practitioners and scholars alike that requires further research (Dreyer et al., 2019; Wuenderlich et al., 2015; Zheng et al., 2018). The objective of this study was to find out which value propositions can be provided through smart service and how they can be conceptualized as patterns. Through an inductive coding of examples provided by a set of 30 experts, we suggested a set of twelve patterns, which are named as follows: Access, Analyze, Assist, Automize, Match, Operate, Optimize, Personalize, Predict, Recognize, Share, and Virtualize.

By suggesting these patterns, we concur with other researchers who argue that innovation challenges can be tackled more efficiently and effectively by recombining existing knowledge (Beverungen et al., 2018). We agree with the position that innovative business models do not have to be built up from scratch; rather, many are based on existing patterns (Gassmann et al., 2014). In this regard, our study showed a certain interrelation between main value propositions within the total dataset of 116 services which ultimately led to our patterns. However, we also noticed that main value propositions are offered in combination with subordinate supplementary value proposing components which themselves could already be a standalone advanced service offering. For instance, predictive or personalized services are often offered in combination with an analysis of data. This shows that even if these patterns reveal known elements, reassembling, copying, and reusing components from existing solutions can lead to business model innovations which are new to the firm or new to an industry (Abdelkafi et al., 2013). In this way, new kinds of sustainable advanced services can be created, and opportunities can be sustainably systematized and supported.

We argue, that companies struggling with smart service innovation might have those difficulties because they do not clearly identify the value proposition for the customer for their smart service activities (e.g. Klein et al., 2018). They rather seem to be driven by technological opportunities and then trying to develop a wide range of services. We urge companies to clearly differentiate between the value proposition they want to create for their customers and then use technologies accordingly to realize the value proposition. The patterns shall help in doing this. Even if the applicability can only be demonstrated in practice, our first brief evaluation survey indicates that practitioners find the patterns useful. Therefore, we are optimistic that they can inspire firms to take a customer-centric view on smart service innovation.

With our results, we also address the criticisms of previous patterns. These were described as confusingly numerous and difficult to compare (Weking et al., 2018). Thus, in contrast to the most existing conceptualizations of business model patterns and following Amshoff et al.'s (2015) declination of different granularity levels of business model patterns, we consciously focused on the value proposition only. This should make the patterns more applicable and comparable.

To find a promising value proposition is seen as one of the main challenges when it comes to smart service innovation. Klein et al. (2018, p. 852), for instance, state that "hazy value propositions and difficulties conveying benefits to customers" are among the major challenges in service innovation. Also, innovation success is said to depend on the value customers see in the smart service (Wuenderlich et al., 2015). Our set of patterns are deliberately kept rather abstract as they should not be merely copied. The inspiration they provide certainly needs to be transferred to the specific context of the smart service system. In this step, they shall inspire firms to craft one or numerous customer-centric value propositions. The patterns can, for example, encourage companies to think about mainly providing information accessibility as a service to their customer (*Access*) or virtualizing specific processes as the principal service (*Virtualize),* leading to questions on how the targeted accessibility or virtualization can be realized in a next step,). That is, the application of these patterns can guide firms to adapt to customer demands they have identified. Furthermore, by having assembled an overview of exemplary smart services as a basis for our patterns, we address the issue stated by recent scholars who call attention to the fact that publications dealing with the issue of smart services do not actually consider specific smart services (Götz et al., 2018; Heuchert et al., 2020).

In addition to discussing our patterns in comparison to existing pattern approaches, we would also like to discuss their influence on the broader topic of business model innovation and Sustainable Development Goals. We see smart services and the development of those as a valuable contribution to satisfying customer wishes regarding a more efficient and sustainable use of products and resources. Thus, the named patterns contribute to the digital servitization of manufacturing firms which can impact named SDGs by facilitating dematerialization and better utilization of resources. We are aware that our service patterns will hardly have a direct effect on a great part of the development goals, like for example on the ending of poverty or the reduction of inequality. However, we see a clear starting point, especially in the operationalization of certain goals through the design of smart service value propositions. Taking Sachs et al. (2019) contribution, we concur with his take on six the main transformational shifts resulting from the SDGs and argue that digital servitization, and with it the development of smart services, can have a positive effect on two of those shifts. In particular the shifts towards *energy decarbonization and sustainable industry* as well as the *digital revolution for sustainable development* are addressed by digital servitization.

Sharma and Singh's study (Sharma & Singh, 2017) suggests that the impact of servitization on sustainability is related to how we understand business and that there is a shift in thinking towards more collaborative networked value creation. Smart services also seem to be accelerating this change. Accepted conceptualizations emphasize the importance of the value co-creation process of smart service providers and customers (Beverungen et al. 2019). This conceptualization also reaffirms that manufacturing firms have to build up new competencies and reconfigure their capabilities (Plattfaut et al., 2015; Pöppelbuß et al., 2011) as well as to collaborate in multi-actor networks for the development of such complex solutions (Anke, Poeppelbuss, et al., 2020). We are convinced that our patterns can assist or at least influence the systematic accomplishment of those shifts. The patterns encouraging a focused development of smart service value propositions and thereby enforce digital servitization, especially in the industrial setting. Future research must show to what extent the systematic development of smart services is supported by the patterns and whether this leads to stronger cooperation and what value this means for our society and sustainability aspects.

Starting from a customer's demand in a particular situation, the development and offering of a smart service shall facilitate tasks and lead to additional value for the customer. The result is mostly an improvement of efficiency and reduction of resource wastage. For instance, smart service value propositions with the main focus to predict a certain state of the customer’s products or processes (pattern: Predict) will probably have a positive impact on potential process disruptions or machine damages. Such will consequently lead to a decrease of downtime costs. Ultimately, this has an effect on an increasingly sustainable consumption and production on the customer’s side. If a supplier focuses on virtualization of existing service procedures e.g. due to augmented reality or remote support applications (pattern: Virtualize) customers’ needs can be fulfilled without traveling expenses. As assets of manufacturing companies are often installed worldwide, that can save resources and expenses. A further example is the concentration on a smart service with the value proposition to optimize a specific deed, process or product (pattern: Optimize). Here the goal is the determined reduction of a waste of resources (time, energy, material or costs), all having a direct positive impact on the environmental impact. The last example is a service value proposition to generate a sharing possibility of an offered good or asset (pattern: Share). Here the increase of efficiency in utilization through sharing can impact the resource utilization in a positive manner. Given examples shall demonstrate possible influences on sustainability and should not be regarded as universally sustainable or exhaustive. Ultimately, even models that initially seem to have a sustainable effect can negatively impact the long run, as we can see with sharing economy models (Verboven & Vanherck, 2016). In principle, however, shown patterns can be assigned to a more sustainable circular economy when used adequately (Ranta et al., 2020). Our patterns show possibilities to enter digital servitization and present value creation potentials of smart services in a product-centric industry; we hope that this could ultimately positively affect sustainability.

LIMITATIONS

First, we noticed that there seem to be different understandings of smart service within the group of participants. While some put their focus on customer orientation and flexibility, others mainly considered the data-driven and automation aspects. For our online survey, we did not provide the respondents with a predefined conceptualization of smart service and remained open to their different understandings. We only not included a service in our dataset if the description of it was not understandable or had no reference to a digital or service component. Thus, we see a certain limitation within our findings due to the participants' diverging understanding of smart service, which might also not align to academic definitions of smart service and smart service systems.

Second, we constructed the patterns with only 116 examples of smart service offerings provided by 30 experts. While this appears to be a large number, it is likely that specific smart service offerings were not covered, which, in turn, could have motivated the conceptualization of further patterns. The brief follow-up survey for evaluating the patterns also only had 22 participants. Hence, the resulting conceptualizing of patterns should be considered as the first results that might need further evaluation and potential refinements. It should also be noted that the patterns are based on real-world specific examples with specific contexts, and even if the adoption of one pattern seems easy, there is no guarantee for success, as the services always have to be adapted according to prevailing market or industry settings. Hence, they should not be interpreted as normative best practices but rather as inspirations that can enrich and speed up the seizing part of smart service innovation.

Finally, the field of study regarding digital servitization and smart service in industry is still a relatively new topic. At present, fellow researchers are concerned with the possibilities, advantages, as well as disadvantages resulting from digital servitization. Mainly, these focus on economic aspects. However, digitalization in particular does not always have positive effects on the environment. Reasons for this are for example high energy consumption due to data processing. Deducing from this, we pose the question whether the increase in efficiency through digital servitization has a real influence on sustainability or if there is a certain bias or paradox within sustainable smart services.

FUTURE RESEARCH

This research article provides the set of patterns and their brief evaluation. In our next steps, we plan to further demonstrate and evaluate the usefulness of these patterns and to refine them potentially. So far, the patterns are the result of an inductive coding of existing smart service offerings. We contend that they can be helpful in innovation processes but still have to demonstrate and evaluate this usefulness in actual smart service innovation processes. Therefore, we plan to work together with industry partners in a workshop session where the patterns will be applied. Feedback from workshop participants will be gathered for evaluating the patterns. We also invite other interested firms to use the patterns beyond our own studies. We would be glad to learn about such initiatives and receive feedback on our set of patterns.

From a more generic perspective, future research should also try to investigate which level of granularity makes sense in which specific situation of innovation initiatives. More precisely, we think that the use of patterns, but also the consideration of different lenses and understandings of patterns, requires further research. Currently, for example, some works deal with the technological possibilities and building blocks of smart service only (Mittag et al., 2018). However, this technical perspective may be linked to the value proposition patterns that we suggest, too. Hence, the available and constantly growing knowledge in the field of smart service innovation should be better integrated. This might also offer opportunities for developing a generic set of design principles for developing smart service systems.

In relation to the transformational shifts, and in particular the SDGs, the influence of digital servitization on precisely such changes and goals must be investigated in the future. It would be interesting to investigate the effects of smart services on the different targets within the Sustainable Development Goals as well as possible harmful impacts and issues need further research (e.g. Nižetić et al., 2020). Thus, we encourage fellow researchers to look into this topic further.

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Sustainable business model patterns for degrowth

Grasping degrowth in organizational designs and logics

Tobias Froese[1,*], Markus Richter[1], Florian Hofmann[2]

[1]ESCP Business School (Berlin Campus); [2]TU Berlin

*tfroese@escp.eu

Organizations are exacted to both deal with change and change the deal for new ways of doing business. Particularly since, as Khmara and Kronenberg (2018, p. 722) point out, business activities are "a key driving force behind economic growth" while humanity approaches planetary and social boundaries (Alvaredo et al., 2018; IPCC, 2018; Steffen et al., 2015). Against this background, degrowth emerges as a new sustainability paradigm, a social movement, and a field of research focusing on how modern societies can become less dependent on economic growth and more future-proof in a socially sustainable way (Asara et al., 2015; Weiss and Cattaneo, 2017). However, while research on degrowth at the level of organizations is growing, it is dispersed and often builds on case studies that are predominantly explorative, presented in various formats, and set diverse foci (e.g., Bloemmen et al., 2015; Bradley, 2018; Kostakis et al., 2018).

For gaining actionable knowledge on degrowth at the level of organizations, research on sustainable business models (SBM) provides relevant conceptual perspectives (Boons and Lüdeke-Freund, 2013). Generally speaking, business models present organizational designs and logics for value creation (Laasch, 2018). Khmara and Kronenberg (2018) have begun to show that the conception of business models, which erstwhile was oriented towards merely economic value creation, can be made fruitful for alternative economic paradigms such as degrowth. In addition, Lüdeke-Freund et al. (2018) have defined the notion of SBM patterns. Building on Christopher Alexander (Alexander et al., 1977), SBM patterns capture knowledge on proven solutions to social, ecological, and economic problems recurring in processes of business model design in a uniform format. Collections of patterns turn into explicit pattern languages when not only an adequate number of patterns but also their rule-based relationships are sufficiently formalized (Leitner, 2015; Lüdeke-Freund et al., 2019). The general idea then is that SBM patterns can be combined to design complete business models (Abdelkafi et al., 2013; Lüdeke-Freund et al., 2019;

Remane et al., 2017). However, relationship types between business model patterns have not yet been identified and systemized (Lüdeke-Freund et al., 2019).

Against this background, the research objective is – much inspired by Lüdeke-Freund et al. (2018) – to synthesize and consolidate knowledge on organizational designs and logics for degrowth in the form of a degrowth-oriented SBM pattern language. This serves several key functions: (1) classification of organizational designs and logics for degrowth, (2) identification of relationship types among the corresponding SBM patterns, (3) examination of the state of research on organizational degrowth, and (4) practical guidance for the design of SBMs for degrowth.

To these ends, the research design is divided into two main phases. First, a systematic review on extant case studies on degrowth organizations has been conducted. To identify relevant case studies, this process mainly followed suggestions made by Tranfield et al. (2003). The identified single or multiple case studies have then been analysed applying Alexandrian pattern theory (Alexander, 1979) and, in particular, the notion of SBM patterns (Lüdeke-Freund et al., 2019; Lüdeke-Freund et al., 2018). For the second phase of the research, the following is planned: The initial SBM patterns and their identified interrelations are presented to experts, in this case researchers and practitioners in the field of degrowth. In line with Lüdeke-Freund et al. (2018), this step builds on Paul's (2008) Modified Delphi Card-Sorting method. This method represents an iterative process throughout which the experts – independently from each other – assess, refine, and sort the identified patterns and their interrelations.

The research is currently at the end of phase one and first results are available. The research brought about a preliminary collection of 48 SBM patterns for degrowth. To give a brief example, the pattern 'Create moments to experience degrowth values' was found in articles written by Bloemmen et al. (2015), Bocken et al. (2020), Bradley (2018), and Chassagne and Everingham (2019). It addresses the problem that a lack of emotional knowledge and experience contributes to socially and ecologically unsustainable behaviour and decision making. Here, organizations can create moments of deeper engagement by bringing together otherwise unrelated actors. For example, organizations can involve local communities in teaching tourists about the local culture and natural environment.

The interrelations of the identified SBM patterns for degrowth are now being analysed in greater detail. It becomes evident that the case organizations generally apply a combination of degrowth-specific and degrowth-unspecific business model patterns. By implication, the derived pattern collection is at times inexhaustive for describing entire degrowth-oriented business models. Hence, the focus on degrowth-specific patterns limits the potential for generic learnings on how business model patterns relate. Still, this is a learning in itself and, secondly, relationship types are emerging among the identified SBM patterns for degrowth.

Furthermore, various ways in which the identified SBM patterns for degrowth could be classified are currently being explored. For instance, patterns can be grouped based on the different value-creating functions they serve, such as governance, product/service delivery, or communication. Then again, another way to group them is based on how they contribute to the broader notion of degrowth – for example, through de-materialisation, de-commodification, de-hierarchisation, or de-colonisation.

Last but not least, more generic logics of how problems in business model design for sustainability are being solved in a degrowth context appear. These point towards the potential to derive generic propositions for a 'positive' rather than normative theory of organizational degrowth (cf. Santos, 2012). On the other hand, however, the identified SBM patterns for degrowth are at times inconsistent or even contradictory. To give an example, while some authors point towards a decommodification logic to solve sustainability problems (e.g., Bloemmen et al., 2015; Gerber and Gerber, 2017) others highlight an extension of the economic sphere to solve sustainability problems (e.g., marketing repair services (Bocken et al., 2020)). Such cases indicate that degrowth – just as other sustainability concepts (e.g., corporate social responsibility or stakeholder theory (Miles, 2012; Okoye, 2009)) – is a dynamically emerging and at times ambiguous or even essentially contested concept.

Considered together, this research aims to contribute insights on how degrowth is realized in organizations and actor networks. The expected results are considered to be relevant to practitioners. SBM patterns for degrowth can serve as tools for businesses that require support for developing motivating visions as well as action knowledge for sustainability (Vandeventer et al., 2019).

Furthermore, while it is not assumed that the research will reveal a nearly exhaustive collection of SBM patterns for degrowth, it contributes to building theory on organizational degrowth. According to Meredith (1993), research develops towards theory building as it cycles along phases of description, explanation, and testing. The research conducted is placed in-between description and explanation. While it describes patterns in organizational designs, it as well considers the interplay among these patterns and, hence, gains explanatory power on how certain degrowth-related outcomes (e.g., reduced commodification) can be generated (Seelos, 2014). Besides, gaining knowledge on relationship types among degrowth-oriented SBM patterns addresses a general gap in SBM pattern research (Lüdeke-Freund et al., 2019).

Finally, the preliminary findings indicate the degrowth concept's stage of development with regards to organizational designs and logics. The results expose knowledge gaps and contradictions which must be addressed in order to develop the existing body of knowledge further. Hence, the results reveal relevant avenues for future research.

Keywords

Degrowth, business models for sustainability, sustainable business model patterns

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The Problem Space as the Missing Link in Business Model Patterns

Martin Ebel[1,*]

[1]Ruhr-Universität Bochum

*martin.ebel@isse.rub.de

INTRODUCTION

Business model patterns are described as a helpful tool to facilitate business model innovation (BMI) and make it more efficient (Gassmann et al., 2014; Remane et al., 2017; Weking et al., 2018). The focus of recent business model patterns often lies in pinpointing solutions. However, research promotes a close link and interrelation between a solution and the problem to gain design knowledge (vom Brocke et al., 2020). The extent to which this understanding also applies to the use of business model patterns should be investigated. For this purpose, a literature search was conducted.

It became clear that business model patterns are often described abstractly and without a clear reference or relation between the problem space and solution space. It seems as if the abstract definition makes the aggregated design knowledge in form of patterns hard to use.

RELATED WORKS

The development of solution patterns goes back to Alexander et al. (1977) who developed a pattern language within architecture. Leitner (2015) further postulates that it seems plausible to "apply Alexander's ways of thinking wherever something is designed or shaped". Here, patterns are based on experience or empirical observations and can be seen as working solutions to problems. This relation is essential if we understand solution patterns as design knowledge (vom Brocke et al., 2020). Such is also present in existing innovation processes and tools. In engineering design, the theory of inventive problem solving (TRIZ) describes a cycle of problem abstraction and solving it through analogy consideration (Da Silva et al., 2020; Savransky, 2000). Another process, which is quite common for innovation is Design Thinking. It follows the double diamond, which also distinguishes between the problem and solution space. Both spaces are iterated through to operationalize innovation efforts (see Figure 1). So far, named lenses on solution patterns as design knowledge, and their usage in design processes with respect to the problem and solution space have not been merged for BMI.

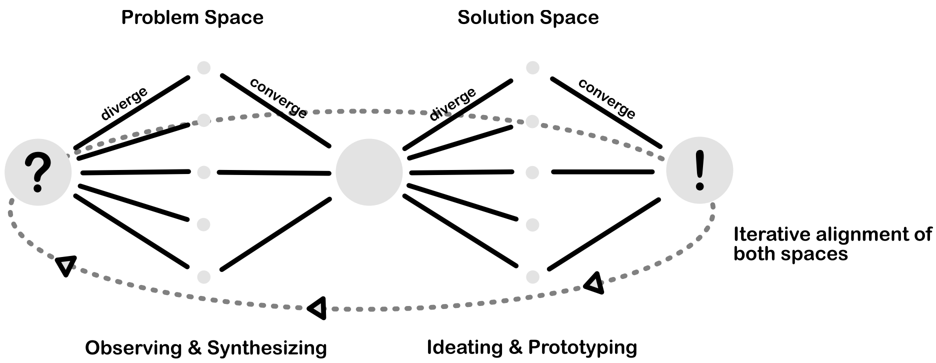

Figure 16: Double Diamond in Design Thinking Process (Lindberg et al., 2011)

METHOD

In this paper, a literature review was conducted. It examines how the design knowledge in form of business model patterns is described and how these are used in innovation processes. For this purpose, the most cited and relevant papers from google scholar were used. The search term "business model pattern" was used and results were ordered regarding their relevance. Results from the first page were checked for relevance. Further papers were added by a forward and backward search. In total, seven papers were included. In Table 1 the search process is classified according to vom Brocke et al. (2015).

Table 7: Literature Search Process

Process	Sequential		Iterative
Sources	Citation indexing services	Bibliographic databases	Publications
Coverage	Comprehensive	Representative	Seminal Works
Techniques	Keyword search	Backward search	Forward search

RESULTS & DISCUSSION

The review of the literature on business model patterns has shown that authors mainly contribute to the stream of BMI as an outcome of new business models (Foss and Saebi, 2017). Patterns are mainly described as exemplars that should facilitate idea generation and make the endeavor of BMI more efficient. About overarching innovation approaches like Design Thinking or TRIZ as well as to the problems that the patterns solve is little to be found. Named definitions and the introduced application of patterns are shown in Table 2.

So far, the problem space seems under-researched. The only paper that addresses the problem space is Lüdecke-Freund et al. (2018), who mention that the patterns are used to analyze problems. Worth mentioning is, that the application area of sustainability describes

Table 8: Results of the Literature Review

Literature	**Definition Pattern**	**Focus**	**Definition BMI**	**Application for BMI**

Lüdecke-Freund et al. (2018)	The core of a solution to a problem that can be repeatedly applied in a multitude of ways, situations, contexts, and domains. It also describes the design principles, value-creating activities, and their arrangements to provide a useful problem-solution combination.	Rigorous synthesis and consolidation of the available literature on sustainable business model patterns	Create new or improved business models.	Use the taxonomy and experiment with pattern combinations. They can also be used to analyze the sustainability challenges a company sees itself confronted with and to support the identification and illustration of possible solutions.
Bocken et al. (2014)	Groupings of mechanisms and solutions that may contribute to building up the business model.	Develop a common language that can be used to accelerate the development of sustainable business models	Innovations through changes in the to deliver and capture value) or change their value propositions.	The archetypes may be used as exemplars in a workshop setting with industry. Companies when brainstorming to develop new sustainable business model ideas may draw inspiration from each of the archetypes
Remane et al. (2017)	Proven solutions to recurring problems during business model design	Exhaustive review and integrate all patterns into one database	Designing a new, or modifying the firm's extant activity system	Guiding to the patterns most suitable for individual situations. Patterns do not focus on imitating, but rather address efficiency, [..], and help to overcome cognitive barriers
Weking et al. (2018)	Recurring phenomena that have proven to be successful in the past in different industries or contexts:	Taxonomy to structure BMPs consistently and to leverage their potential for BMI	Building on reoccurring successful solutions as a blueprint for BMI	The structure makes it easier to use than an alphabetically sorted list of BMPs, and the example cases provide the basis for analogical thinking
Gassmann et al. (2014)	Samples of successful business model innovations, which can be used as a template	Methodology that helps BMI with 55 pattern cards	BMI describes a recombination of repetitive patterns. BMI needs a change in 2 of 4 pillars (who, how, what, value).	Confront participants in workshops with individual business model patterns and encourage them to apply the underlying logic to their own problem or company.
Amshoff et al. (2015)	Proven business model elements, which reveal valuable insights about pursued business logics.	Methodology for pattern-based business model development through disruptive technologies	Solution patterns, which serve as building blocks for the design of new business models.	The basic idea of the pattern concept is reusing solutions that are documented generally and abstractly to make them accessible and applicable to others. To combine patterns a computer-aided tool is provided.
Abdelkafi et al. (2013)	Relationship between a certain context or environment, a recurring problem, and the core of its solution.	Systematically business model innovations in the field of electric mobility.	A BMI happens when the company modifies or improves at least one of the value dimensions.	By knowing patterns, managers and decision makers can find it easier to generate a new business model in their industries or to adapt an existing one.

problems that will affect, without exception, all organizations. Proposed Sustainability Development Goals (SDGs) of the United Nations (2015) further set targets that can be interpreted as an abstract problem to solve. But such a link does not exist in all areas for which patterns have been developed.

Through such anchoring, a stronger influence on organizations could be achieved. Further, more studies with a more rigorous research method should show the effectiveness, but also the postulated efficiency of business model patterns and their integration in innovation processes. In most papers, the application remains very abstract for the reader. Looking at common approaches like Design Thinking or TRIZ and using and adapting business model patterns to such processes can contribute to business model innovation. Design-oriented research methods like Design Science Research may provide new insights for further research. For example, the consideration and classification of business model patterns as design knowledge and mapping them in the design knowledge space on the levels of projectability, fitness, and confidence (vom Brocke et al., 2020) could help to complement and expand existing approaches.

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Keywords

TRIZ, Design Thinking, Business Model Innovation, Design Knowledge

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Track 4.1.

Theoretical and Intellectual Roots of Business Model Research

Track 4.1. Theoretical and Intellectual Roots of Business Model Research

Track chair: Jonas Gabrielsson
Halmstad University, Sweden

This track seeks to historicize business model research by exploring its intellectual roots and examining classic works that serve as theoretical building blocks for contemporary approaches and models. The track welcomes a wide range of methodological approaches, from meta-analytical reviews and bibliometric studies to biographical reviews and life histories of pioneering scholars.

Towards An Understanding Of Business Model Categories As Empirical Phenomena

Sergio Alves[1],*, Sujith Nair[1], Herman I. Stål[2]

[1]Umeå School of Business, Economics, and Statistics, Umeå University, Sweden; [2]Gothenburg School of Business, Economics and Law, Gothenburg University, Sweden

* sergio.alves@umu.se

Abstract

Business Model Categories (BMCs), such as Sustainable Business Model, are descriptors of how firms can create and capture value that are important and prevalent in practitioners' vocabulary. Yet, studies on BMCs are scarce, and answers lack to questions of how, why, and with what consequences BMCs become established amongst practitioners. Given the potential of BMCs to shape firm behavior, the Business Model for Sustainability (BMfS) literature can benefit significantly by advancing research on BMCs.

In this paper, we present a theoretically grounded conceptualization of BMCs, and how they emerge, that builds on a social constructionist view of reality and the literatures on categories and institutional work. BMCs are not given but rather social conventions that emerge through the production and consumption of texts by actors' purposeful and reflexive efforts.

Our conceptualization points to the relevance of studying issues of signification (what gets to be deemed (not) sustainable) and power (who gets to decide it), but also for the need of reflexivity amongst BMfS scholars when engaging with research and practice. We contribute to the conference by emphasizing the necessity of studying BMCs, providing a foundation for doing so, and highlighting the need for a more reflexive approach by BMfS scholars.

Keywords

Business Model Categories, Categories, Institutional Work, Social Constructionism

Building a market for circular economy

A social construction of business models

Christian Koch[1,*,+], Thomas Polesie[2],

[1]Aarhus University, Department of Business and Technology;
[2]University of Gothenburg

*kochchristian65@gmail.com

[+]submitted for track 4.1: Theoretical and Intellectual Roots

Abstract

Most business model approaches, including those involving circular economy rest in an interesting tension between assuming that new turnover can be created for products and services and that it is possible to create a market for these, and the, on the other, hand belief in classical economic concepts of demand and supply is preexisting. Business models attempting to implement circular economy experiences enjoy different degrees of diffusion into domains of the traditional linear economy. A case in point is the building industry. Attempts to create circularity often exhibits isolated dyads of secondhand material owners and singular new built projects that demand such secondhand material. In other words, very incomplete constellations of suppliers and buyers. And selling second-hand material barely come about.

The business and societal potential for creating circular business models in the building industry might be considerable, but how can this transition come about and how should it be understood?

Callons concept of market shaping is used. Callon propose that the shaping of market can be understood as five steps: (1) passiva(c)tion; (2) the establishment of qualculating agents; (3) the organisation of market encounters; (4) market attachment; and finally (5) price formation. These concepts are illustrated with two examples from Swedish building industry. The examples show that the establishment of market arrangements in support of circular business models is a long process that experience setbacks, yet also more and more rigorous support from government. The absence of “government” and the limited role of standards in Callons vocabulary is discussed.

Keywords

Circular Economy, Buildings, Callon, passiva(c)tion, qualculating agents, market attachment

INTRODUCTION

A circular economy has been portrayed as a coming creator of qualitative growth (Ellen Macarthur, 2016) and legislators and politicians alike have attached great expectation to it for its potential of mitigating the climate crisis, such as it is expressed in EU new green deal (EU 2020) and Bidens similar plans.

A transition from one main market form to another -albeit possibly an over simplication of the present change- is interesting to discuss from a business model perspective. In particular it is interesting to study how the transition process occurs as the circular market emerge.

In this paper the emergence of circular economy in the building sector is picked as case. The sector is a large producer of material “waste”, carbon dioxide and other greenhouse emissions, with a fragmented set of companies; architects, consulting engineers, contractors and real estate developers and -operators. Circular building has lately emerged as a fragmented submarket consisting of immature technologies and uncoordinated suppliers and customers supported by an emergent institutional framework. This submarket is actually under pressure from a number of dynamics that inhibit its growth.

The paper aims at scrutinizing the emergence of a circular market, exploring a possible framework of sociology of economy and using the building sector in Sweden as basis for providing illustrative cases.

We draw on a framework of understanding from sociology of economy, more specifically Michel Callons works (Callon 1998a, b, 2017). Second the framework draws on concepts of business models. Third the frameworks also borrow inspiration from concepts of sustainable transition and business strategy studies.

The contribution of this paper is to commence understanding the processes of emerging market better and thereby accelerating the transition towards circular building for example using strategic partnerships as vehicles for developing the necessary standards and practices to support market creation.

The empirical material had been collected over a period of two years from may 2019. In this period circular initiatives has been followed, including professional press, governmental report, new legislation, EU materials etc. The period has been characterized by a large number of initiatives both regionally, nationally and internationally. It is not possible to give full justice to all. Two rather limited cases has been selected to illustrate processes of market shaping. It has been chosen to keep them anonymous underlining their preliminary character and also much material in Swedish is not referenced. Convenience was the main criteria for the chosen cases. Therefore the substantial material behind that backs the cases up are not shared.

FRAMEWORK OF UNDERSTANDING

Many highly profiled scholars in circular economy focus on material flows and their management (Lüdeke Freund et al 2019). We posit that circular economy is not about handling material flows, making these flows amenable to counting, categorizing and classification. Rather its about establishing the social relations needed in the social shaping of a circular market. And in these processes social and material agencies are intertwined. Relations between suppliers and buyers, between bodies of standardization and technical experts etc. needs to be established. We therefore suggest adopting Michel Callons sociomaterial concepts of "grip of the market" (Callon 2017) to understand how an emerging circular market might commence a journey towards upscaling and agglomeration. The company's business models are due to change during the formation of market (Lüdeke Freund et al 2019).

Callon propose that the shaping of market can be understood as five steps: (1) passiva(c)tion; (2) the establishment of qualculating agents; (3) the organisation of market encounters; (4) market attachment; and finally (5) price formation (Callon 2017, Lagerie 2020, Tadjeddine 2018).

The first step is labelled passiva(c)tion. It described the process where an object or an activity is activated as exchangeable and at the same time passified by depriving of certain properties. Passiva(c)tion aims to free a good of any social, symbolic, historical, or political connotations that would render it singular and immobile so that it becomes freely exchangeable. A building components, such as a door is rendered passive when fitted into a building. To become active and part of a circular economy it needs to be extracted from the building, which is the activation. Once this happens the door loses certain features that was related to being part of the house (such as contributing to use qualities and/or architechural quality)

The second step is the establishment of qualculating agents. This involves agents equipped with methods for carrying out the qualculations and also establishing them as credible. Callon (2017) distinguishes between calculation and qualculation. Calculation, according to Callon & Muniesa (2005) starts by establishing distinctions between things or states of the world, and by imagining and estimating courses of action associated with those things or with those states and their outcomes. In order to be calculated, the entities taken into account have to be detached, ie passivactivated. The insisting in qualculation, rather than calculation emerges from Callons (2017) observation that no agent operate a clinical valuefree calculation. The third step then involves introducing the qualculative agents that can operate the qualculation- qualculative agent thus encompasses material arrangements which rank goods, enabling them to be identified, categorised, compared, and hierarchized.

The fourth step is then to establish a market exchange. This involves the act of purchasing: first, the conditions for an encounter between a buyer and a seller should be established and then an occasion and a space for carrying out the exchange should be established. Callon (2005, 2017) repeatedly used classical market places as examples of this (ie. strawberry or fruit markets). The exchange on the market also involves the difficulty of matching suppliers offerings with the customers expextations. Callon presents some interesting issues in sociology of consumption to provide understanding of the frameworks of addiction and attachment and second the buyer's desire for the good.

The final stage in the market process is the fixing of a price . The formulation of price and singularisation of the "goods content" of a commodity represent the fullblown market according to Callon (2017). Now all elements are in place; passiva(c)tion, qualculating agents, market organisation and attachment. The main trust of Callons understandin of price setting is that price is determined by and embedded in social relations. Prices setting is not a simple "collision" of supply and demand. The actors that interact ("sell" and "buy") are always related to each other and they are not independent. One example of an embedded price determining social relation is the dependence of games of strategic influence between the actors

Summarizing,Callon propose that the shaping of market can be understood as five steps: (1) passiva(c)tion; (2) the establishment of qualculating agents; (3) the organisation of market encounters; (4) market attachment; and finally (5) price formation. We will use this framework in the emergence of a circular market in building.

A SCANDINAVIAN TOWN ON ITS WAY TO CIRCULARITY

The town is in the midst of an urbanization process and there has been a vibrant building activity from 2015 to present day. Thousands of square meters of apartments, public institutions and infrastructure has been realised and the vast majority following the, at the time, law and regulation in force, thus at a mainstraimed sustainability level. It is a period where a new version of the environmental certification, "miljöbyggnad" was developed and launched, also supported by a LCA calculation tool. Very few buildings became certified by miljöbyggnad or BREEAM (Sweden) also launched in this period.

It was therefore innovative when a group of architect companies, building clients and research institutes commences a dialogue on circular economy in the building sector in the town. They were addressing a dominant notion of "waste" concerning surplus building material for example extracted from existing buildings undergoing renovation. They were possibly inspired by an international development, for example reflected in the EU projects "buildings as a material bank", which commenced formalizing a standard for how to valuate and document recycled material (the BAMB projekt 2015-2018, BAMB 2020). It is quite common for innovative initiatives to emerge from a professional community in Scandinavian towns, typically hosted by non-public associations. Its however also recurrent that the idea of recycling as it was initially coined was funded by public innovation support.

It was therefore possible for the community to start developing concepts, understandings and methods for circularity in building. It was for long dominated by a technical discussion of material flows. Also, it took quite long before any clients started demanding projects with a circular element. So, the development occurred in a protected niche (Schot & Geels 2008, Koehler et al 2019), where market forces of supply and demand where not crucial. It is likely that it was a project from another Swedish town that initiated the demands. In the "out of town" project calculations were done of cost reduction and climate impact of reusing recycled material. The project result was backed by research and exhibited a substantial reduction of carbondioxide equivalents (6,5 tons) and purchasing costs (200.000 SEK). Also the project obtained an sustainability certificate. This project finished 2018.

Public funding was again obtained to support the development of a virtual market place. A digital portal was intended to tie the "market" together and enable exchange of materials and services. Some 40 companies joined and in the spring 2020 around 60 entries of materials for sale were made and around 40 offerings of service related to reuse and circularity. Both nationally and internationally circular building projects were launched that created a context for the local development. This includes another Swedish project which results were announced in spring 2020, getting certified and also recycling PET bottles, concrete and vindow frames.

The collaboration around the digital portal also initiated a series of projects with a recycling element. One highly profiled client arrange reuse of extracted material from one institutional building to another within the confines of the same client, thus largely arranging a transfer outside of public exchange. Another realised quite a high level of recycled material but faced a serious of liability and measurement of property issues. A third maintained an existing garden around a new building, describing this as recycling. Further projects with variated levels of recycling was done.

In spring 2021 the portal gathered almost 50 members, but still offers material in the same amount as one year earlier, some 60 entries. The portal traffic thus does not appear to be growing significantly. The portal however also provide documentation, guidelines and other material. A list of reference projects have reached 17 in the spring 2021.

CIRCULATING STONES

Civil engineering projects, and to some extent building projects, extracts and add large amount of various types of earth, small and larger stones as well as rocks. It/They come in polluted as well as newly sorted "clean" versions.

The handling of these masses is often optimized with a focus on the single project (Fossilfritt Sverige 2018). This requires local space for temporary storage. Some masses are treated as waste and risk ending as landfill. The exchange of masses between projects are often handled by site managers that use their network to enable local optimization. Seen from a general perspective there is a risk that mass transportation have larger cost and more climate impact than needed (Fossilfritt Sverige 2018). In 2016 a large contractor launched an digital market place for masses the building sector, supported with an app. The idea was to support sales and purchasing of material between building sites. Ie. stone material and other land fill masses.

The service was framed as an independent company owned by the large contractor. From 2015 to 2016 the company priced the turnover of masses with 5 procent payment of sales value of new material which is sold by stone quarries that announces on the site. The service appeared successful and a growing number of persons and companies joined

It was evaluated by the company, that the pricing of load transport was creating a barrier for the further diffusion and growth of the market place. In 2016 it was made free to use the digital market place so that user are not hindered from announcing or exchange a masses with each other of costs reasons. Focus was then instead shifted towards to deliver other values to the users through also offering consultancy services for environmental certification of masses and create access to new material. A fee of 20 procent of the payment of the environmental consultants whos services are announced on the site was imposed. The site had around 9000 users, about 250 of Sweden's 1600 rock quarries and seven environmental consultancies attached in 2018. From 2015 to 2018 the digital site handled over 2-million-ton material. Mostly directly between site managers and other users, rather than through deposit companies.

However, the company was closed down in 2019 by the mother company with reference to lack of external financing to the company. Possibly the reason behind relates to short termism of the mother company.

DISCUSSION

So the aim of the contribution was to scrutinize the emergence of a circular market within the building sector using a framework of sociology of economy. The concepts adopted from Callon of the shaping of market consisted of five steps: (1) passiva(c)tion; (2) the establishment of qualculating agents; (3) the organisation of market encounters; (4) market attachment; and finally (5) price formation (Callon 2017, Lagerie 2020, Tadjeddine 2018).

The two illustrative examples from Swedish building industry shows examples of the emerging circularity, appreciating the longitudinal perspective of possibly decades of the emerging circular economy, making usual case studies too short sighted (Birkin and Polesie 2019, Khmara and Kronenberg, 2018, Lüdeke- Freund et al 2019).

So do we see a social shaping of a market? Callon tells us to look for early examples of passiva(c)tion where projects are levered out of an protective context. The early "out of town" project in the circular building case can be said to gone through such as "extraction" from a non commercial context. The case was portrayed as having led to substantial reduction of carbondioxide equivalents (6,5 tons) and purchasing costs (200.000 SEK). Also, the project obtained a sustainability certificate. And the valuation of CO2e and purchasing cost was backed by research. So the building material of this project possibly went through a passiva(c)tion, freeing the material/good that was reused from its social, symbolic, historical, or political connotations. By calculating is CO2 reduction and the purchasing cost it was rendered singular and immobile and emerges to become exchangeable in a more open public context, something that did not occur so clear in this first case. Second hand material is today heavily embedded in existing buildings with a series of seamless links to particular architecture, vested interest in buildings functionality, norms of usability etc. This was also clear in the case occurring one half year later, where old materials were transferred from one estate to another within the same owners portfolio.

The open digital platform for trading masses also represent an activisation of something previously understood as waste. But the case also shows how some qualculative actors preferred to keep "waste" land masses out of the proposed new economic system and thereby kept them passive in an existing more informal economic context.

As seen in the both cases the passivaction requires a qualculatice process to be carried out rendering the actual material comparable to other second-hand material as well as newly produced. This also require the introduction of qualculative agencies involves material arrangements which rank goods, thus enabling them to be identified, categorised, compared, and hierarchized. This process barely occurs in the first case. But in the second case a price is calculated for announcing masses and for transporting them as well for consulting. And the masses becomes a commodity that are exchanges in many tons and amongst thousands of actors. In the first case the interactions are far more limited. We see how a dyad of a supplier of used materials and a client receiver is established, but it occurs without price setting. And the portal in first case stays with a very limited set of materials and service providers. So, within the frame of the city case its difficult to claim that an organisation of market encounters has occurred. But in a broader national view in Sweden possibly around 100 000 materials are categorized in database accessible to many players in the building industry. However in mass trading digital platform a market is created, at least for a period and thousands of customers flock around the platform

Although the first case is clearly in its early days, recycled material entering the portal and other interactions then needs to enter market exchange, or market attachment (Callons fourth step, Callon 2017), something that occurred in the second case for a period. Suppliers would attempt to engage in relation with customers carrying out the act of purchasing: first, the conditions for an encounter between a buyer and a seller need to be there and at present buyer and sellers of second hand material are separated from each other in space and time. The buyer's desire for the good might not be met. The final stage in the making market process, the fixing of a price is also barely present at the circular building market in the town case today. Supplier – receiver relations occur rather as result of search processes with very few options, if any at all.

The establishment of market arrangements support circular business models in building in both cases. But in general, in Sweden it is a long process that experience a series of setbacks, such as seen in the second case, and indicated in the first through the limited support obtained. At a time, paradoxically the establishment of market arrangement also receive more and more rigorous support from government (Kumar et al 2020).

So the business models of the participating companies are prone to change in both cases. However, as the cases of circularity remain rare in the first case, the changes of business models are actually quite limited. One case is an architect company that exhibit seven reference cases of circularity but most of the are very limited, such as keeping furniture at a refurbishment projekt. In the second case its likely that purchasing and partnering with suppliers have changes give the offer of a new (liaison) partner offering stones. Evidently the closing down of the company means that business returns to “usual”.

It is notable given the clear government role in the first case that Callons concepts exhibits an absence of “government”. We would suggest that shaping of an interaction market with buyers and supplier is possibly mostly occurring with some role for the state in the shaping process. The state contributes clearly by valuating sustainability element of circularity. CO_2-equivalent reduction is posited as value by the state. It can therefore be speculated that a mixed public private set up of the second case might have lead to a longer life of the initiative, that possibly could have saved it.

Also (product) standards enjoy a limited role in Callons conceptualisation of an emergent market. The second hand material in focus in the first case needs to become standardized to make it an exchangeable good on a larger scale. As long a seller and a buyer is close to each other one can imagine a market build on trust (such as the second case actually reveal), but already in the early examples in the first case, we see how formalized contractual relations emerge and under such circumstances there will a need for standards, including measurement standards for how to monitor the quality of the reused material. In the second case the trading of masses can rely on a long term established standardization of masses, specifying sizes, volumes, degree of dryness etc.

IMPLICATIONS

When using Callons concepts of market formation on the building sector in Sweden certain aspects become clear. The emergence of a circular economy, as the town case exhibit, there is a need to understand a slow start of an emerging market. Even if Callon suggest a five step model, our first case rest more or less inside passiva(c)tion. It is also clear that Callon provide a qualitative model, but that market formation as a gradual diffusion of certain market constitutive concept, such as from waste to value, would benefit form some form of quantification. Ie. how many circular building projects is needed to establish the organisastion of market encounters (Callons step three)?

It is (however) clear that Callons concepts are intended for understanding market formation in any part of the industry, something we have evidently not scrutinized here. Nevertheless we would claim that the same phenomena could have occurred in other sectors of the economy, something the research in circular business models confirm (Centobelli et al 2020, Lüdeke Freund et al 2013, Kirchherr et al 2018 Tonelli & Christoni 2019). This include the possible speed of the transition, the role of the state and the standards. Moreover, as a further common point we would add that Callons five steps should not be understood too linear but rather a set of interrelated events and occasions that could occur in an overlapping manner (Clausen & Koch 1999). The relative success in the stone case of setting a price for the services early appear to indicate that.

CONCLUSION

This paper set out to scrutinize the emergence of a circular market in the Swedish building sector, exploring a Callons framework of sociology of economy.

Through the two illustrative cases we saw how the circular economy is in a very early stage both in the town case studied and the masses trading which was stopped again. In the first case of the circular community in a town a few examples of customer demands have occurred and some suppliers of second material and circular services have occurred, but a full transition of material from waste to commodity has not occurred. The second case became a short period of temporarily creating circular flow, that however quickly disappeared again. Although not the main theme in this contribution we claim that the new resource economic market that will possibly emerge of the next ten years would value product/commodities with a more multidimensional value set than the present strong focus on pecuniary quantity. Moreover, we note that the market will involve the state as a modifier, a continuation of the state role in the present neoclassical economy, even if not believed so by neoclassical economists. In our case the state plays an active an important role in the emerging shaping of the market, which escaped Callons conceptualisation, yet only is a small modification as the state can be understood as any other agency in the field with accompanying qualculations.

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Disentangling the Connections of Tools, Initiatives and Approaches (TIAs) in the literature: A bibliometric analysis

Núria Bautista-Puig[1], Rodrigo Lozano[1], María Barreiro-Gen[1]

[1]University of Gävle, Department of Industrial Management, Industrial Design and Mechanical Engineering, Kungsbäcksvägen 47, 801 76 Gävle (Sweden)

*Nuria.Bautista.Puig@hig.se

During the last three decades, a number of corporations have been engaging in becoming more sustainability oriented (Dunphy et al., 2003; Fergus & Rowney, 2005). Interest in sustainability from the corporate sector is evidenced by over 13,000 companies in 160 countries (UNGC, 2010), that have signed the UN Global Compact. Another indication of corporate interest in sustainability has been the number of voluntary initiatives (such as tools, initiatives and approaches (TIAs), developed by and for corporations, which have been gaining momentum for fostering sustainability by companies (Lozano, 2012, 2020; Robèrt et al., 2002). Among the most widely use ones are Corporate Social Responsibility (CSR), Life Cycle Assessment (LCA), Eco-efficiency (ECO) and Sustainability Reporting (SR) (Lozano, 2020).

The majority of these TIAs have focussed on the economic and environmental dimensions (as discussed by Atkinson, 2000; Lozano, 2012a; Reinhardt, 2000), and on technocentric and managerial ploys (Lozano, 2015). Relying on one initiative can result in a limited and narrow contribution to sustainability and curtail coverage of the company's system, whilst using too many tools wastes resources and energy due to duplication in tasks (Lozano, 2012). The TIAs have been limited in capturing the full spectrum of sustainability and its implications of and for corporations (Lozano, 2020; Oskarsson & von Malmborg, 2005). In most cases they have been poorly linked to each other, leading to company leaders and decision-makers being increasingly confused about how they could fit together or how they should be used (Ny, 2009). Attempts to provide guidelines on the best use and potential synergies have been offered by Robèrt (2000) and by experts in different tools (see Robèrt et al., 2002). However, there has been little research on the use of such initiatives (with the exception of Windolph, Schaltegger, & Herzig, 2014), or how they should be combined, with some exceptions such as Lozano (2020), who proposes that between four and six initiatives are used by corporations to embed sustainability into their systems.

This paper is aimed at elucidating the interrelations between these tools discussed in academic literature. This paper analysed the literature of the twenty TIAs (see Lozano, 2020) published between 1961 and 2020 using a bibliometric approach and visualisation techniques. A total of 73,672 documents (all typologies) were identified from Web of Science through different search strategies based on relevant terms identified from the literature. The datasets were validated with different procedures (title and abstract relatedness, and thematic analysis). The results show that LCA had the higher number of documents (n=23,139), followed by Green Chemistry (GCHEM) (n=14,561). The evolution of the number of documents by year of publication shows that LCA or CSR are pioneering specialties' in the sixties, whereas Corporate Sustainability (CS) or Sustainable Supply Chains (SSC) presents output since the 2000s.

The average growth rate shows the TIAs that presented a major growth during the period have been circular economy (CE) (31.37) and, CS (29.53) while others present a lower growth i.e., Factor X (FX) (0). In addition, a burst analysis was conducted to determine the sudden increases in the usage frequency of the different TIAs (i.e. the hotness of a topic) by using the Kleinberg's algorithm (see Kleinberg, 2003), which show that research on LCA has been carried out since the early 1990s, whereas on some other TIAs (e.g. CE and SSC) have been more predominant in the last five years.

The interrelations between the different TIAs were analysed with a co-occurrence keywords analysis, resulting in five clusters. GCHEM and LCA are positioned each one in one cluster showing a higher link strength, while the rest of TIAs are interrelated in two others (Industrial ecology (IE) and ECO vs rest). At a lower level, the subtopics of each TIA were identified from the paper's abstract information in CiteSpace software. It can be observed that eleven TIAs share subtopics with others: Triple Bottom Line (TBL) constitutes a subtopic of CSR whereas SSC appeared as one subtopic of TBL. Later, a chord diagram was used to summarise those relationships. SR and SSC are the ones that present a higher number of connections whilst others scarcely present connections (ECO). As a result, a new Research Framework was developed which links the TIAs and their subtopics with the sustainability pillars, showing that some TIAs are linked in *theory* (based on the definition) and *practice* (based on the literature subtopics) such as Cleaner Production (CP) whereas some others *in practice* even cover additional pillars (IE).

The findings provide insights into the patterns and research trends on each TIA, as well as its interrelations to other TIAs as discussed in the academic literature. This research provides an assessment on how the TIAs connect to each other, which can serve as a base for companies to use them in making their business models more sustainable.

Keywords

bibliometric analysis; tools, initiatives and approaches; holistic framework

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New Business Models and Energetics

Towards an energy approach of value creation

Niels Faber[1,2,*,+], Martijn Veening[3], Henk Hadders[4],

Fourth Author[3], Fifth Author[4]

[1]University of Groningen, Centre for Sustainable Entrepreneurship; [2]Hanze UAS, Research Centre Bio-Based Economy; [3]EntropoMetrics; [4]Ecosystem Catalysts

*n.r.faber@rug.nl

+corresponding author

Abstract

This paper contributes to the search for this sweet spot in the safe and just operating space for society, exploring the area new and sustainable business models (SBM) may occupy within. In this contribution we explore this space inspired by insights from the field of thermo-dynamics, while building on system capital theory. System theory and thermo-dynamics inform us that for a business model to be sustainable, it needs to strike a balance within and with its host systems. This observation provides us with an empirical lens on sustainable business models. Thermo-dynamics and capital theory enable us to conceptualize value from an energy perspective, defining it as 'work for change' in relation to capitals, leading to a normative lens on sustainable business models. Lastly, an informational lens informs us about the openness with which adaptation and learning are conceptualized in sustainable business models. The three lenses form a rudimentary 3-dimensional space in which business models for a safe and just operating space for humanity may take shape.

Keywords

Sustainable Business Model, safe and just space for humanity, thermo-dynamics, system theory, capital theory

INTRODUCTION

The discourse on sustainable business models has emerged to explicitly incorporate environmental and social aspects of sustainability into the realm of business modelling. Business models are postulated as devices of value creation (e.g., Teece, 2010). Sustainable business models have moved the discourse on business models from the pure monetary form of value creation to the broader debate on multiple value creation. The idea of multiple value creation pushed the value creation envelope to also include environmental and social values (Jonker and Faber, 2019). This rise of sustainable business models may be seen as an extension of the debate in the field of ecological economics. This field has risen in the 1980s, addressing a similar question, namely redeveloping the field of economics in such a way that it became possible to clarify its interactions with the environment in the first place, and secondary with society (Spash, 2011). Similarly, the challenge of sustainable business modelling is the development of a common conceptualisation of value and value creation across economic, environmental, and social values. This will be a necessary step in the field to pave the path to developing business models that occupy a spot in the safe (Rockström et al, 2009) and just (Raworth, 2017) operating space for society.

This paper contributes to the search for this sweet spot in the safe and just operating space for society, exploring the area new and sustainable business models (SBM) may occupy within. In this contribution we provide a view to push this even further, exploring the safe and just space for humanity inspired by insights from the field of thermo-dynamics (see also Bauwens & Pazaitis, 2019). In our pursuit, we build on two theoretical roots. First, we apply a system theory perspective in the way we perceive empirical reality. This implies that we perceive business models and the context in which they operate as systems. Second, we apply capital theory to further conceptualize value creation. This is further developed towards an energy-based conceptualisation of value creation (similar to Hauriou, 1899). In the end, our approach culminates in three conceptual lenses that may be used as a guide to find the safe and just range for SBMs.

We elaborate our argumentation in the following sections. Section two elaborates on the foundations of our systemic perspective on business models. It discusses the physical characteristics of systems, its dynamics, and how these insights demarcate the suitable area for value creation. In section three, we develop the notion of value, exploring the relations between value, value creation, and information. Section four brings together the insights from sections two and three, presenting three conceptual lenses that span the safe and just area for SBMs. Finally, section five presents our conclusions and discussion.

BETWEEN CHAOS AND ORDER

Traditional business models operate within 'the economy' (Teece, 2010), which is the context where its customers and suppliers are, and where resources, costs and turnover come from (Osterwalder, 2010). This context suits the business model well, for it enables the creation of value within the established paradigm. In the particular case of the traditional economy, the value creation paradigm is that of creating monetary value. This traditional economy however is also known for its paradigmatic and physical limitations (Meadows, Meadows, Randers, and Behrens, 1972) and devastating effects on our planet (Carson, 1962).

With the growing adoption of sustainability, the value paradigm that is in effect for business models is changing. As indicated above, SBMs build on a value creation paradigm that surpasses the limited perspective of monetary value creation, also incorporating environmental and social values. In systemic terms, the economy is now challenged to accommodate for this changing value paradigm and signifies the limitations of considering the economic system as stand-alone, residing in its own vacuum. Instead, it emphasises that the economy is part of a much larger system, including societies, ecosystems and material systems. We label this the ’earth system’.

For a business model to be sustainable, in addition to economic factors, it also needs to take into account its impacts and dependencies on these host systems (Günther & Folke, 1993). This implies that a business model must be aligned with the ‘interests’ of its hosting systems. Consequently, we depart from the premise that a ‘healthy’ business within an ‘unhealthy’ system is not a sustainable business. While a healthy business may have a positive impact on its hosting system, the detrimental effect of the unhealthy host will chiefly cancel these out. However, taking this angle requires for ‘systemic interest’ (or ‘systemic health’) to be well-defined concepts, both qualitatively and quantitatively. Such a formalization allows for comparative metrics against other (e.g. natural) systems that we regard as ‘healthy’. Where most current narratives on new economic models use one-dimensional and dichotomic qualifications such as ‘linear versus circular’, centralized versus non-centralized, growth versus degrowth, or even entropic versus syntropic, in reality there is no such trivial aspect that we can use as a single eligible metric for ‘systemic health’. Instead, we have to take a step back to recognize the *chaotic ensemble* in these complex systems: compositions of myriads of linear and circular aspects at every scale, myriads of centralized and decentralized dynamics, and myriads of entropic and syntropic gradients, etc. What matters is the *proportionality* of these aspects within the system. More precisely formulated: there is only a limited set of *distribution-profiles* of these aspects that yield healthy, self-sustaining systems.

From this perspective it can be argued that current global distribution-profiles do not support a resilient, self-sustaining environment anymore: they have become so skewed, that they threaten to push this global system out of balance, ultimately resulting in systemic collapse.

The Anthropocene is then characterized by this increased skewing, caused by the increasing human aggregate energy throughput, mainly through increasing technological and economic complexity. After all, as you add more complexity to a system, thermodynamic optimization forces will skew distribution-profiles ever more (Veening, 2021).

The physical logic behind this requires a matured empirical framework, to assess these dynamics from a macro-perspective, and how they interact with the micro-scales of the business model.

Visually, Raworth's (2017) doughnut economy captures our intuitive idea of a 'healthy' system. It comprises both hard (outward) thresholds (resources, ...) and soft (inward) thresholds (normative boundaries). The healthy distribution profile, described above, of a *sustainable economy* is then illustrated by the *width* of the metaphorical doughnut. After all, the narrower the doughnut, the easier it is to push the system out of this stability bandwidth.

VALUE, VALUE CREATION AND INFORMATION

A clear concept of sustainable value creation (SVC) is lacking in the SBM field. Lüdeke-Freund et al. (2020) argue that closing this gap may require a new multi- and interdisciplinary research programme. They raise three questions to frame the debate on the essence of sustainable value creation: (1) what is value and what are its sources, (2) how is value created, and (3) for whom is value created? We use these questions to structure our line of argumentation below.

What is value and what are its sources?

We define value as the ability to do the 'work of change', now and in the future (Tunjic, 2020). From this perspective, something is of value if and only if something causes positive change. Using a capital theory approach on sustainability, we identify capitals as the generators and stores of value; it is these capitals that provide the 'work of change'. In the realm of SBMs, value is created with regards to multiple capitals simultaneously (Porritt, 2005; Baue, 2020). We consider value as energy in business, as positive change does not just happen, it takes work. The energy and ability to cause change is the thing that all capitals have in common; this is the universal measure of equivalence instead of money or monetary valuation. We distinguish at least five forms of capital that store value - natural, human, social, manufactured and financial capital (Porritt, 2005). The work each capital can do is based on its unique properties and characteristics. Some capitals exhaust through use, while others increase. Systems and related capitals have a specific carrying capacity (McElroy, 2013) and are linked with limits and thresholds in the empirical world to help avoid entropy. Capitals do not spontaneously transform. A business model describing the control, activity and resources systems needs to be interposed between (input and output) capitals. Although not incorporating an energetic perspective, the Shankey or 'spider' diagram of IIRC illustrates the relationship that may form between the various capitals (IIRC, 2021, pp 22; see figure 1).

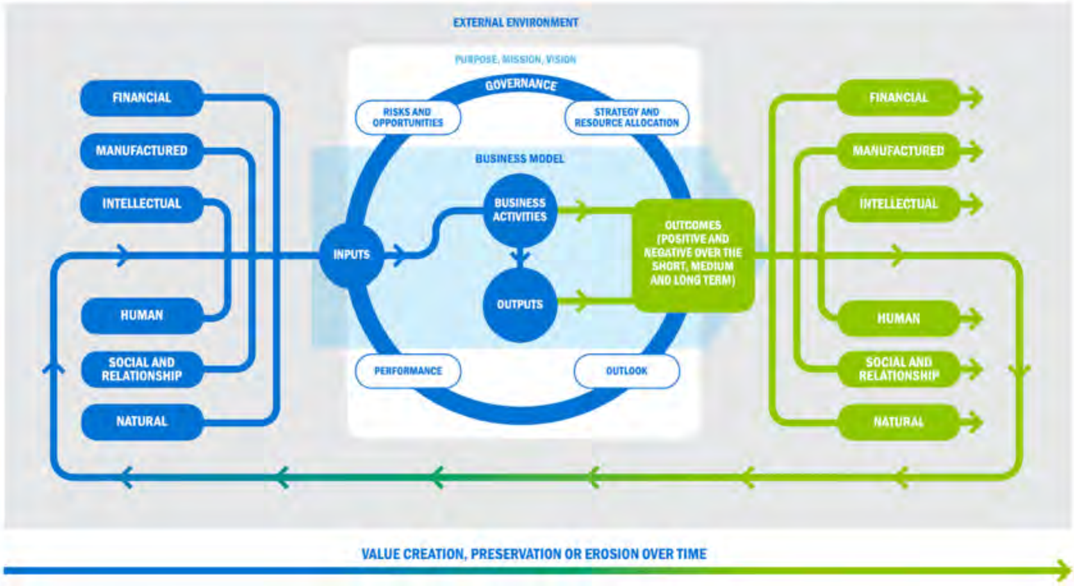

Figure 1: IIRC diagram (IIRC, 2021)

How is value created?

Value is created when capitals are transformed into more value or energy to power the organization. Capitalisation means the growth of the capacity to do work. In a context of value creation by transactions, this will also involve loss of value in the form of transaction costs to transform capital (Coase, 1937). Following our line of reasoning, it is a mistake to assume that a business model describes the logic of how revenues and profit will be generated. From a value perspective, if a business model transforms capitals with a value (work capacity) greater than money into money, the transformation renders inefficient. The result is more money but less value. In practical terms, this means the business model is producing less capacity for the organization and its supersystem to do work in the future. Rather than capitalize resources it leads to an overall decapitalisation.

For whom is value created and who captures value?

To maintain and sustain the corporation's entire existence relies on efficient capitalisation. It must create and accumulate surplus capital (capacity or energy) through efficient transformation of capital, or in other terms realize a positive return on value invested. Businesses 'feed' on the capital of stakeholders / rightsholders (and vice versa) receiving and accumulating capital and value and rendering back at them. The difference in value enables the corporation to exist and reproduce their own existence into the future. In essence, businesses and business models alike are not money-making machines (Roche, 2021); they are artificial systems (Simon, 1969; Faber, Jorna, van Engelen, 2005) focused on increasing value available to consciously do the work of building a thrivable society.

FRAMING A SAFE AND JUST OPERATING SPACE FOR HUMANITY

Above, we developed two conceptual lenses that may help to demarcate the safe and just operating space for humanity. Section two elaborated on the first lens: the empirical lens. It presents a systems perspective on empirical reality, positing systems as vehicles for energy throughput, and emphasizes the nested characteristics of systems including businesses and business models. It also emphasizes the condition of realizing distribution profiles in how a system operates in relation to its hosting systems in order to remain healthy or sustainable.

In determining the safe and just operating space for humanity, the empirical lens shows the balance that exists within a focal system and between the focal system and its hosting systems. It captures a focal system's ability to maintain its integrity against the natural pull towards disintegration and chaos. This way it signifies the capacity to keep the focal system's identity and integrity intact. Reversely, the empirical lens informs us about the integrity of the hosting system(s) and the impact the focal system has on it. From a capital theoretical perspective, the empirical lens is about systemic resilience across all five capitals (Porrit, 2005), and signifies whether or not this is within their respective boundaries. For example, when carbon-dioxide emissions exceed the absorptive capacities of ecological systems, the latter will eventually cease to function in ways we know them. The boundaries the empirical lens identifies concern thresholds for flows of values that are embedded within their respective capitals (e.g., Tietenberg, 1984). For business models this lens presents its current operations, their coherence, and the impact(s) it yields on society and the environment. In the pursuit of value creation, business models intervene in its hosting systems, rearranging existing energy throughputs. The empirical lens lays bare these rearrangements and provides indications to what extent this moves the business model and its hosting system(s) to a (un)healthy state.

Section three elaborated on the issues of value and value creation, explaining both in terms of energy; value is the capability to do 'work of change'. We label this as the normative lens. Where the first lens informs us about how systems, including businesses and business models are currently operating, the second lens gives us the ability to express how we desire these systems to change to serve our needs and wishes, and in what direction this change needs to materialize. In other words, the first lens describes the IST while the second is about the SOLL.

The 'normative' lens sets normative measures to guide operations across all capitals within the limits of the systems the empirical lens lays bare. The normative lens identifies what balance between order and disorder is desired (i.e., what level of non-natural capitals we require to maintain civil society). In other words, the normative lens indicates to what extent and scale value(s) may be extracted from capitals and transformed into other capitals. Such transformations intend to create or increase order in the target capital, but consequently increase disorder at the source capital.

In this section we extend the empirical and normative lenses with a third, namely that of information and feedback. We label this as the 'informational' lens. It informs us about the connections between empirical reality and the desired and undesired states we pursue, and the extent to which necessary information on their respective states is exchanged between them.

The 'informational' lens focuses on the notion of adaptation and learning. At the core of it, we envisage the level of openness and the notion of distribution of information and feedback in our conceptual space. In a closed perspective, the informational lens only is able to explain behaviour of focal systems and the norms enforced on it. On the opposite end, taking an open perspective, makes informational flows within the focal system and between that and its hosting system visible, as well as its complex relations with the norms that are in effect. As such, this lens provides insights into the working of the empirical and normative lenses and to what extent capitals are used within the space demarcated by their inherent thresholds and the social norms enforced upon them. We consider the presence of information and feedback as a precondition for the resolution of any occurring misalignment that comes out of the other lenses. It encompasses positive and negative feedback-loops, and provides local and global system perspectives on the workings of the system as a whole. All things considered, the informational lens allows for gap analysis, recognition of conflict, and the identification of sweet spots with regards to the thresholds and set norms on the use of capitals.

Together, the three lenses comprise a rudimentary 3-dimensional space, enabling the identification of the safe and just operating space for humanity, and demarcating the sweet spot in which sustainable business models may materialize in order to give shape to a sustainable society and ultimately a sustainable earth system. It enables to determine the alignment with systemic resilience aspects (order-disorder), with normative, societal values (value dimension), and the ability to receive feedback and act /adapt adequately (open-closed). Specifically, the space gives rise to the development of assessment metrics and multi-capital scorecards for sustainable business models. Finally, this space has potential scalability, and may be used equally well at business model level and other system levels.

Discussion

In this paper we have provided a further conceptualization of the safe and just operating space of humanity, as coined by Rockström et al. (2009) and Raworth (2017), towards the application in business modelling. We used system theory and capital theory as the theoretical roots to develop our conceptual lenses, spanning the rudimentary 3-dimensional space to capture this. Furthermore, we have been inspired by insights from the field of thermodynamics, which emphasizes the natural tendency of order which exists in systems to move to higher levels of entropy, ultimately losing coherence. Upholding systems, whether these are businesses, business models, or systems of civil society, consequently necessitates continuous efforts. Over time, natural and biological systems have seemingly evolved to maintain themselves, harnessing their integrity against this constant pull towards disorder. Current economic arrangements have thus far not been able to incorporate or observe the delicate balance these systems maintain. Instead, it has formed a normative framework in which constant economic growth is enforced on empirical systems that are unable to accommodate. Our rudimentary cube is another step towards bridging this gap between empirical reality and the world of desires, dreams, and imagination.

The conceptual space we present in this paper is a first, small step in exploring and clarifying the safe and just operating space in which sustainable business models may take shape, in which value and value-creation have been postulated from an energy perspective. Loosely, we have entertained the idea to use the three lenses as dimensions spanning this space. While primarily the lenses provide a certain way of looking, they may very well be complex dimensions that allow for more in-depth and fine-grained analysis of said space. If so, this would open the possibility to develop these dimensions further, and allocate to them specific metrics, thresholds, and allocations, opening the door to qualitative and quantitative inquiry. This part we have deliberately left out of this contribution. A preliminary exploration of this is provided in Faber, Veening, and Hadders (2021). More about this will be addressed in future writings.

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Track 4.2.

Ethnographic Research and New Business Models

Track 4.2. Ethnographic Research and New Business Models

Track chair: Sarah Pink
Monash University, Australia

Research on how new business models are developed has advanced greatly during the last two decades. However, there are still very few studies that bring the social, experiential or behavioural approaches of the social sciences questions of how to successfully develop new business models. Some exceptions are, for example, Michea (2016) and Meyer et al. (2016). It raises the question of how qualitative research approaches such as ethnography can help us to advance our understanding.

Therefore, this track seeks to bring together researchers and scholars who are engaging social, experiential or behavioural theories (e.g. of anthropology, sociology or psychology) and ethnographic research methods to processes of business model innovation. In line with the theme of the conference the papers should account for how sustainability is impacted through the use of these approaches. The aim is to generate new discussions within the field of new business models and engage a community of researchers who are interested in sharing, exploring and expanding innovative qualitative methodologies.

Papers that approach this question from different directions are welcome, in order to generate new dialogues and knowledge about existing engagements with ethnography in this field and where it has been effective.

This might include using ethnography in different ways in relation to business model innovation, for instance: research that has involved ethnographic insights about everyday life practices and experiences or of consumers to create greater understandings of markets; ethnographic studies of business model innovation processes and what we might learn from them; uses of ethnography to better understand how innovation occurs in organizations; and other ways of working with ethnography in the business model innovation field.

The following areas are examples of what might be covered, however, the general principle of this track is to open up this field and discover new dialogues, therefore the list is not exhaustive.

- How and where ethnographic insights support value creation, delivery and capture?
- What are possible uses of ethnography when working with design or design thinking for business model innovation?
- What is the relationship between ethnography, technology design and business model innovation?
- How ethnographic methods can inform the processes of business model innovation for sustainability?

- What opportunities and challenges are there for applying ethnographic methods in the research on new business models?
- What is the role of ethnographic research in studying value creation and ethics?
- How user value creation can be explored through ethnographic research in new and sustainable business models?
- What is the contribution of ethnographic research and insights to sustainability in business model innovation?
- What are the benefits of ethnographic insights about human creativity and everyday innovation amongst consumers for business model innovation?
- How ethnographic insights can contribute to conceiving and implementing new types of business models such as business models for the circular economy?

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Circular business model innovation through sensory ethnography

Kim Poldner[1,*], Anja Overdiek[1]

[1]The Hague University of Applied Sciences

*k.a.poldner@hhs.nl

Abstract

The aim of this study is to unpack the value of ethnographic research as a relevant methodology for studying and developing new business models. A pop-up store we ran for three months in 2020 served as a testlab to experiment with value creation around buying, swapping and borrowing secondhand clothing.

Keywords

Ethnography, pop-up retail, fashion, circular business models, experimentation

RELEVANCE OF THE PROBLEM

The circular economy has become a core concept to drive sustainability transitions in business. However, there is still significant uncertainty associated with the implementation and impacts of the circular economy. Experimentation with circular business models is needed to understand which propositions work in practice and what their complex environment impacts would be. To kickstart transformations within businesses, business model experimentation has recently gained foothold in the sustainability sphere (Bocken et al., 2017; Bocken & Snihur, 2020): it has been described as a process to learn about future business models (McGrath, 2010) and co-create them in practice, and has long been a method in the natural and physical sciences (Weissbrod, 2019). However, the processes and methods for experimentation in a business context still need significant development (Bocken & Snihur, 2020; Felin et al., 2020). Bocken recommends to start experimenting for the circular economy at the product or material level, as this may naturally lead to more complex and impactful change at the value chain and business model level (Bocken, 2021). Experimentation, regardless of the method, is necessary to support the development of innovative solutions (Bocken, N., Boons, F., &

Baldassarre, B., 2019). However, more insight is needed to understand the most appropriate practices, which is where ethnography might be of value.

Innovating business models in the fashion industry is crucial as the industry is dubbed as being the second largest polluter in the world, after oil (Thorisdottir & Johansdottir, 2019). Rental and resale business models for clothing are one out of the two most interesting investment opportunities in the fashion industry with the biggest impact on sustainable systemic change (Ellen McArthur Foundation, 2020). Unfortunately - based on personal conversations with founders - current rental models such as physical clothing libraries and online rental services in The Netherlands are either dependent on funding or don't survive longer than a few years. At the same time, we observe that resale is booming with large brands stepping on the bandwagon with reselling their collections[19] while the market for person-to-person resale of pre-owned clothes is scaling up across Europe[20].

Circularity in a retail context is understudied in four ways. First, consumers have a high ambition to buy circular, but fail to implement in practice: they lack knowledge on both circular products as well as circular services such as rental, lease and resale (European Commission, 2018). Second, it is unclear which costs the consumer is prepared to pay for circular production and services. Third, for retailers it is crucial to anticipate policy regulations – the Dutch government has the ambition to be fully circular by 2050 - and to understand which skills they need to achieve circular objectives. Fourth, retailers need to shape collaboration with partners in the supply chain to come to circular procurement and sales (Overdiek, 2019). Value creation might lie in the product, but also in local network creation and curation (Overdiek, 2019). Experimenting with and developing new business models thus requires insight in the role of the social context (including customers) to answer the question if people are willing to change from ownership to rental models.

With this study we want to provide perspectives for the entrepreneurs who want to start a resale or rental model in fashion retail building on the knowledge we have about small fashion retail businesses (Overdiek, 2018; 2019; Poldner, 2013). Our assumption is that only a thorough understanding of pitfalls and best practices can support these innovators to create real impact.

METHODS

Testing business models with real customers paying real money provides the highest fidelity (Chesbrough, 2010), which is why we developed our study as a testlab for ethnographic action research. Building on Pink's ethnographic work, especially her conceptually rich discussions on the relationships between different media and the

[19] Zalando enters resale market: https://fashionunited.com/news/retail/zalando-enters-resale-market-with-launch-of-pre-owned-category/2020092135539

[20] United Wardrobe acquired by Vinted: https://peak.capital/blog/en/peak-capital-s-portfolio-company-united-wardrobe-acquired-by-vinted

construction and interpretation of ethnographic text (Pink, 2009; 2012), we undertook a multi-sensorial ethnography (Pink, 2011a). We explored the relationship between visual (Pink, 2007a,b; 2011b) and other knowledge not through simply translating 'visual evidence' into verbal knowledge, which reinforces an implicit superiority of the written word over the visual image, but rather related visual material to other senses, like smell, sounds and speech.

The research setting is a second-hand clothing pop-up store near the city of Utrecht (The Netherlands) run by the first author over a period of three months from September until December 2020. We opened the shop to visitors three days a week, on Thursday, Friday and Saturday from 1-5 p.m. which resulted in 12 hours per week for 12 weeks leading to a total of 144 hours of direct customer engagement. In addition, we spent approximately 8 hours a week managing our Instagram account, which was the only social media platform we used, and answering to inquiries from the media and other interested parties. The Instagram account of the pop-up shop was used to highlight items from the store to inspire customers to visit the store. Texts (in Dutch) were kept short as the images of clothes spoke for themselves. On her personal Instagram account, the first author openly contemplated on the process of entrepreneuring and her interactions with customers. The combination of images, often selfies in an outfit sourced from the store, with English narrations of her experiences can be seen as a reflection diary. This data creation process resulted in another 96 hours of ethnographic data consisting of images, Instagram posts, artefacts (mainly fashion items) and (media) articles online and in print. We also collected a range of artefacts, from the everyday sales gathered in a simple accounting system, up to the price tags and the entire collection of garments that was our ‘stock’. We followed grounded theory and analyzed our data using ATLAS.ti coding, triangulation between researchers and reflective sessions to make sense of our findings. Limitations to the study are that data is based on a single case in a local sociocultural context.

RESULTS & DISCUSSION

We found that our multi-sensorial ethnography helped to disclose the more aesthetic and emotional aspects of value creation in circular business model experimentation. First, our ethnographic approach revealed a shift in the sensory values that people had in terms of safety and hygiene, which may have implications for the future of second hand businesses. Customers remarked that our shop had a different feel than your average second hand store, especially in terms of smell. The importance of scent in relation to perception of previously owned clothes is backed up by earlier findings (Overdiek, 2018: 74). In addition, the store had strict quality criteria to accept items: they had to be clean, undamaged and preferably ironed. We refused items that did not abide by these criteria and also items that really did not fit the style of the store. Pieces that didn’t meet the desirable conditions for a second-hand life were donated to charity shops. Thus our pop-up had the sensorial qualities of a fashion boutique, which positively surprised our customers and helped them to overcome their resistance about second hand clothes.

Second, the study affirms that space plays an important role when it comes to successful fashion business models (see for a summary Overdiek, 2020). The pop-up shop was located in Metaal Kathedraal, a breeding place for circular economy and the arts located in an old cathedral, which later served as a metal factory. The raw aesthetics of the physical space formed a ‘perfect marriage’ with the curation of vintage and second hand clothing that was offered. The sensory and storytelling qualities of a physical space add value to the customer experience and enable multi-sensory engagement as well as discovering and learning (about new materials, products and styling). This is the reason why even successful online fashion players opened physical stores pre-Covid. For the development of and experiment with so called ‘slow fashion’ retailing, the temporary store has been used for some time now (Alexander & Bain, 2016; Pomodoro, 2015). Particular practices related to a temporary or pop-up store such as breaking consumers’ spatial routine, creating curiosity and fomo (fear of missing out) and engaging visitors in multi-sensory experiences sustain the goal of testing (and receiving feedback on) future business models (Overdiek, 2018).

Third, through the shifting customer perception, the physical space served as a vehicle for having a conversation about sustainability. Our pop-up was not located in a regular shopping street, but people had to know about it to be able to find it. Most of our customers learnt about us through Metaal Kathedraal and were already conscious consumers, but many also passed by on their bikes to and from the city and got off as they were curious to learn what we were doing. Their surprise often translated to a spontaneous purchase, but also to becoming more aware about their practices of fashion consumption. Next to swapping and borrowing, their eyes often opened to the value of maintaining damaged clothes (e.g. mending, alterations) demonstrating a potential in fostering alternative forms of circularity beyond buying new.

Fourth, time was an essential aspect as we ran the pop-up during COVID-19 (September-November 2020) and shut it down just before the hard lockdown in The Netherlands forced all fashion retail stores to close their doors. From the beginning of November people were advised to wear face masks in public spaces, but only from December onwards it became obligatory. We decided not to wear face masks in the store to be able to maintain open customer interaction and this appeared to be of great value. As one elderly customer said: “I don’t dare to go to regular stores anymore, but here I can still feel human in communicating without face mask”. People sensed that we served as a hiding place to still enjoy service and seemed to love the personal attention and styling guidance we could provide. This customer value creation by fashion and styling advice was also reported in earlier studies about circular retailing (Overdiek, 2018; Overdiek, 2019).

Fifth, our ethnography confirms that the pop-up store also lends itself for experimenting with the integration of online and offline value-creation, weaving social media activity into the value creation fabric of the temporary physical store. Overdiek & Warnaby (2020) propose the pop-up store as a space for co-creation between a business and its consumers and as a testlab for design and marketing research. 'Pop-up environments can thus be conceptualized as assemblages/spaces that facilitate consumers' engagement with a (future) product or service offering in order to ascertain the nature of, and subsequently co-create, value. We term this 'pop-up store research'.' (Overdiek & Warnaby, 2020: 4) The pop-up store then functions as a testlab where various aspects of value creation can be explored and co-created together with the local environment and consumers.

PRELIMINARY CONCLUSIONS

The paper presents a business model innovation of a pop-up second-hand store that explored buying, swapping and borrowing of fashion as alternative form of value creation. We sensorily engaged with the routines created by this physical and online space and its visitors to develop methodological experimentation. By co-creating different new business model elements together with customers and inquiring for circular economy, this approach advances practice-based knowledge to the SDG 12: 'Responsible Consumption and Production'. The study has methodological, theoretical and practical contributions. The combination of ethnographic and 'pop-up research', together with offering alternatives for 'buying new fashion' opens up new business model opportunities for physical second hand fashion businesses. Furthermore, embedding a study around the local network and curation aspect of a circular business model within a pop-up store research offers new opportunities for relevant and rich ethnographic data collection about business modelling. It allows for real-life experimentation and iteration of different value creation practices.

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Influence of institutional logics on the uptake of sustainable business models in existing commercial organisations

Erica Olesson[1,*], Suvi Nenonen[1], Jamie Newth[1],

[1]University of Auckland Business School

*e.olesson@auckland.ac.nz

Keywords

Sustainable business model change, institutional logics, ethnography, barriers and enablers

INTRODUCTION

Through design and choices in the business model (Benoit Demil et al., 2015), businesses can actively contribute to creating a future that is fairer, healthier, and happier for all people, and that protects and regenerates the natural environment (World Business Council for Sustainable Development, 2010). As a result, and to truly address our known sustainability challenges, researchers have called for changes "at the core of the business model" (Bocken, Short, Rana, & Evans, 2014, p. 44). Extant literature has concentrated on identifying the range of activities that existing organisations undertake to achieve a step-change in sustainable outcomes. It is also necessary, however, to understand how changes for sustainability occur within organisations. In this paper, we specifically explore the research question: how do institutional logics influence business model change towards sustainability? We follow, through an ethnographic case study, a professional service organisation ('Orion') seeking to understand sustainability challenges and implementing initial actions.

INSTITUTIONAL LOGICS

Thornton and Ocasio (1999, p. 804) define institutional logics as "socially constructed, historical patterns of material practices, assumptions, values, beliefs and rules by which individuals produce and reproduce their material subsistence, organise time and space, and provide meaning to their social reality". Institutional logics thus hold the shared approaches and values that have developed over time and guide 'acceptable' actions and decision-making. In this paper, we explore the interpretations and interactions between three logics: commercial, professional, and sustainability logics, summarised in Table 9.

Table 9 Attributes of commercial, professional, and sustainability logics (adapted from Barac, Gammie, Howieson, and Van Staden (2019); Laasch (2018); Thornton (2004))

Attribute	Commercial logic	Professional logic	Sustainability logic
Objectives / drivers	Financial	Personal expertise, autonomy	Environmental and social benefit
Key stakeholders	Customers, shareholders	Professional network	Humanity, society, environment
Governance	Efficient, effective, profitable	Networked, consensus	Inclusive, equitable, restorative
Interactions	Opportunistic, self-interested, contractual, market exchange, competition	Peer review, cooperation to build future knowledge, social contract	Relational and caring, moral responsibilities, multi-stakeholder exchange, collaboration
Timeframe	Short to medium	As prescribed by technical need	Long

ETHOGRAPHIC METHOD

This research comprises an ethnographic case study of a PSF that was seeking to understand how to respond to sustainability challenges. 'Orion' is a well-established PSF of medium size operating predominantly in Australia and New Zealand. Orion provides services related to the built environment to a wide set of public and private companies across many sectors. Over the 2-year study period, Orion allocated resource to sustainability action, which led to the development of new activities, internal networks, and the inclusion of sustainability as a core pillar of Orion's organizational strategy. Data collection took place from July 2019 to March 2021. In addition to the approximately one day per week undertaking Orion's sustainability project, the first researcher spent one to two days per week engaging with team members on separate projects. This provided additional opportunities to observe Orion interactions in different settings and have informal interactions regarding the sustainability project. Through these multiple avenues, the first researcher had unfettered access to individuals across Orion, including senior management and Board members.

FINDINGS

At commencement of the study period, the commercial logic acted as an enabler to commence the project through tying the need for consideration of the sustainability logic to current and likely future client demands. The 'business case for sustainability' approach was used by the project leaders, who successfully argued that it was necessary to spend time and effort (and therefore money) on understanding sustainability challenges and developing responses to client expectations. In contrast, the professional logic hindered this progress. This is because the professional logic is associated with individuals choosing to work together (Thornton, 2004), leading to a consensus-based management style (Greenwood, Hinings, & Brown, 1990). The consensus-based management style meant that the leadership team did not have mandate from the wider organization to make significant changes and relied on passionate individuals to more slowly lay the groundwork for future changes. In our case study, passionate individuals used the 'business case for sustainability' framing to argue that sustainability activities could be seen as sufficiently aligned with the leadership team's existing mandate as to warrant further investigation and initial actions.

As the project progressed, we identified that commercial logic acted as both an enabler and a barrier to change efforts for sustainability. As an enabler, a focus on customer expectations drives a focus on sustainability. From the customer component of the business model, customers are able to influence consideration of change in other components. For example, customers requested sustainability accreditation tools be used in delivery of services, resulting in Orion acting to building its capability to deliver these tools in the product and service component. Customers also asked for details on operational component activities, such as Orion's operational carbon reduction plan, for diversity and inclusion policy and activities in the employee component, and how Orion supports indigenous outcomes through its supply chain in the supply chain component. In this way, customer pressure enables changes not just where the customer is directly engaged, but in several other components in the business model.

However, we also observed the focus on customer expectations acting as a barrier to wider change. When customers indicated a general interest or expectation of sustainability considerations, these were given general responses, but no changes were made to organizational activities, thus, maintaining the existing logics. However, when customers made specific requests, such as requiring detailed information on Orion's carbon reduction plan, this provided pressure for change within Orion. This sequence highlights several related barriers. First, a focus on meeting the customer's immediate need means that actions implemented are unlikely to extend beyond the specific request. In other words, the commercial logic leads to a narrow view of sustainability. Second, changes are slow, as they rely on customers making individual and specific requests, before any action is taken. Third, while specific requests provide pressure for change, this may not always lead to the requested change being made. Instead, change may be intended, but not operationalized. For example, Orion may indicate an intention to develop a carbon reduction plan, but not put sufficient resource or support into developing, finalizing, and implementing a plan.

The professional logic was already aligned with the sustainability logic in the employee component of Orion's business model through a shared focus on caring for employees.

During the study period, the sustainability logic was integrated further into this component through the establishment of two new recruitment partnerships to increase diversity of interns, a key pipeline of future employees.

In the delivery of products and services, however, the professional logic acted as a barrier. We observed a view that 'good work' already includes sustainability and so no changes are needed, skepticism of solutions provided sufficiently meeting professional standards and therefore a hesitation to change, and an expectation that any changes would be simple and straightforward. These interactions reflect the professional logic's specialized knowledge of individuals and professional associations which the individuals belong to and shape. While we did not see substantial change in these views over the study period, we posit that these barriers will be overcome through the focus on sustainability in Orion's strategy and associated activities. This is because there does not appear to be a direct conflict between the characteristics of logics.

DISCUSSION

Previous literature has found that the possibility of economic returns through increased sales or new markets is a driver for sustainability (Long, Looijen, & Blok, 2018; Schaltegger, Lüdeke-Freund, & Hansen, 2012). We provide a more nuanced explanation for how customers act as a driver for change; comprising motivation to commence and triggering actions in other parts of an orgnaisation's business model. However, we also suggest that reliance on this customer pressure may lead to reduced pace, breadth, and depth of sustainability integration. These details are important because there has been a tendency among researchers and practitioners to look for a commercially beneficial approach to responding to the global challenges of sustainability. One aspect of this is pointing to customers and consumers as an essential driver for organisations responding to sustainability challenges. Our findings suggest that commercial framing of sustainability as a need of customers is an important aspect, but is may not be sufficient to acheive the breadth, depth, and pace needed.

Whereas several characteristics of the commercial and sustainability logics appear in direct conflict (such as short and long timeframes, and a narrow and wide key stakeholder set in the commercial and sustainability logics, respectively), this is not the case for the professional logic. Indeed, we identify that aspects of the professional and sustainability logics are aligned and can be further mutually reinforced. We posit that the professional and sustainability logics could be complementary, should the characteristics of the sustainability logic become embedded into professionals' understanding of quality and technical expertise in their work.

Conclusion

Our findings show that the professional and commercial logics interact to both support and hinder different aspects of integration of the sustainability logic. Our paper builds on the currently limited research into change within existing large organisations' work to become more sustainable (Long et al., 2018) and how institutional logics (Laasch, 2018) manifest within business models and business model change processes.

Our findings contribute to greater understanding of multiple logics interacting within existing organisations seeking to become more sustainable. We suggest further research explore what our findings mean for how effective different types of institutional work are when responding to different logics.

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New Horizons for Applied Ethnography

Ethnography-Inspired Research at the Core of Energy Efficiency Horizon 2020 R&D Projects

Gregor Cerinšek[1*], Dan Podjed[1,2], Sara Arko[1], Domen Bančič[1], Jure Vetršek[1]

[1]Institute for Innovation and Development of the University of Ljubljana

[2]Research Centre of the Slovenian Academy of Sciences and Arts, Institute of Slovenian Ethnology

*gregor.cerinsek@iri.uni-lj.si

Abstract

Ethnographic methods developed in anthropology hold great promise for conducting applied, practical, and problem-based research and development in a variety of settings and contexts. Although often perceived as a time and resource consuming process and its outcomes as not generalizable due to their primary focus on individuals and smaller groups, we offer evidence that ethnography can and should form an integral part of interdisciplinary energy efficiency projects, enabling us to understand the everyday realities of people and engage them in the development processes. Therefore, this paper presents the practical implications of ethnography-inspired approaches as applied in several EU projects in the Horizon 2020 programme. It starts by describing the 4-step people-centred methodological framework and provides five case study examples as applied in the projects MobiStyle, TripleA-Reno, U-CERT, BUSLeague, and NRG2peers. The conventional and primary ethnographic method is participant observation, where researchers take part in people's daily activities, interactions, and events to learn about the explicit and tacit aspects of their work- or energy-related habits and life routines. In our examples, the use of ethnographic approaches is not only tied to experienced anthropologists, but we also train and involve professionals from other disciplines, such as engineers, architects, and computer scientists, who observe and participate in a wide range of daily activities, both routine and extraordinary, along with the people as research participants. The paper concludes with a discussion of selected experiences and gives a brief overview of future prospects.

Keywords

Ethnography, people-centred development, interdisciplinarity, Horizon 2020 projects

Main text

1. INTRODUCTION

"I talked with people!"

- a message from an enthusiastic engineer who started to apply ethnography-inspired techniques in an EU Horizon 2020 project.

As discussed by Pink, Tutt, Dainty, and Gibb (2010), ethnographic methods developed in social anthropology hold great promise for conducting applied, practical, and problem-based research and development in a variety of settings and contexts. Through iterative-inductive research and drawing on a family of methods (such as semi-structured interviews, participant observation, focus groups, fieldwork, and shadowing), ethnography enables and encourages direct and sustained contact with human actors in the context of their daily lives. By asking questions, listening, and observing what happens, we can create a rich account that respects the irreducibility of human experience and acknowledges the role of theory as well as the researcher's own role in viewing people partly as objects and partly as subjects (O'Reilly, 2005).

Inspired by the work of Pink and Morgan (2013), we argue that ethnography could be of high value when applied in non-academic settings; however, it is also often perceived as time-consuming, resource-intensive, or not generalisable, as it focuses mainly on qualitative research involving individuals and smaller groups of people. Robust ethnographic research is typically conducted over an extended period of time – months or years – and requires a type of physical fieldwork in which researchers participate in the everyday activities of their informants. Qualitative data – on research participants' experiences, values and worldviews, social dynamics and practices, etc. – are therefore recorded *in situ*, enabling a particularly rich insight into the social and environmental contexts, as well as into the evolving entanglement of various material, human and societal factors. Ethnographic research can thereby offer a potent contribution to understanding the human lived experiences, as well as their potential for change.

In this respect, our ethnographic studies in European research and development projects face a number of challenges. First, projects are time-bound and oriented towards pre-defined goals, while ethnographic research is, at least in its more traditional form, essentially open-ended, embracing methodological improvisation and potentially unexpected research outcomes. Second, the vast majority of the projects we are involved in are part of Horizon 2020 Energy Efficiency Programme, involving interdisciplinary research groups that often have no prior experience in conducting qualitative research.

As expressed by several engineers in our research teams, as domain experts they were not even used to "talking to people[21]" in their usual research practice. Last but not least, in the global Covid-19 crisis, we are forced to conduct our research online, making it a kind of "netnography", as Kozinets (2020) figuratively puts it, relying instead on alternative methods and tools, which constitute what has become known as "remote ethnography" (see Postill, 2016; Góralska, 2020; Lupton, 2020).

Rather than using the term "ethnographic research", we prefer to speak of ethnography-inspired research that draws on some of its key methods – interviews, focus groups, and participant observation. Furthermore, the use of rapid ethnography, rapid assessment or rapid appraisal, which became popular in anthropological and social science research as early as the 1990s (Beebe, 1995; Harris et al., 1997; Kumar, 1993), is also relevant to our project practice as it represents a research approach that is contemporary both in its subject matter and in its application to applied research projects that aim to make informed interventions in the world (Pink & Morgan, 2013). Broadly, the essence of ethnographic inquiry remains, which is to attempt to understand people's worldviews through empathy and embodied practices (Roberts, 2020), while attempting to neutralize the researcher's own biases toward the research subject.

2. METHODOLOGICAL FRAMEWORK

In addition to applied, intensive, short-term, yet theoretically grounded research, our methodological framework also builds on the practical implications of the people-centred development approach, which has been developed on the basis of various research and development groups that integrate ethnography into their work. The baseline principle of the approach is to take into account people's characteristics, needs, and expectations in order to develop more people-friendly and intuitive products, services, or other solutions. The approach was introduced by Xerox in the 1970s when developing the first photocopier (Suchman, 1987). In the 1990s, the approach was also used by Boeing in developing the 787 Dreamliner and by Microsoft in testing Windows XP. Using this approach, a group of anthropologists and other social scientists at Intel are also researching and developing ubiquitous computing and similar technologies that will be important in the future (Dourish & Bell, 2011). These types of research and development approaches use participatory and collaborative (rather than observational and detached) ethnography. They are intensive excursions into people's lives, using both intervening and observational methods to create contexts through which to explore questions that reveal what is important to these people in the context of what the researcher is trying to find out (Pink & Morgan, 2013).

How does the approach work in our applied project practise? We iterate and build on the practical methodological implications, results and lessons learned from real case studies

[21] Whereby »people« refers to groups of individuals, who are more commonly classified as »end-users« in technology-focused projects.

of several EU Horizon 2020 projects. These projects have shown that it is not only possible, but necessary to make a transition from an expert development process to a people-centred mindset and development process that enables the co-creation of meaningful and sustainable products and services. We divide it into four basic steps (see Figure 1). The first step is identification, where we start by defining whose problems are to be solved or who the people in focus are. In the second step we explore and analyse their needs, using and combining different ethnographic methods such as interviews, focus groups, and participant observation. In this way we learn about people's routines, practices, and habits. The third step is interpretation. Based on the research findings and in collaboration with the developers and participants of the study, we develop recommendations to contribute to and guide the design. The basic idea of people-centred design and development is that people can – and should – be involved in this part of the design process as well, acting not just as informants for the researchers, but as partners in the creative process. The fourth step, i.e., testing, ensures the optimal experience. At this stage, when we already have a prototype of the product or service, the key question is why and how – and whether at all – the newly created solutions are relevant, important, and meaningful to people. We test the prototypes with people, using a variety of techniques to assess their suitability and overall people-friendliness. Based on the results, we develop recommendations for further improvements.

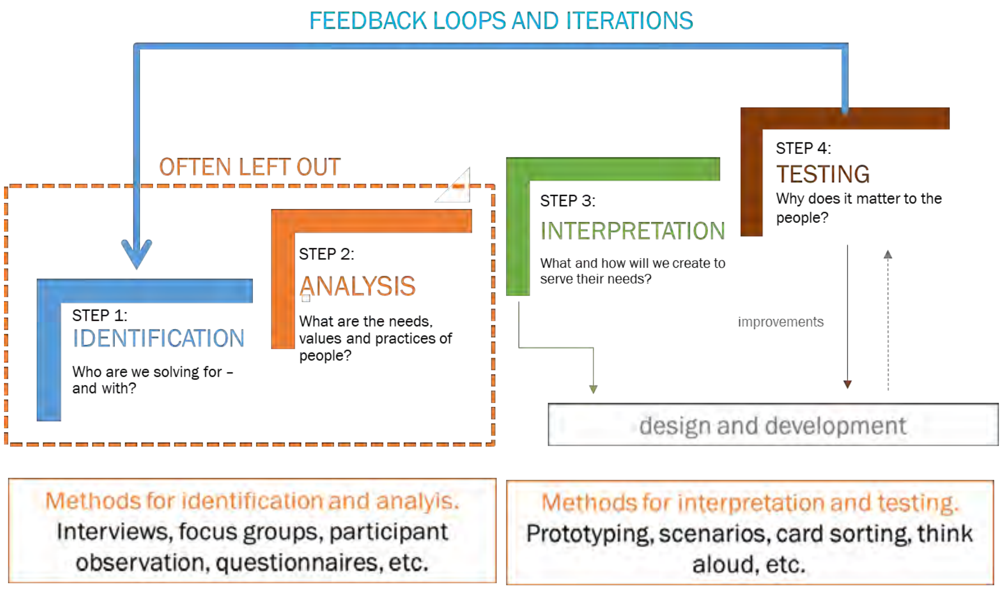

Figure 1: Four steps of the people-centred development.

3. APPLYING ETHNOGRAPHY IN INTERDISCIPLINARY RESEARCH AND INNOVATION PROJECTS

Horizon 2020 projects we are engaged in involve interdisciplinary teams across sectors (research, industry, NGOs, policy…) and across a number of European Union member states. As these projects are primarily focusing on energy efficiency innovation in terms of technologies, processes or systems, qualitative research inevitably constitutes only a portion of the planned project activities (i.e., “work packages” and “tasks” in the EU project jargon) and a vast majority of the engaged researchers and experts come from a technical background. As relevant qualitative data nevertheless needs to inform the innovation process in all project demonstration pilots, social science researchers need to also support other project partners (e.g., engineers or architects) in delivering parts of the ethnography-inspired research. To train project partners in the respective people-centred development methodology, we organise and deliver ethnographic workshops where our participants gain hands-on experience in conducting qualitative research such as open-ended interviews, field visits with participant observation, sensory ethnography, and analysis and interpretation of data along with writing qualitative research reports. We provide project partners with methodology guidelines and a set of tools, such as reporting templates, to further facilitate their research endeavour. During the research implementation phase, we are in constant contact with our partners to support them by supervising their work, accompanying them in short-term intensive field visits, answering their possible questions, and helping them with the final interpretation of qualitative data.

3.1. MOBISTYLE

The first large-scale test of the relevant methodology in an EU Horizon 2020 programme was the MOBISTYLE project (2016–2020). The overall goal of the project was to raise consumers' awareness and motivate them to change their behaviour by providing attractive, personalised, combined knowledge services on energy use, indoor climate, health, and lifestyle through ICT-based solutions. In the project we tried to shift the focus from buildings and technologies to people. We sought to understand how people interact with buildings, tools, and appliances at home and at work, how they use energy throughout the day and how we can change and influence their lifestyles through the use of technologies and non-technological means. In the project, we relied on ethnography as a type of research that explores routines, habits, and practises through qualitative approaches. These approaches allowed us to gain a deeper understanding of human behaviour, to go beyond the quantified behaviour of *Big Data* collected through technological solutions, and to provide insight into Thick Data (Wang, 2013; Pretnar & Podjed, 2018; 2021). For example, using ethnographic methods, we evaluated effectiveness of energy saving campaigns in five demo cases: a neighbourhood in Denmark, a smart city in Poland, smart university buildings in Slovenia, a hotel in Italy, and an office building in the Netherlands. The findings from the ethnographic research were synthesised into sustainability recommendations (see Figure 2), which were, in collaboration with developers, engineers and other experts, tailored and adapted to different scenarios, characteristics of buildings and their occupants (Tisov et al., 2017).

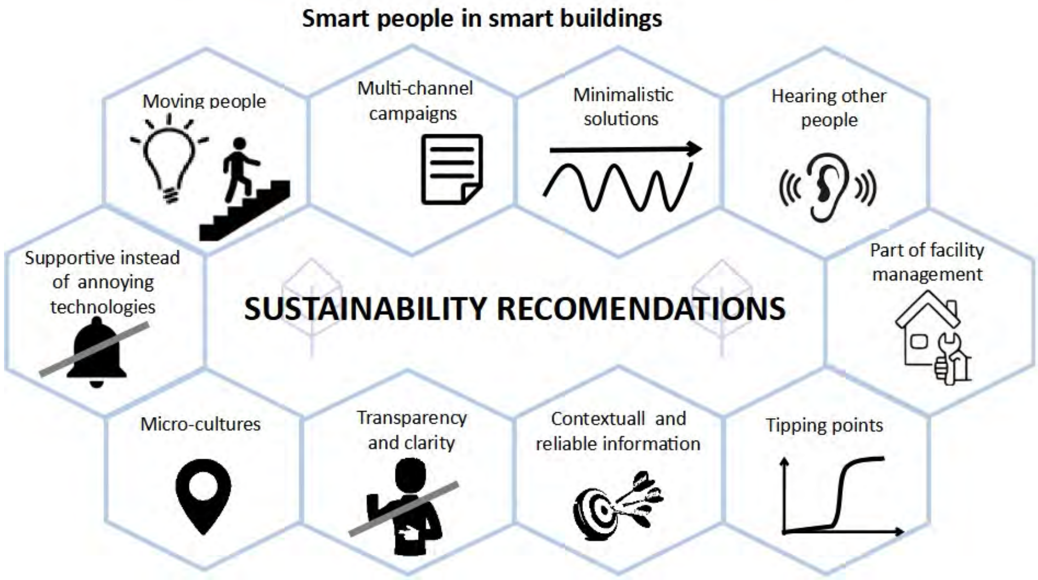

Figure 2: MobiStyle Sustainability Recommendations

3.2. TripleA-Reno

The first iteration of the proposed methodology was delivered in the EU H2020 project TripleA-Reno (2018–2021) – in which it was already recognised as an integral part of several tasks and not just an add-on to the project when submitting a project proposal, in order to emphasise interdisciplinarity. We challenged the initial understanding that "buildings consume energy" (and not the people who live or work in them) - an assumption that is still prevalent in energy efficiency discourse. The technical potential scenario assumes that energy efficiency technologies are suitable for all building configurations, are infinitely available or below the cost under consideration, and pose no economic, social, or psychological risks that would discourage consumers or organisations from adopting them. Within this arena, people implicitly act as producers of energy service needs and as economic agents who evaluate and purchase goods in terms of the cost-effectiveness of their expected future energy savings (Moezzi et al., 2009). In this sense, people are not seen as creators of improved energy use, but rather as disruptors or barriers to such improvements because they are unable to understand what is in their best interest. The result is a set of top-down views of people and energy that are unable to recognise heterogeneity, social organisation, or interests beyond energy and economic rationality (Moezzi & Janda, 2014).

To understand how human behaviour affects energy demand and the acceptance of new technologies, the "energy studies need social sciences" (Sovacool, 2014). The sociological, psychological, and anthropological theories, together with their research and analysis methods, can provide a measurable improvement in promoting energy conservation, which is influenced by both behaviour and technology. As D'Oca et al. (2017) argue, the solution is to incorporate the social sciences and humanities not simply as an afterthought in a physical context, but as an "equal partner" (Cooper, 2017). With this image in mind, the vision of the TripleA-Reno was to promote widespread energy retrofitting of the existing European housing stock and to empower individuals and communities to engage in such developments. The first phase of the project aimed to improve understanding of different contexts and processes of energy renovation. To achieve this, several case studies were carried out and investigated in different EU member states. As the focus of the TripleA-Reno project was on end-users (i.e., the building occupants) and other actors involved in retrofit activities, qualitative ethnographic methods were used to analyse and explain how specific contexts influence the respective processes. The analysis and cross-comparison of results from different case studies portray the complexity of renovation processes by taking into account the everyday realities, motivations, and problems faced by all the actors involved (for concrete results see Cerinšek et al., 2019 and Prati et al., 2020).

3.3. U-CERT

The main aim of U-CERT is to introduce a next generation of people-centred Energy Performance Certification Schemes – systems of methods and tools developed on the level of individual EU member states as a result of the Energy Performance of Buildings Directive[22] promoted by the EU commission. EPC schemes are best known for their end result, which is the Energy Performance Certificate (EPC) – a document describing a building's energy performance. The U-CERT project seeks to make these documents more holistic, cost-effective, reliable, of better quality, and perhaps most importantly, more people-friendly.

In U-CERT we were primarily interested in the experiences of both experts in the field of energy performance certification as well users of the EPC products and services to define potential improvements and developments of the future EPC concept. Following a familiar set of ethnography-inspired qualitative research methods, U-CERT engaged 162 people from 11 countries[23] in a number of research activities (91 semi-structured interviews and 9 focus groups). With the specified goal-oriented focus of the research, we gathered a large quantity of qualitative data and categorized it, with accordance to the research goals, in the following sections: (1) perceptions and attitudes towards the existing EPC schemes, (2) people-friendliness, (3) quality, (4) cost-effectiveness, (5) wide base support, and (6) comparability.

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[22] The Energy Performance of Buildings Directive (EPBD) is a legislative framework that promotes policies aiming towards high energy efficient and decarbonised building EU building stock by 2050, support sustainable investments, and enable environmentally responsible consumer choices. https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en

[23] These are Bulgaria, Denmark, Estonia, Spain, France, Hungary, Italy, the Netherlands, Romania, Slovenia, and Sweden.

The outcomes can be summarized in two groups. The first group characterizes the strengths and weaknesses of existing EPC schemes. Most intriguing among them is perhaps the gap between the declared (theoretical) purpose of EPC schemes and how they are perceived in practice. While EPCs are being described as an instrument to “contribute to enhancement of the energy performance of buildings” and “improve the energy performance of the building to the owners or tenants of the building”[24], practice shows they are predominantly seen as an unnecessary cost and administrative necessity[25]. The reasons for such characterisations were located primarily in deficiencies of the supporting systems, which include lack of quality control, lack of promotion, and an imbalance of costs, benefits, and effects related to the existing schemes.

The second group of outcomes focuses on potential improvements. These include enhanced people-centred features and design of the EPCs, digitalisation of the scheme, integration with parallel concepts, tools and technologies (BIM, Energy Audits, SRI etc.), improving coordination and communication of the involved stakeholders, ensuring support from a wide base of potential users, and aspects of knowledge, education, promotion, and marketing (see Figure 3). Results from U-CERT qualitative research will guide future developments of the EPC concept from the perspective of the people who ought to use EPC products and services in their daily life and were verified by researchers working on six other sister projects[26]. This will encourage the development and application of holistic people-centred innovative solutions and steer decision-making towards investments in (deep) renovation of buildings and an environmentally conscious life.

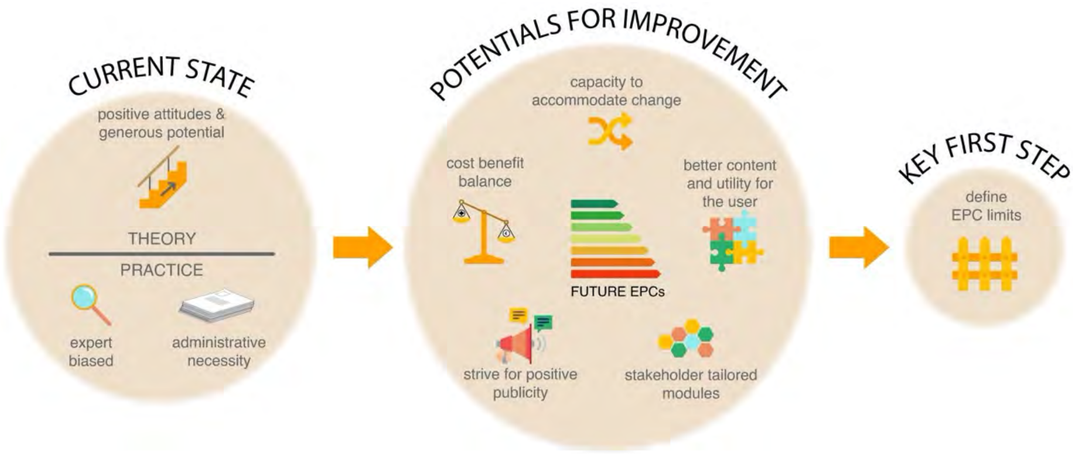

Figure 3: U-Cert Improvement Recommendations

3.4. BUSLeague

[24] See: https://ec.europa.eu/energy/eu-buildings-factsheets-topics-tree/energy-performance-certificates_en
[25] For more information see: https://u-certproject.eu/proceedings/epcertificates-people/
[26] See: https://u-certproject.eu/news/recording-web-workshop-u-cert-building-energy-perf/

The BUSLeague EU H2020 project (2020–2023) is dedicated to stimulating a demand for sustainable energy skills in the construction sector and in this context the methodology helps us better understand the relations between the concept of Sustainable Energy skills and how they relate to everyday lives of people active in the construction sector – also providing new insights into the social, cultural, and material realities of the construction sector. We are especially interested in ways how knowledge, education, and work are experienced by the professionals and key stakeholders working in the sector. Better understanding of everyday work-life processes of individuals, businesses, and institutions working in construction, while focusing specifically on education and training, will help us work towards understanding and stimulating market demand for BUSLeague solutions.

By including a wide scope of different stakeholder groups into the analysis, we aim to collect insights into value(s) and expectations regarding recognition and appreciation of expert work and skills. That will enable us to approach challenges, such as acting at market level, supporting legislative changes that will stimulate the demand for energy skills, and perhaps most importantly, to address the barrier of motivating the majority of the construction sector workforce – both white-collar and blue-collar professionals – to upskill according to technological and knowledge advances in the sector. (Figure 4 demonstrates the BUSLeague “ethnographic compass” integrating project objectives and interrelated tasks.)

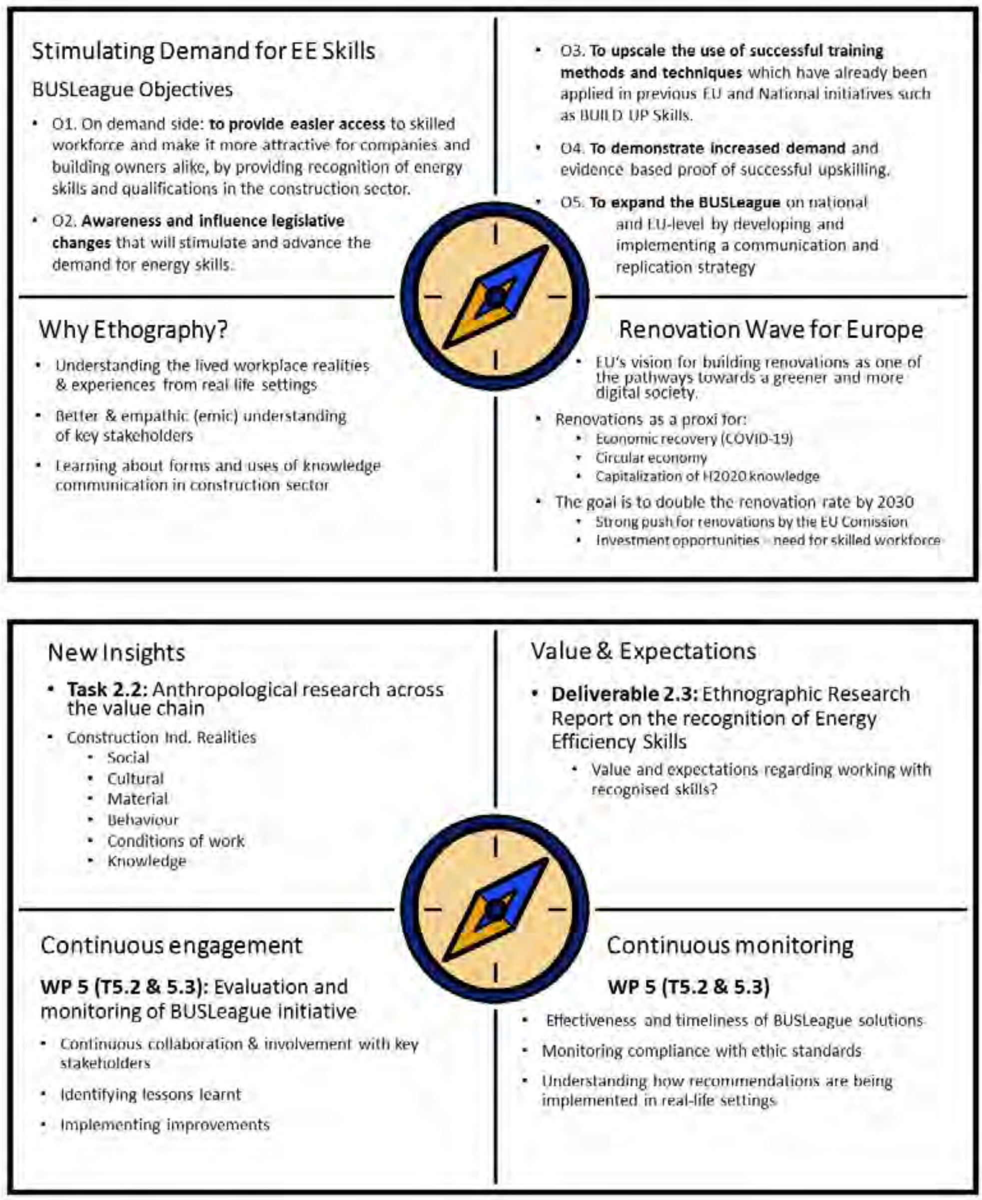

Figure 4: The BUSLeague Ethnographic Compass.

3.5. NRG2peers

The NRG2peers project aims to support the uptake of a next generation of European peer-to-peer energy communities, by collecting experiences from operative peer-to-peer energy communities, providing smart demand-response mechanisms to optimise energy consumption and peak demand at the community level, and adopting community-based nudging mechanisms for peer-to-peer transaction of renewable energy. Ethnography-inspired research is strongly embedded into the project research and innovation activities, involving qualitative research in nine existing pilot energy communities in four regional ecosystems. It lays the foundation for understanding how the next generation of people-centred energy communities could look like, focusing on specific (national or regional) drivers, barriers and interpretations of reliability, people-friendliness, and cost effectiveness.

The key idea of ethnography-inspired research in NRG2peers is to understand the perspectives of various stakeholder groups around energy communities and to include them in making and improving the set up and uptake of energy communities. Qualitative research will not only provide national guidelines and recommendations for a holistic people-centred support mechanism and its relevant value propositions, specifically usable for motivating and engaging future members of energy communities but will also strongly contribute to the project's technical outputs – a gamified platform to support residential energy communities in increasing energy efficiency and integrating a higher share of renewable energy.

4. DISCUSSION

The socio-technical dimension of energy is the reason that, apart from the challenging technological innovation which is required, there is a number of different energy practices (individual, household, community, policy, market) which interact, coexist, and are often in ambivalent relation. Energy is therefore as much a social substance as a purely “material” one (Forde 2017) and energy use, as well as the use of energy-related technologies, is to a large degree socially constructed and influenced by societal norms and routines, and our everyday practices, which also determine our ability and willingness to change those patterns (Heaslip & Fahy 2018). And change in behaviour, practices, or values is often required to support a just and faster-paced energy transition.

Social sciences and humanities (SSH) have not been oblivious to matters of energy and there is a fast-growing corpus of research available. Likewise, energy and ethnography have been in a long-lasting relationship and anthropologists have been exploring how energy is generated, used, or conceptualised (see e.g., Watts 2019 for an in-depth account of renewable energy on Orkney islands). Nevertheless, the trickle down and sideways in terms of mode, intensity, and scope of integrating SSH knowledge and methodology into technology development and innovation processes has been somewhat slower. SSH is still predominantly regarded as a means to orient the market and encourage individuals to accept a top-down policy, technology, or process, and this is further illustrated in the ways in which the Horizon 2020 energy calls are fundamentally framed and positioned (Sonetti et al. 2020). Yet a fuller integration will be crucial to achieve the desired impacts: provide technological solutions that stem from and respond to the needs of their intended users or enable the required change in everyday practices, or to support the emergence of new energy communities by an orchestrated cooperation on household, local, regulatory, and institutional levels. Energy technologies have to be meaningful, relevant, and desirable if they are to be accepted, widely adopted, used properly and continuously.

Integrating ethnography-inspired research into the predominantly technology-oriented Horizon 2020 projects, while co-developing in an interdisciplinary and collaborative fashion a people-centred approach as a *modus operandi* of the project innovation and development process, has therefore been a contribution in embedding social science expertise and methodology more firmly into a specific European energy research arena. Due to the nature of the projects, most of the project partners we worked with had limited prior knowledge of social science in general and anthropology in particular, and its theoretical, methodological, or applied implications. This inevitably posed a number of challenges, in terms of transferring qualitative research methodology, ensuring quality of research, and overseeing simultaneous research activities across a number of EU member states. However, the collaborative process also resulted in a number of positive impacts and unexpected "side-effects". In addition to the relevance of research results for the overall project outcomes, as well as their theoretical and practical insights, the research approach has contributed to demonstrably strengthening the interdisciplinary skills and capacities of the engaged researchers and practitioners.

One of the tangible impacts on project partners was the acquisition of new knowledge about social sciences and the added value of a people-centred approach to research and development in sustainable living, energy efficiency, and building skills. They reported greater awareness and understanding of what anthropology and ethnography can bring and contribute to understanding and solving specific project-related challenges. In addition to this awareness and understanding, these newly ethnography-inspired *humanistic engineers*, as one of them now refers to themselves, are empowered to act as ambassadors for the people-centred approach in innovation and development. In words of an engineer involved in MOBISTYLE ethnographic research, "now I often take on the role of an 'interpreter' between social science and technical or engineering experts in interdisciplinary project groups to facilitate interactions and build bridges towards common objectives."

In addition, the opportunity to gain practical experience of working with people-centred approaches triggered certain changes in the mindset of the experts who were involved in the research. An architect involved in the ethnographic research in the TripleA-Reno project described his experience by stating that *"if you involve people in the design process from the beginning, you can avoid problems later on and produce something that these people are more likely to accept,"*. It is not enough to ask people directly what they want and need, but to spend time with them in the environments and contexts in which they are expected to use a new product or service. For partners coming from different research backgrounds (especially for engineers and software developers), going into the field with social scientists and learning about their methods in practice proved to be a potent way of raising awareness of the added value of these methods. *"They went to the people, talked to them, they were enthusiastic about it,"* concluded a manager of a partner organisation involved in the BUSLeague project.

As reported by some of our industry project partners, the people-centred approach promotes a holistic view that goes beyond customers and passive consumers to include the perspectives of different stakeholders, including the companies themselves. It starts without predefined assumptions, asks broader, open-ended questions, delves into the everyday lives of people and organisations, and gathers large amounts of information that can challenge companies' initial assumptions. Using this approach allows companies to tackle problems in ways they cannot (yet) imagine; it allows them to look beyond the surface and uncover the part of the iceberg that lies beneath the surface, e.g., while the roll-out of smart metres may seem like a simple and predominantly technical task, qualitative research can show that it may involve various cultural biases, perceptions of new technologies as control mechanisms and possible resistance, or – as shown in the MOBISTYLE and other projects – have social implications in terms of energy inequality, etc.

The approach discussed in this paper builds on and is comparable to certain existing methodologies for eliciting needs and requirements of people, such as user- or human-centred design (see Kumar 2013; IDEO 2015), design anthropology (see Pink, Ardevol, & Lanzeni 2016) and rapid ethnography (see Beebe, 1995; Harris et al., 1997; Kumar, 1993). Still, what is original in the approach compared to the existing frameworks is in the way it aims to connect and integrate different theoretical paradigms and research disciplines (notably anthropology, sociology, engineering, architecture, and computer science) into a genuine transdisciplinary journey in which non-anthropologists also conduct qualitative research and in which non-academic representatives start to consider and use ethnographic data as the key starting point of the product & service development process.

Several most recent strategic agendas of the European Union (e.g., EU Green Deal) indicate a rapidly growing awareness that understanding people should become an integral part of the development processes if we want to achieve new categories of products, services, interventions, or business strategies that fundamentally address people's needs and lead to sustainable innovation. As a university-based institute in charge of enhancing interdisciplinary collaboration between faculties and research domains within the University of Ljubljana, the application of the people-centred development methodology can be considered as a sustainable business model that has provided several long-term university-business collaboration and technology transfer opportunities (as indicated in previous parts of this paper) – applied in relation to national bi-lateral industrial development projects and European research projects in general. These opportunities are evident especially through existing Horizon 2020 and forthcoming Horizon Europe calls for projects, demonstrating that there is a growing need for inter- or transdisciplinary approaches, which enable an efficient integration of social sciences and humanities into more technical, energy efficiency projects. This is also indicated through several evaluation reports that the project proposals have received with regard to the people-centred development methodology and approach:

> "The interdisciplinary approach is well-defined as the consortium includes a dedicated partner with strong expertise in anthropology and clearly defines the best strategies to effectively manage the users' long-term engagement.",

"The innovation potential is excellent, replacing the usual top-down user-consideration with a bottom-up co-creation approach. A key principle of the project is a bottom-up, people-centred approach. This is very good.",

"The extent to which the consortium brings together the necessary expertise is excellent. The participants bring together all the required expertise in the fields of energy, e-mobility, ICT and social sciences."

"The use of stakeholder knowledge is excellent. The project builds on a people-centred development approach to smart cities and communities which puts citizens 'in the driving seat'. This is excellent.",

"Consortium is well balanced and complementary, providing a wide range of required competences, with special focus on applying social sciences and humanities methods to engage users/stakeholders throughout the project, which is good."

5. CONCLUSION

By iterating on our methodology in the five projects described above, the method has become even more integrated in other projects from the EU H2020 programme, including DRIVE-0, reMODULEES, INFINITE, and will also be part of the CrossCERT and REMARKABLE projects starting in September 2021. It also found its way into Erasmus+, an EU programme designed for transfer of skills into pedagogical processes. Projects Active8-Planet, UCITYLAB, HAPPY, and Urban Boot Camp all include the people-centred development approach, as well as other R&D projects connected to development of people-friendly and sustainable products, e.g., DriveGreen and Invisible Life of Waste (Podjed, 2019).

Integration of the people-centred approach into energy efficiency projects and industrial processes is, however, not the end of the road for applied ethnographic research. In the coming years, the approach should be further developed and adapted to global challenges, especially those related to sustainability. In the next EU Framework Programme, Horizon Europe, the next necessary step should be taken, i.e., a transition to a planet-centred approach along the lines of UN Sustainability Goals. The new approach should put people at the centre while addressing crucial environmental challenges and contributing to industrial competitiveness which will be based on the principles of sustainability. The approach will thus contribute to one of the main tasks of Horizon Europe, namely climate change adaptation, including societal transformation. In the Active8-Planet Knowledge Alliance project we will experiment with the "planet-centred" development methodologies that integrate four key principles: (1) People-centred design and development (involving people in the research & development processes); (2) Interdisciplinary and Intergenerational Co-creation (collaboration across disciplinary boundaries and intergenerational collaboration to support new forms of solidarity and transfer of knowledge and experiences between different generations); (3) Environmental Ambition & Action (addressing environmental problems – the environment is understood as a key stakeholder in the research and development process); (4) University-Business

Collaboration (what is important is that non-academic partners are not seen as clients but rather as equal partners in the research and development process).

We expect that ethnography in industrial settings will be upgraded in the next steps by combining it with quantitative approaches, e.g., Big Data analyses, to understand society and people in a more holistic perspective. Moreover, the new ethnography-based approaches, such as remote sensory ethnography (Pink 2015) and circular mixed-methods (Pretnar & Podjed 2018; 2021), will accelerate the otherwise slow-paced ethnography, which is also the main complaint from industry: *"Ethnography takes too long!"* It is critical that anthropologists and other social scientists doing ethnography participate in interdisciplinary and transdisciplinary projects not just as marginal observers but take on leadership roles that will elevate the contribution of ethnography beyond anthropology and other social science disciplines. Consequently, ethnography is not seen as an “appendix” of development projects, but rather as their driving force (see Podjed, Gorup, & Bezjak Mlakar, 2016).

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Business Model As A Practice – Opportunities And Barriers

Christian Koch[1],*, Martine Buser[2], Veronica Carlsson[3]

[1]Aarhus University, Sweden; [2]Aarhus University, Denmark; [3]Chalmers University, Sweden

* kochchristian65@gmail.com

Abstract

The business model of small building contractors can be characterized as a business model in practice. It is through practices of the craftsmen that business propositions, revenue channels, supplier partners etc. are chosen and shaped. Small contractors usually enjoy a strong position on the single family house market, especially renovation. Energy renovations of single-family houses hold great potential for decreased energy consumption. This could imply business opportunities for SME contractors. Previous research has focused on SME contractors and their work or house owners and their behavior, but to understand the lack of energy renovations, it is not enough to examine only either/or, but rather the interaction between these two actors in order to understand how the space is used and how they negotiate. This work hopes to contribute to research that investigates face-to-face interactions between SME contractors and house owners and also provide explanations of why energy renovations of Swedish single-family houses are lacking. An interpretivist semi-ethnographic understanding, using Goffman's dramaturgical theory, was used. The results demonstrate that SME contractors express insecurity regarding their roles, and also some of the materials and possible solutions they could use. It shows how these insecurities shape and structure their interactions with house owners. Tensions were highlighted involving roles and performances, which create challenges for business model development and implementation. Interactions between SME contractors and house owners comprise a key aspect of the lack of energy renovations of single-family houses. The established roles and performances locks the two actors into a routinized play.

Keywords

SME, construction, craftsmen, Energy renovation, Dramaturgical approach

Shared Value Creation and Sustainable Development: From Insights into the Process to Developing a Causal Model. Analyzing Energy Cooperatives in Different Institutional Contexts

Ireen Gerrits[1], Bartjan Pennink[2]

[1]Master student International Business and Management, University of Groningen, The Netherlands

I.gerrits.3@student.rug.nl

[2]Assistant Professor, Faculty of Economics and Business, University of Groningen, The Netherlands

b.j.w.pennink@rug.nl

Abstract

Research aim: A theoretical understanding of the process, causal linkages, relationships, and dynamics of shared value creation is largely missing in this field. Hence, this research aims to contribute to the theoretical development of shared value creation in new business models by developing an all-encompassing theoretical model in two Phases. First, it empirically advances the understanding of the process of sharing values in cooperation with different actors. Second, it analyzes the dynamics and relationships between values, actors, and cooperation to develop a causal model.

Design: This research was executed by conducting eight case studies in Belgium and Dutch energy cooperatives. In different countries, they provide the perfect background as they are moving towards new business models and provide insights about different institutional contexts.

Findings: The findings show how a variety of values, more actors, and increased cooperation lead to more shared values. However, these relations are moderated by

members' differing needs, involvement of the members, and successfulness of cooperation (kind of organizationalcontext). Additionally, new independent variables are discovered: professionalization and kindof institutional context.

Limitations: More (experimental) research is needed to exclude alternative causal explanations.

Implications: This provides a direction for testing these causal linkages with other research designs/ methods or in other organizational contexts. Additionally, the causal model could give practitioners and researchers insights into which variables to manipulate to get more or less shared value.

Contributions: This study uniquely contributes to the knowledge of the concept of shared value creation to ultimately reach sustainable development by combining detailed insights intothe process accompanied by a comprehensive ready-to-test causal model.

Keywords

Creating Shared Value (CSV), New Business Models (NBMs), Multi-Value-Multi-Actor, Causal model

Main text

1. INTRODUCTION

The current economic system calls for a transformation because the traditional business models that are driven by profit (the added value) are unsustainable (Rotmans, 2012). In light of the complex and globalized social and environmental issues, such as rising temperatures andhuman rights violations, this is now more crucial than ever. Outside pressures, like thedevelopment of the sustainable development goals (SDGs) by the United Nations in 2014, are pushing towards a collective effort to achieve sustainable development: meet the needs of the present without compromising the ability of future generations to meet their own needs (UN, 2015; UN & FCCC, 2016; Brundtland, 1987). Consequently, new ways of organizing are emerging in the field of business models in which sustainable development is central (Jonker, 2012). These new business models (NBMs) are moving away from neo-classical thinking by changing their focus from profit as the only added value to a much more encompassing value concept. This shift in focus arose from an article of Porter and Kramer (2011) in which they showed that the widespread engagement in CSR has only brought the outdated value approachto light and where societal issues are treated as peripheral matters essentially focused on improving a firm's reputation (Porter & Kramer, 2011). According to Porter and Kramer (2011), the solution lies in the transition towards creating shared value (CSV) for which they emphasized the interrelation and connection between more values besides profit (social and ecological values) and different actors (society and company) resulting in a win-win situation. Along with that concept, these NBM's are the embodiment of shared value creation as they areconstructs that also entail embedding ecological or social values besides profit due to a configuration of parties (Jonker, 2012; 2018).

Aside from the popularity and the potential to reach sustainable development, the concept of a CSV is still in a nascent stage, and a theoretical understanding, empiricalgrounding, and causal linkages/ framework of the sharing values process is missing (Austin &Seitanidi, 2012; Crane, Palazzo, Spence & Matten, 2014; von Liel, 2016; Wieland, 2017). Hence, this research aims to contribute to advancing the concept of shared value creation by developing an all-encompassing theoretical model. It will first empirically advance the understanding of the sharing values process, i.e., how different actors cooperate to create shared value. Second, it will analyze the dynamics and relationship between values, actors, and cooperation in order to develop a causal model.

The Multi-Value-Multi-Actor model of Pennink (2016) provides us with insights into how the CSV process works for which more stakeholders and more values are considered than in traditional business models (Pennink, 2016). Energy cooperatives are analyzed while these cooperatives are moving towards new (community-based) business models where more values,actors, and cooperation is expected to be present, also they are perceived to be an important instrument in achieving regional sustainable development (Jonker et al., 2018; Jonker, 2018; Gertler, 2001; 2004; ICA, 1995; Hentschel, Ketter & Collins, 2018). Additionally, this researchincludes different energy cooperatives from the Netherlands and Belgium which responds to the need to provide further insights into institutional aspects that may foster these initiatives (Yildiz et al., 2015). All in all, this leads to one overarching research question*: Which values are created, which actors are involved, how do actors cooperate, and how does this lead to more or less shared value creation, and how will this differ across different institutional contexts?*

2. THEORETICAL BACKGROUND

The Concept of Creating Shared Value as the motor for sustainable development

The originators of the concept of "creating shared value" (CSV) are Michael Porter and Mark Kramer (2011) who took a step forward in strategic CSR. Originating from the idea that the community's health and the competitiveness of a company are closely intertwined (Porter & Kramer, 2006), firms should focus on the social and economic progress in parallel, resultingin a win-win situation. They argue that current CSR initiatives only scratch the surface, while these are essentially focused on improving the firm's reputation and are not sustainable in the long run. Instead, companies should bring societal issues to the core, redesign the company's purpose to creating shared value, and implement value principles which are benefits related tothe costs (Porter & Kramer, 2011). According to Porter and Kramer (2011), this will boost innovation, productivity, legitimacy, the relationship with society and, ultimately, long-term success and competitiveness. Porter & Kramer (2011) suggest three distinct ways of creating value: a) reconceiving products and markets which entails developing new products and serving disadvantaged communities to meet societal needs and increase innovation; b) redefining productivity in the value chain through improving energy and resource utilization and procurement conditions and productivity; and c) enabling local cluster development as a company's success is affected by the supporting companies and infrastructure around it.

Jonker (2012; 2018) builds further on the concept that the current economy and its business models no longer suffice. A system is needed that not only adds value for the companybut adds more value for and with more people. Three values should be central in this system: sustainability, circularity, and inclusivity (Jonker, 2018). In this thinking, business models needto be aligned while, in a transaction model based on money, sustainability is threatened within the organization's boundaries or the value chain (Jonker, 2012). Consequently, Jonker (2012; 2018) elucidates the idea of new business models (NBM) which entails embedding other ecological or social values as a result of a configuration of parties; this leads to transactions thatare perceived to be valuable by both parties (Jonker, 2012; 2018). Pennink (2016) summarizeswhat is discussed thus far in combining the actors (across a broad range of sectors) and different values (social, ecological, economic) in the Multi-Value-Multi-Actor Model to gain insights into the sharing values process. Thus, the idea is that only when incorporating more values into organizing and collectively working together on what is of value, can sustainable development be reached in which inclusivity, sustainability, and circularity is central (Pennink, 2016; Jonker,2018).

However, the concept of a CSV is not free of critique (Wieland, 2017; Crane, Palazzo, Spence & Matten, 2014). Crane et al., (2014) state that it lacks originality and theoretical/ empirical grounding for certain assumptions. For example, Porter & Kramer (2011) disregard the existing tensions between social and economic outcomes and assume win-win situations (Crane et al., 2014). Additionally, Porter & Kramer (2011) understand the CSV concept as company specific and internally generated and assume the parallelism of objectives is sufficientfor a civil society organization to become involved. However, the CSV approach that was adopted by the European Commission (2011) and the United Nations (2014) was built on the understanding that a CSV is driven by the integrations of stakeholder's interests and stakeholders' resources in their strategy (Wieland, 2017). Moreover, Jonker (2012, 2018) emphasizes that multiple organizations and parties create value depending on each other. Thisreflects an important debate in society, but greater knowledge of the processes of shared value creation is required for theoretical advancement and practitioner guidance (Austin & Seitanidi,2012).

Cooperation – Dealing with different actors, values and organizational cultures

In order to create shared value with a broad range of actors, literature and politics increasingly stressed the importance of cooperation and collective action (Jonker, 2018; UN, 2002). However, in literature, there is ambiguity about the dynamics of how different underlying relationships and collaboration processes contribute to value creation potential (Austin & Seitanidi, 2012). This impedes shared understanding and the ability to co-create value, meaning it is important for us to shed a light on these collaboration processes (Austin &Seitanidi, 2012). First of all, cooperation is seen in the literature as a collective activity, i.e., two or more agents cooperating to achieve their ends or their shared collective end (Tuomela, 2006). The strongest way to accomplish cooperation is having a shared motivation towards a common goal and the prospect of working together in the future towards the same shared purpose (Pennink, 2004). Additionally, Yildiz et al. (2015), state that a common understandingof what the organization 'is' or 'should be' is considered of great importance for efficient decision-making. According to Tuomela (2006), a weaker form is when human beings individually pursue their intended private goals.

According to Yildiz et al. (2015), participation, conflict, and trust are the most important components for determining the success or failure of cooperation. It is important to look at (increasing) participatory processes because a decision made from collective action processes may find greater social acceptance, form a broader consensus, and build social capital in local networks of diverse actors (Yildiz et al., 2015). A fundamental assumption of the conflict theoryis the concept that conflict supports change. Furthermore, according to Pondy (1967), conflict in an organization can have positive or negative effects on its productivity, stability, and adaptability depending on various factors. Conflict theory illustrates that negative outcomes ofconflict are especially precipitated if norms and values are at stake (Ayub & Jehn, 2014). Furthermore, trust has been claimed to provide a range of benefits that are essential to stable relationships, vital for the maintenance of cooperation, and fundamental for any exchange (Misztal, 1996).

According to the Dutch abbreviated BBO Model of Jonker (2016), citizens, businesses,and governments are the most important actors that come into play in shared value creation and the development of new business models. However, these actors face several challenges whencooperating with each other. Klijn & Teisman (2010) found that public-private partnerships (PPPs) are, at this point, facing many difficulties in joint decision making (Klijn & Teisman, 2010). Differences in core business (political vs. financial conditions), values (emphasis on risk avoidance vs. emphasis on market opportunities, risk, and innovations), and strategies (search for certainties to produce vs. search for ways to guarantee substantive influence) create tensionsand consequences for the success of the PPP (Klijn & Teisman, 2010). Furthermore, non- profits' motives tend to be social and altruistic while business partners tend to pursue instrumental motives linked to self-interest (Tabellini, 2008; Selsky & Parker, 2005). Most studies assume non-profits and businesses to have different priorities and to have sectoral differences that makes the development of trust and a common partnership culture crucial to establishing a successful partnership (Selsky & Parker, 2005). Huijstee, Francken, and Leroy (2008) mention some of the advantages of intersectoral partnering, e.g., access to financial resources, often local knowledge, and expertise. On the other hand, the challenges are the indistinction between tasks and responsibilities, legitimacy loss, cultural differences between parties, and insecure outcomes (Huijstee, Francken & Leroy, 2008).

Institutional context – Shifting boundaries between citizens, government, and business

The institutional context affects the way organizations operate and cooperate, while institutions are the shared, stable structures that govern social behavior and provide meaning toit (Spencer & Gomez, 2011). Institutions build the rules-of-the-game that include formal rules (laws, regulations) and informal constraints (customs, norms, cultures), which in the most fundamental level consists of three ‘’pillars’’ (North, 1990; Peng, 2003). First, the regulative pillar focuses on formal rule systems and enforcement mechanisms sanctioned by the state (North, 1990). Second, the normative pillar defines legitimate means to pursue valued ends (Peng, 2003). Finally, the cognitive pillar refers to taken-for-granted beliefs and values that areimposed on or internalized by social actors (Peng, 2003). The focus is mainly on the regulativepillar as formal functioning institutions with a good rule of law are required for successful exchange and cooperation. Also, in this paper, the political institutional approach is taken in which institutions are defined as formal or informal procedures, routines, norms, and conventions in the organizational structure of the state or macro-political level (Amenta & Ramsey, 2010).

Interestingly, society is also experiencing shifts in the institutional context, mainly in political structures and governance. The governance focus is shifting from public actors and hierarchical decision-making to the interaction of public and private actors and non-hierarchical political structures, resulting in the obscurity between boundaries and responsibilities (Finke, 2007; Scherer & Palazzo, 2007). The Dutch king has introduced the new term: participation society where citizens have to cooperate, participate, and assume more responsibility for their own well-being (Koster, 2014). The ''participatory governance'' approach, in other words, the inclusion of citizen involvement, is also included in EU policy (Finke, 2007). According to Scherer & Palazzo (2007), globalization has resulted in transnational challenges that are more complex, such as quality in the labor standard, that should be dealt with in a decentralized process involving NGOs, international institutions, companies, etc. and not by the governmentalone (Scherer & Palazzo, 2007). According to Scherer and Palazzo (2007), the challenge is tofind new forms of democratic governance that domesticate economic pressures and go beyondnation-state governance and integrate more actors (Scherer & Palazzo, 2007).

On the other hand, authors Eversole (2010) and Fung (2015) mention several challenges that arise from private actors operating in a new playing field. For example, a bottom-up changestill needs formal institutional allies to help overcome barriers that communities cannot shift for themselves and to access resources not available any other way (Eversole, 2010). Thus, bottom-up initiatives will regularly deal with institutional barriers which makes it really valuable to learn their language, participate in their procedures, and acculturate to theirinstitutions to get resources and support (Eversole, 2010). Jonker (2015) also acknowledges that the government cannot solve all societal problems independently but that a collective, combined effort from society is the solution. Conclusively, according to the BBO Model, government, businesses, and citizens need to cooperate and interact with each other on an equalfooting and create collective value to reform the new “system of society” (Jonker, 2015).

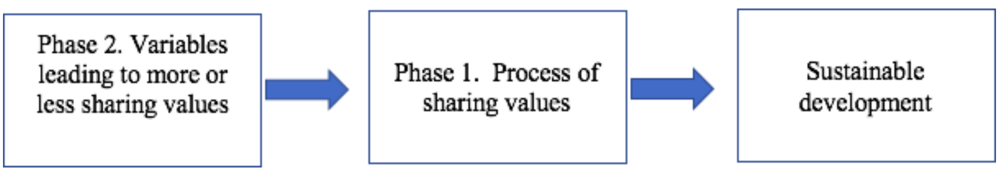
Theoretical model development - Creating Shared Values as motor for development

In theory, creating shared value has the potential to transform our economy and achieve development that is more sustainable. However, currently, there is a lack of understanding about the causal linkages, relationships, and dynamics of shared value creation which leads to the need for a more specific, systematic, and comprehensive framework (Austin & Seitanidi, 2012; Von Liel, 2016; Husted & Allen, 2007). The authors respond to these needs bycontributing to the theoretical understanding of shared value creation in new business models by following several steps to develop a comprehensive theoretical model. First, baseline model(Figure 1) was developed, which shows the aim of this research: finding out which variables lead to more or less shared value creation and finding out how this process of value creation between different parties works to eventually reach the ultimate goal of sustainable.

development. Since the aim of this study is contributing to the theoretical understanding of shared value creation, we will focus on the first two phases of the model (Figure 1)

FIGURE 1

Baseline model



Additionally, a preliminary conceptual model was developed, see Figure 2, as a further guide through theory development, while these sensitizing concepts will lead us through the data collection and analysis (Charmaz, 2006). The five most important concepts were derived that are involved in creating shared value from the matrix and the theoretical background. Sub-questions and an overarching main question were also formulated that helped for gaining insights into the relation between these concepts and sharing values.

The following sub-questions have emerged from the literature:

On the process of sharing values:

1. ***Which values are created and how?*** *How is this related to shared value creation?*
2. ***Which actors are involved in the creation of value and to what extent?*** *How is this relatedto shared value creation?*
3. ***How do the actors cooperate?*** *How is this related to shared value creation?*

On the variables that influence the sharing value:

4. ***What is the influence of the institutional context?*** *How is this related to shared valuecreation?*
5. ***How is more or less shared value created?***

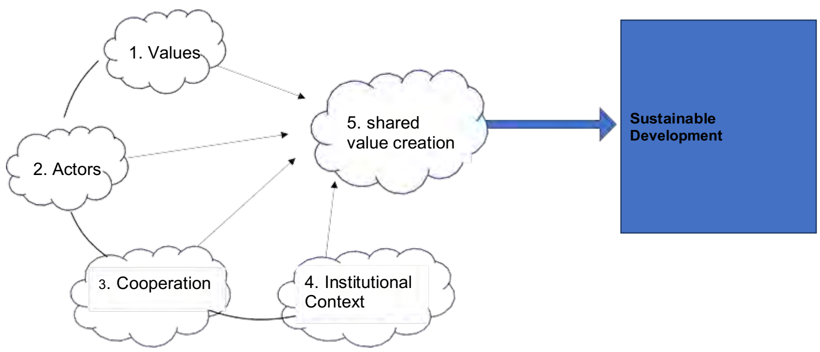
These sub questions are asked to work towards the overarching main question:

Which values are created, which actors are involved, how do the actors cooperate, and how does this lead to more or less shared value creation in the context of energy cooperatives; andhow will this differ across different institutional contexts?

After developing the sensitizing conceptual model, the process of theoretical model development started, consisting of three phases.

FIGURE 2

Conceptual model for sharing values

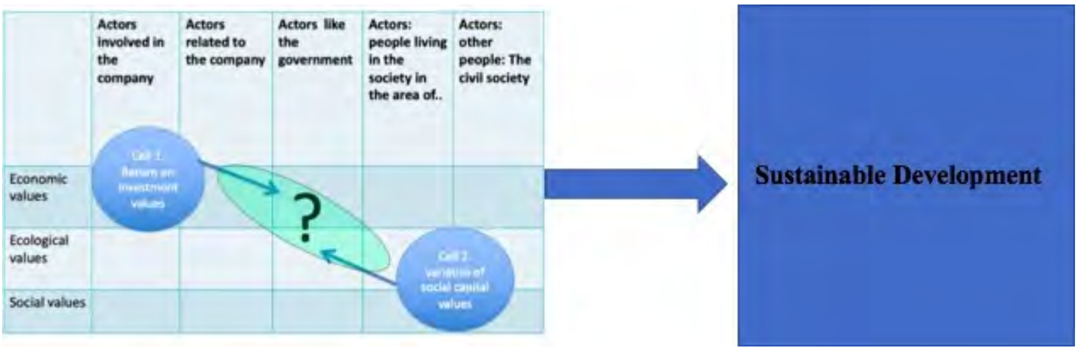


In Phase 1 (see Figure 1), the focus is on describing and depicting the process of sharing values in order to create a better understanding of how values are shared between different actors in these cases. Firstly, the model depicted in Figure 3, based on the Multi-Value-Multi- Actor Model of Pennink (2016), was used to gain additional insights into how the value processcan work in relation to sustainable development. This model considers the interplay of creatingmore values than profit (social, ecological) and involving more actors than in earlier literature.The matrix should be perceived as a map where companies can move across depending on theactors involved and the different values created. The idea behind this is that a ''traditional for- profit'' business will be focused on creating economic value by interaction mainly with actors within the company, which means this company will be located on the matrix's top left side ("Cell 1"). Conversely, a social business will be involving more actors outside of the organization to create multiple shared values, which means that this company would be more on the bottom right corner (''Cell 2''). For both situations, research is needed on answering thequestions of which positions contribute better to sustainable development in a region. The authors use this model as a starting point to explore what happens in the other cells situated inthe center field between the traditional for-profit businesses and social businesses. Thisprovides insights into how different contexts and relationships influence the creation of value(s)and the number of actors involved, which leads to a different positioning in the matrix.

Secondly, the conceptual model (Figure 2) and results from the sub questions are used as further input to describe and depict the process of sharing values.

FIGURE 3

Sharing values: Multi-Value-Multi-Actor model and Sustainable development



In Phase 2 (see Figure 1), a more abstract causal model is developed (see Figure 5 in Paragraph 4.2). It shows which variables to manipulate to get more or less shared value. The conceptual model is used as a starting point and, through analyzing the results, the dynamics and causal linkages between these concepts were seen. Conclusively, the concepts were supplemented by new variables found in the results.

In Phase 3, the insights from Phases 1 and 2 are brought together into developing a comprehensive theoretical model that can be tested in the future (see Figure 6 in Paragraph 4.3).

3.METHODOLOGY

3.1 Research design

The concept of a CSV is regarded as a nascent theory that makes exploratory qualitative research suitable because this allows for inductive theory building (Doz, 2011; Eisenhardt, 1989). Specifically, the qualitative case study design allows gaining a comprehensive understanding of the dynamics of shared value creation in interaction with interpreting and understanding institutional contexts' complexity (Yin, 2011; Doz, 2011; Birkinshaw, Brannen & Tung, 2011).

In this study, the multiple case study design is most suitable while it is a powerful means to create theory and ready-to-test hypotheses by combining existing knowledge with new empirical insights (Yin, 2013; Eisenhardt, 1991; Dyer & Wilkins, 1991). Furthermore, multiplecases enable comparison within and across cases and allow for more accuracy, robustness, andgrounding when developing a theory (Eisenhardt, 1991; Eisenhardt & Graebner, 2007).

3.2 Case selection

Due to the qualitative nature of the study, non-probability samples are used to select the study population. The cases are chosen for theoretical reasons, which is an appropriate methodto find cases that illuminate, identify relationships, or extend the emergent theory (Eisenhardt & Graebner, 2007). Cases have been selected in energy cooperatives, also called new collectiveor community-based business models, for several reasons (Jonker, 2018). First of all, cooperatives' characteristics, rationale, and principles (see appendix 1) promote partnerships, coordinated action, and capacity building and allow them to look at multiple and shared value creation as opposed to only focusing on profit maximization (Jonker et al., 2018; Jonker, 2018;Gertler, 2001; 2004). Additionally, Crane et al. (2014) contend that Porter and Kramer's approach is to cherry-pick shared value success stories with little regard for the negative impacts of companies' core products and markets. Therefore, especially energy cooperatives are interesting to analyze because their core service of producing renewable energy is sustainable. Moreover, they are considered as an important instrument for achieving sustainabledevelopment (Gertler, 2001; 2004; ICA, 1995; Hentschel, Ketter & Collins, 2018).

Furthermore, the specific selection of energy cooperatives is criterion-based or purposive, and this sampling technique aims to achieve a homogeneous sample; a sample that shares the same particular features or characteristics (Mason, 2002; Patton, 2002). Table 1 displays the criteria that the companies were required to meet. Table 2 depicts the sample afterapplying these criteria.

TABLE 1

Selection Criteria

	Selection Criteria
1	An official renewable energy cooperative, no preference for the type of renewable energy
2	Cooperative established min 2 years ago and with established project(s)
3	Cooperative founded by concerned citizens
4	Located in the Netherlands or in Belgium (Vlaanderen)

TABLE 2

Selection of cases and conducted interviews

Cases (cooperatives)	Country	Region	Year of establishment	Sub study	Interviewee + position	Type of interview	Date
Ecostroom	NL	Amsterdam	2013	1	Respondent 1, board member	Online semi structured	7-10-2020
Zuiderlicht	NL	Amsterdam	2011/2012	1	Respondent 2, work organization	Online semi structured	13-10-2020
Grunneger Power	NL	Groningen	2011	1	Respondent 3, director & respondent 4, metrics	Face-to-face semi structured	26-10-2020
Ecopower	Belgium	Whole country	1991	1	Respondent 5, communication & marketing	Online semi structured	12-10-2020
Vlaskracht	Belgium	Leiestreek	2018	1	Respondent 6, board member	Online semi structured	20-10-2020
Klimaan	Belgium	Groot Mechelen	2018	1	Respondent 7, board member	Online semi structured	4-12-2020
Westerlicht	NL	Amsterdam	2017/2018	2	Respondent 8, board member	Online structured	5-11-2020
CWW	NL	Waterland and Edam-Volendam	1988	2	Respondent 9, board member	Online structured	5-11-2020
Grunneger power	NL	Groningen	2011	3	Respondent 3, director & respondent 4, metrics	Face-to-face unstructured	14-12-2020

In total, a maximum of eight cases were selected, i.e., five cases in the Netherlands and three cases in Belgium. As they require in-depth analysis, the emphasis should not be on the number of cases but on making it understandable and producing a theory (Eisenhardt, 1981; Gustaffson, 2017). By analyzing cooperatives in multiple regions and two different countries, the hope is to obtain more insights into how (different) institutional contexts can influence the creating shared value process of cooperatives. The decision to include cooperatives from Vlaanderen and the Netherlands was initially based on the perceived similarities: geographical proximity, same language, and a similar trend of citizens organizing themselves in energy cooperatives. Subsequently, interesting differences were found. In the Netherlands, there are 184 energy cooperatives that evolved around one project while, in Belgium, there are only 17 energy cooperatives with more projects and a broader geographical scope (HIERopgewekt, 2018; REScoop, 2020). These similarities and contrasts between the countries provided a promising setting to explore how the institutional context influences the CSV process.

3.3 Data collection

Since flaws in reliability, validity, and bias are mostly caused by a lack of rigor that case studies suffer from, the authors aimed to maximize the rigor in the design by integrating the multi-method approach (Brewer and Hunter, 1989). The multi-method approach's fundamentalstrategy is to attack a research problem with an arsenal of methods that have nonoverlapping weaknesses in addition to their complementary strengths (Brewer & Hunter, 1989). This approach suggests the tactic of triangulation by engaging in multiple methods in different stagesin the research (Brewer & Hunter, 1989). This was applied by engaging in multiple data collection methods (structured interviews, semi-structured interviews, and unstructured interviews) in three different sub-studies. This helped to effectively resolve rival hypotheses, minimize bias, and solve validity/ reliability issues in the other stages of the research process (Johnson, 1997; Golafshani, 2003; Sinkovics, Penz & Gauri, 2008). Variation in the methods was mostly applied by using different interview methods while observation and focus groups were more or less ruled out because of the Covid-19 restrictions.

Table 2 provides an overview of the specifics of the cases, sub-studies, conducted interviews, the type of method used, and position of the interviewee. The first sub-study was aimed to gain in-depth information about energy cooperatives in the Netherlands and Belgium.Semi- structured interviews where used, consisting of open-ended questions while the interviewee is free to talk as openly as he or she wishes and, in that way, can get to the heart ofthe matter, also this method of interviewing is highly efficient for gathering rich empirical data(Eisenhardt & Graebner, 2007; Harvey-Jordan, Long, 2001). So here, three semi-structured interviews with board members or directors of the Dutch and three with Belgium cooperativeswere conducted. The duration of the interviews was between approximately 60 and 90 minutes.

During the first sub-study, the authors noticed that, during the interviews, the response was unintentionally influenced by probing questions towards a certain outcome which is calledresearcher bias and can be a threat to validity and reliability (Johnson, 1997; Jonker & Pennink,2010). The second sub-study was aimed to define the shared value process more narrowly and to solve this problem of interference/ bias (Johnson, 1997). Consequently, two structured interviews were conducted in which a list of predetermined questions are asked with little or novariation, which is also used in quantitative data and limits bias/ interference of researchers (Gill, Stewart, Treasure & Chadwick, 2008). The duration of the interviews was between about60 and 90 minutes.

The aim of the third stage was to gain more in-depth information about the shared value process in a new business model. Grunneger power, which was already interviewed in the firstsub-study, is explicitly working towards the topics that the authors are researching: collective,shared, and multiple value creation. Additionally, they are developing a new collective businessmodel in which they activate citizens to consume and produce and thus become prosumers. Consequently, an unstructured interview with Grunneger Power was conducted as this interview method is especially useful when significant ''depth'' is required (Gill, Stewart, Treasure & Chadwick, 2008). The duration of this interview was 50 minutes.

3.4 Data analysis

This research is based on grounded theory's foundations to make sense of the data and generate a theory (Langley, 1999). Specifically, the authors followed Strauss and Corbin's (1990) structured steps in data collection and analysis to ensure that the grounded theory was used correctly and increased rigor (1990). The constant comparison method of similarities anddifferences in each stage and sampling on theoretical grounds played a central role in this study(Strauss and Corbin (1990). Furthermore, the analytical coding process mentioned by Strauss and Corbin was also used as a baseline (1990) which includes three basic coding types: open, axial, and selective coding. These basic types of coding are supplemented by specific coding methods in open coding and the additional focused coding process to analyze the data in a detailed manner (Saldana, 2013; Charmaz, 2006, 2014). Corbin & Strauss (1990) mentioned that there is room for some flexibility in the specific procedures. Furthermore, memo-writing is often recommended to elaborate categories, specify their properties, define relationships between categories, and identify gaps (Strauss and Corbin, 1990; Saldana, 2013; Charmaz, 2006). This was also extensively used in this research, especially in the data analysis phase which helped capture comparisons and connections that were made (Saldana, 2013; Charmaz,2016).

All of the interviews were audio-recorded, and these recordings were transcribed verbatim. After the transcription of all of the interviews, the coding was done manually in Word.In the first cycle coding phase, initial or open coding was used, and a detailed analysis of the separate cases was performed with a within-case analysis (Eisenhardt, 1989). The purpose of this initial stage of data analysis was firstly to split the data into individual coded segments (Saldana, 2013; Strauss and Corbin, 1990). Subsequently, incidents were compared andgrouped into categories (Saldana, 2013; Strauss and Corbin, 1990). In the second cycle, focused, axial, and selective coding was used, and an across-case analysis was conducted to ascertain the similarities and differences between the cases (Eisenhardt, 1989). The goal was toreorganize and reanalyze the data coded in the first cycle method in categories, themes, and concepts (Saldana, 2013) while ultimately reconfiguring these to develop a select list of broadercategories/ themes and concepts (Saldana, 2013). An overview of the detailed steps in analyzingand coding the data can be found in Box 1.

3.5 From data analysis to model development

After analyzing the data, a few steps still had to be taken toward theory and model development. The second cycle of coding helped to determine patterns, connections, and relations between the sensitizing concepts and the core variable. The authors could translate, describe, and depict these insights into the process model (Figure 4). This was done in a detailed and all-encompassing manner to make the process of sharing values in energy cooperatives visible in the richness of its field. Subsequently, this detailed process was used to determine whether the conceptual model created in advance was complete and to obtain insights into thecausal linkages between these concepts. Conclusively, these concepts were supplemented by new variables found in the process, and the causal linkages were shown in a newly abstract andcomprehensive causal model (see Figure 5). The authors are aware of the danger that this is notstrictly based on traditional logical rules but, by doing this, it was possible to shed light on sharing values with a conceptual model. In further empirical research, this model has to be tested

3.6 Validity, reliability, and transparency

In this research, triangulation was applied to increase validity by eliminating bias and dismissing plausible rival explanations (Mathison, 1988). If the diverse data sources' outcomesconverge, this would be an indication of validity (Miles & Huberman, 1984). Unfortunately, this was not tested since the data was not analyzed per sub-study. Triangulation was also applied to increase the reliability for which the essence is: utilization, inclusion, and combinations of different (data) sources until no new information is discovered in the data analysis (saturation)(Jonker & Pennink, 2010). Due to the open research question, a grounded theory approach, andtime constraints, no complete saturation was achieved. Additionally, in cases studies, it is difficult to assure external validity while the case study does not allow a generalization of the findings to other settings (Stoecker, 1991). However, a case study is suitable for exploratory research and generating a novel theory (Stoecker, 1991; Eisenhardt, 1991). Instead of pursuingthe sample-to-population logic, analytic generalization can function as an appropriate logic forgeneralizing findings from a case study (Yin, 2013).

Another important factor for strengthening the reliability and value of qualitative research is transparency (Jonker & Pennink, 2010). The researcher should show how and wherehe/she has conducted the research (Jonker & Pennink, 2010). To increase the transparency in this study, all of the intermediate steps were clearly shown between developing a conceptual model to a causal model. The process of data analysis and theory building are all made visiblethrough interview schemes, transcripts, multiple stages of coding, sketches, and memo-writing,which are accessible for the University of Groningen. This makes it possible for otherresearchers to replicate this study and achieve similar results, which improves the external reliability.

4. RESULTS & DISCUSSION

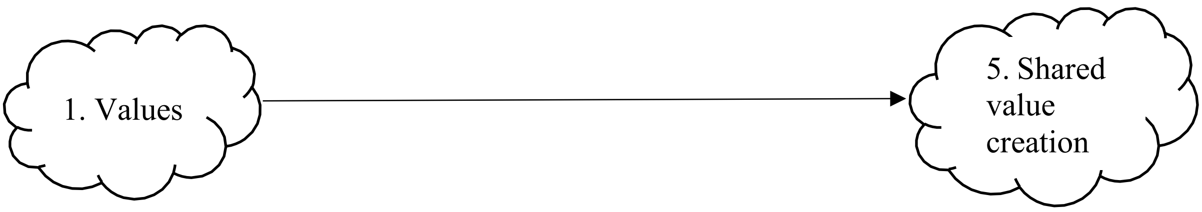
In this section, the empirical findings will be discussed which consists of three parts.

The first two parts consists of describing and depicting how the process of sharing values works and depicting the variables that lead to more or less sharing value in a causal model. These parts both inevitably contribute to theoretical model development. The last step is about merging these first two parts to develop an all-encompassing final theoretical model.

4.1 The process of sharing values in relation to sustainable development

In this section, the aim is to explore the process of how values, actors, cooperation, and different institutional contexts lead to sharing values to provide more and new insights into this process in the richness of its field. Firstly, the process is explained by answering thefirst four sub-questions in relation to sharing values. Additionally, in this phase, the findingsand concepts that were beyond the initial scope are discussed. This was followed by a depiction of the process in Figure 4.

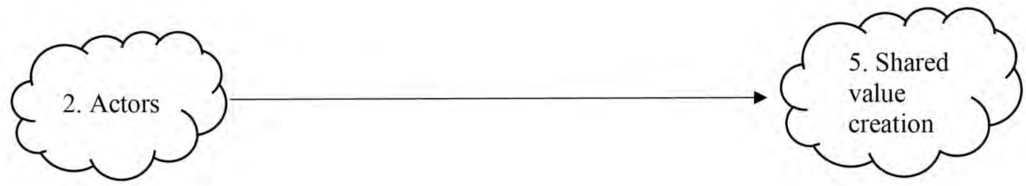
4.1.1 Which values are created and how?



When examining the Multi-Value-Multi-Actor Model, it can be seen that energy cooperatives are, in general, just as expected, shifting across all of the values towards cell 2 (see Figure 3). An explanation of this process follows in this section. First of all, the social values are prevailing in the cooperatives' operations. Cooperatives mostly mention the importance of inclusion, fairness, and honesty to activate citizens to build an energy system together and for everyone. Additionally, involving the local area and investing in social causes by giving out subsidies, free advice, donating shares, and or/ raising awareness by educating students is considered to be important. Furthermore, the core operation of every cooperative isgenerating renewable energy and ecological values such as a new energy society and CO2 savings and focusing on the climate are often prioritized. Lastly, cooperatives mention that economic goals are not a priority, however, financial health is often an important condition forachieving ecological and social values. They state that a well-regulated organization and finances will increase trust and convince members, investors, and partners to participate. A high return is considered to be important for investing in social, ecological, cultural projects, improving the local area/ economy and improving the access to capital for citizens.

Conclusively, cooperatives create/ move across all of the values in the Multi-Value- Multi-Actor Model, while the values are all interrelated/ connected, and an interplay is required to achieve shared value creation, which was expected from the literature (Jonker, 2012; 2018; Porter and Kramer, 2011). More specifically, the dynamics between social values (fairness, inclusion), ecological values (renewable energy), and financial values (influencing profit/ price,capital shifts) are crucial for achieving an overarching goal of redesigning the current energy society. However, in literature, it remains ambiguous whether there is a causal link between social commitment and financial progress and whether this results in win-win opportunities (Porter et al., 2012; Wieland, 2017; Crane et al., 2014). In reality, mostly win-win opportunities were mentioned, although one trade-off was visible. In cooperatives, the needs of the memberscome first which leads to considering different motivations that could sometimes hinder creating shared value. Explained by the conflict theory that states that negative outcomes of conflicts are especially effectuated when norms and values are at stake (Ayub & Jehn, 2014).

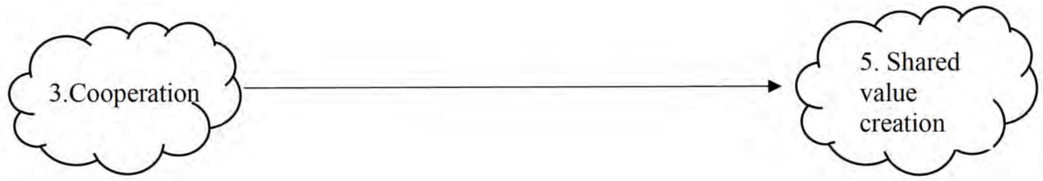
4.1.2 Which actors are involved in the creation of value, and to what extent?



When analyzing the actors involved with the Multi-Value-Multi-Actor Model, it was ascertained that, just as expected, energy cooperatives are involving a broad range of actors andpositioned around cell 2 (see Figure 3). An explanation of this process follows. First of all, cooperatives are positioned in the civil society cell while, in cooperatives, citizens are organizing themselves and setting up a community to create shared value as a community bases business model (Porter, 2018). Inside the cooperative, daily management is mostly executed bythe board. However, in the more professionalized cooperatives, there is a division of roles, dailymanagement is carried out by the work organization, and the board is in charge of supervision/strategic decisions. According to most cooperatives, members are involved in critical decisions,financing (co-owner), and the needs of the members come first. Surprisingly, cooperatives are, in reality, less democratically owned than research suggests (ICA, 1995) since they have no pure form of citizen participation and only minimally involve members in decision making. This has several reasons: unburdening members with formalities, no added value, time-consuming, difficulty in establishing extensive participation structure, and progressing less quickly, which is known in literature as the disadvantageous aspects of democratic processes (Harrisson & Freeman, 2004). Thus, little involvement and participation are mostly considered beneficial in (speeding up) the process and making more impact, contradicting the theory of Yildiz et al. (2015), where participation is considered to be important in the success of cooperation.

Just like literature, cooperatives stress the importance of involving diverse actors across the entire matrix/ societal sectors to create shared value which leads to a positioning on the rightside of the Multi-Value-Actor matrix (Jonker, 2012; 2016; 2018; Sedlacek & Gaube, 2008; Gertler, 2001; 2004). Cooperation among cooperatives plays the most significant role, which was expected since they share cooperative values, a similar philosophy, and a common goal (ICA, 1995). Joint operations with cooperatives are a way to share knowledge, share support, accelerate learning, share products/ services, share local anchoring, and apportion financing to ultimately create more value together. Cooperatives also mention collaboration with other partners from the private sector: non-profit organizations, technical/ commercial partners, banks, overarching organizations and so on to fulfil specific needs and creating more shared value. Another crucial and often mentioned partner that cannot be ignored is the (local) government. They are the owners of many roofs and presenter of opportunities/ projects. Theycan be of assistance with increasing the network, and they are involved in distributing subsidiesor loans to be able to begin right away, hire an employee, or finance projects. Confirming the statement of Eversole (2010), bottom-up change still needs institutional allies to overcome barriers and access resources. Additionally, municipalities are either ambitious or forced to transition to renewable energy which they cannot do by themselves. This results in a major rolethat cooperatives are able to fulfill in impactful (private-public)

4.1.3 How do the actors cooperate?

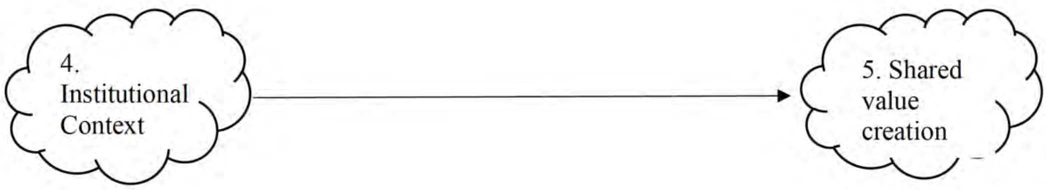


The cooperatives mention the importance of having close contact, harmonious relationships, a constructive way of working, and focusing on a common goal inside the cooperative for successful cooperation towards creating shared value. Different views about the direction could creation natural tension, however, just as the conflict theory suggest, this is sometimes necessary to grow (Pondy, 1967). Furthermore, the needs of the members come first, which sometimes leads to considering different motivations and/ or conflicts of interest that could hinder successful cooperation towards a specific value.

The (local) government is generally considered as an important partner, but the smoothness of the cooperation varies, and conflicts do arise. This is primarily because the government is perceived as unreliable, inconsistent across different political levels, and as having a low continuity of policy, preferences, and people. Cooperatives consider adaptabilityand flexibility beneficial in mitigating these conflicts, which is in accordance with the conflicttheory (Pondy, 1967; Yildiz et al., 2015). On the other hand, cooperatives mention that the inability to adapt and cautiousness of the government about working together with the "new" cooperatives complicates the cooperation. In literature, this is explained by the idea that differences in core business, values, and strategies create tensions and consequences for the success of the public-private partnership (Klijn & Teisman, 2010). However, cooperatives alsomention the close and impactful (public-private) collaboration that they have with the government. There is a mutual dependence while the municipality has a common goal and usesthe cooperatives to execute these as they cannot do it themselves. Additionally, a couple of cooperatives acknowledge the advantages of having a contact inside the local authority that helps them to procure projects.

Similar to cooperation with public sector partners, a common goal and similar (cooperative) values are the most important predictors for a successful cooperation with privatesector partners, which is aligned with literature (Pennink, 2004; Klijn & Teisman, 2010). Cooperation with other cooperatives is considered to be most fruitful since they meet these criteria, which can be traced back to the ICA principles (ICA, 1995). Most of the cooperativesdo not exclude other private sector partners (commercial, technical, non-profit, etc.) from sharing projects, knowledge, and experience and to ultimately achieve their goals/ make moreimpact. However, cooperatives experience that different ideologies, values, characters, phases of maturity, expectations, core businesses, strategies, and method of working between private sector partners can negatively influence the success of cooperation. This also reflects the literature in which negative outcomes of conflict are especially triggered if norms and values are at stake and when different philosophies/ motives play a role (Ayub & Jehn, 2014; Tabellini,2008; Selsky & Parker, 2005).

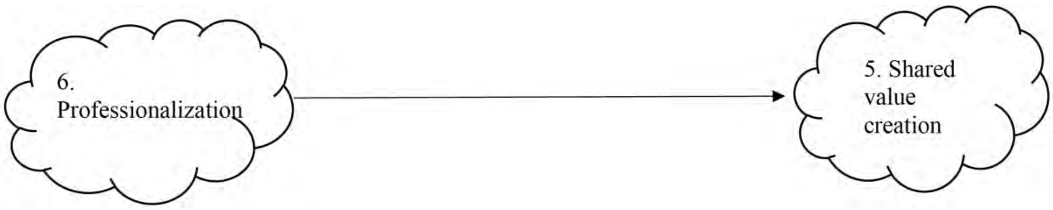
4.1.4 What is the institutional context, and how does this differ across countries?



In the Netherlands, the regulative context is generally perceived as unreliable as the government has a low continuity of regulations, people, preferences, policies, and unaligned political levels which can complicate the creation of shared value. Cooperatives perceive adaptability, understanding of the law, and flexibility to be beneficial to overcome these challenges. This is in accordance with literature since Eversole (2010), mentions that it is reallyvaluable to learn the language of institutions, participate in their procedures, and acculturate to their institutions to obtain resources and support. Cooperatives also mention high financial barriers and outdated legislation. However, they also mention financial support of authorities in the form of subsidies for difficult projects, compensation of an employee, or applying for a subsidy together. In the Netherlands, citizen participation is institutionalized, and citizens/ initiatives are invited to participate in realizing the regional energy strategies (RES) as experts,residents or representatives. This confirms the "participatory governance approach" of the Dutch Government where private actors are now involved in non-hierarchical political structures (Jonker, 2016; Finke, 2007; Scherer & Palazzo, 2007). This resulted in a major role for one cooperative in a public-private partnership and the ability to create more shared value.However, in reality, the Netherlands is still a long way from the participatory society while most cooperatives mention top down plans or little involvement of the Dutch municipality (Koster, 2014).

The regulative context in Belgium is considered to be even more problematic. While the cooperatives themselves are progressive, legislation is inadequate and limiting them in their operations and ultimately in creating shared value. Legislation is particularly limited in these areas: solar sharing is not allowed, it is impossible to provide energy to people in energy poverty, there is no distinction is being made between commercial companies and cooperatives(same financial benefits, unfair competition), and no possibility to receive direct subsidies. Allin all, Eversole (2010) makes a valid argument: bottom-up change still needs formal institutional allies to help overcome barriers that communities cannot shift for themselves andto access resources not available any other way. In Belgium, there are no signs of the so-calledparticipatory society that is included in EU policy (Finke, 2007). In general, Belgium cooperatives do not feel support from the government for bottom-up movements and legislation, in particular, the absence of citizen participation hinders the creating of shared valueof cooperatives. Although it is expected that legislation is changing soon, the major covenant of the EU forces authorities in Belgium to commit to energy targets and formalize citizen participation in the energy transition.

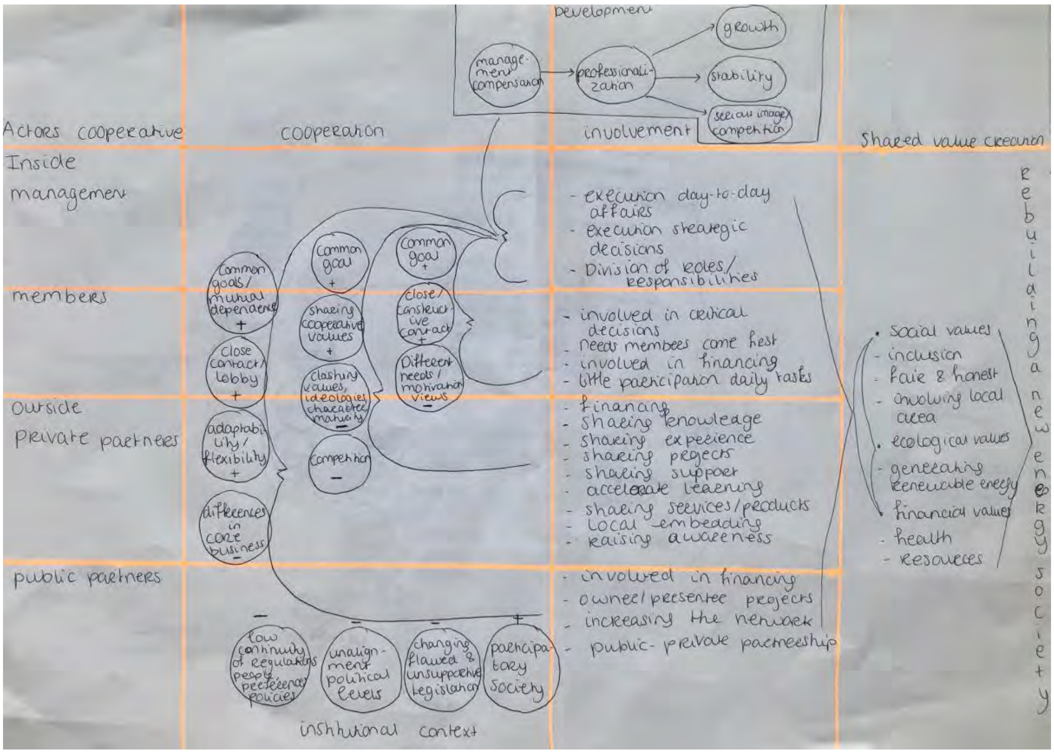
4.1.5 Findings beyond the initial concepts; an extra variable in the process



From the general information and questions about the cooperatives' development, an important finding beyond the initial scope can also be derived. An interesting finding was: the need for professionalization to successfully grow, change, compete, be taken seriously by members, investors, and other stakeholders, to ultimately create more shared value. Management compensation is considered important in order to be able to shift from working with volunteers to hiring employees and ultimately professionalize. Professionalization in a cooperative generally leads to a better governance structure with a division of roles/ responsibilities, less involvement of members, competing with the same resources, having finances in order, more growth, more stability, and a more serious image. The smaller cooperatives emphasize the importance of compensation of employees to not only share knowledge in their own time, compete with the same resources, be less dependent of subsidies to eventually fuel growth, and a more serious image. The bigger cooperatives emphasize the importance of professionalizing as an actual stable business with a clear governance structure, compensated/ professional work organization, and no volunteers as they commit to long term investment and big contracts. In the next paragraph we will include this extra variable in the development of the causal model.

FIGURE 4

From the process of sharing values to a causal model



4.2 How is more or less shared value created? – Building the causal model

In this section, the aim is to explore the causal linkages and connections between the concepts in order to inform practitioners and managers about which variables to manipulate toget more or less shared value. First, the variables are explained in Table 3, subsequently a ready-to-test causal model is developed, see Figure 5.

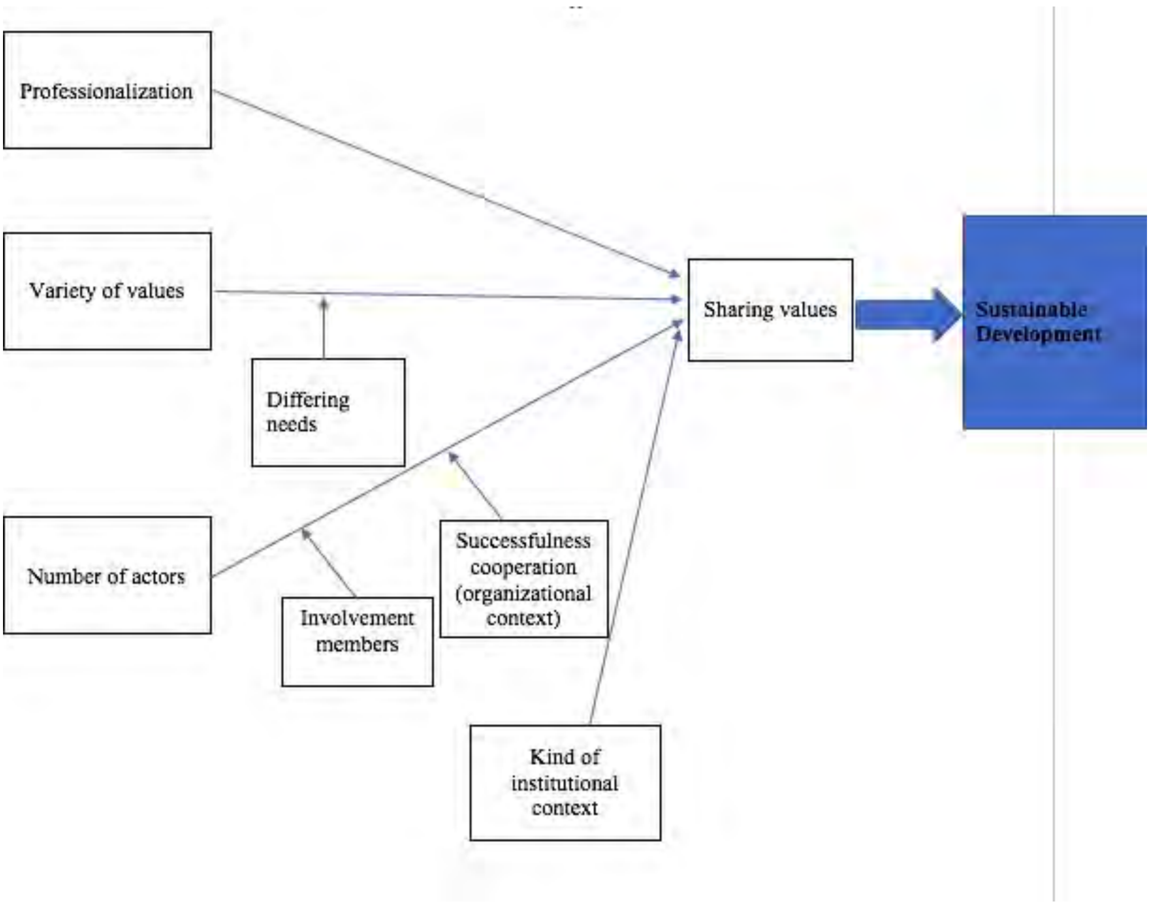
TABLE 3

Explanation variables causal model

Dependent variable	**Sharing values** *Ranging from a little to a lot* Gaining an understanding of the dynamics that ultimately lead to more or less sharing values
Independent variable	**Professionalization** *Ranging from a little to a lot* Professionalization is mostly fueled by management compensation and it generally leads to: a better governance structure with a division of roles/ responsibilities, less involvement of members, competing with the same resources, having finances in order, more growth, more stability, and a more serious image, to ultimately be able to create more shared value
Independent variable	**Variety of values** *Ranging from a little to a lot* The inclusion and interrelation of more values (ecological, social, financial) besides only profit results in more sharing values
Moderating variable	**Differing needs members** *Ranging from a little to a lot* More differing needs can limit the creation of sharing value, while the needs of the members are the highest priority and the cooperative has limited mandate to invest freely.
Independent variable	**Number of actors** *Ranging from a little to a lot* In general, collective action and including a broader range of actors are core features that allow for more sharing values
Moderating variable	**Involvement members** *Ranging from a little to a lot* High involvement of members is considered to negatively influence the creation of shared value (time-consuming, not useful, progressing less quickly), while low involvement of members is considered to be beneficial for creating more shared value.
Moderating variable	**Successfulness cooperation (kind of organizational context)** *Ranging from unsuccessful to successful cooperation* Clashing values, different philosophies, and/ or different motivations will weaken the success of cooperation to create shared value. While, sharing similar (cooperative) values and a common goal strengthens the success of cooperation with people in and outside the organization.
Independent variable	**Kind of institutional context** *Ranging from a top down unsupportive institutional context to a participatory/ supportive institutional context.* A traditional top- down institutional context, with no citizen participation or unsupportive legislation regarding bottom-up initiatives negatively influences the ability for cooperatives to create shared value. On the other hand, governments that shift to a participatory society and involve the private sector in the energy transition positively influence the ability for cooperatives to create shared value.

FIGURE 5

Causal model for sharing values

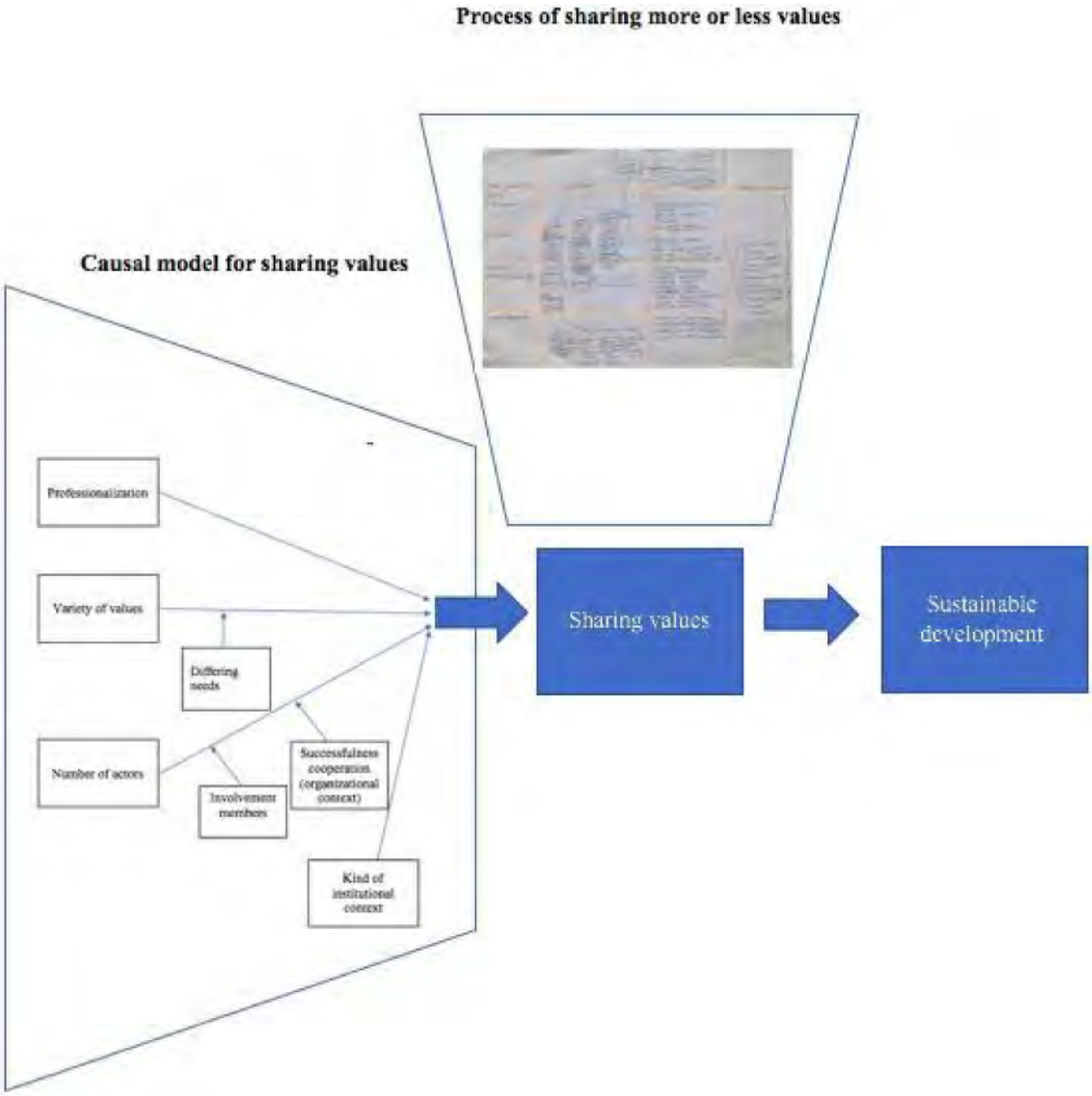


4.3 Building the final theoretical model

In this section, we merged both the process and the causal model into the baseline model(Figure 1), to ultimately develop a comprehensive final theoretical model (Figure 6). This model allows us to see the coherence and importance of combining both the process and the causal model to gain a deep theoretical understanding of the Creation of Shared Value. 101

FIGURE 6

Final theoretical model



5.CONCLUSION

This research is aimed at creating a deeper theoretical understanding of the creation of shared value in new business models to stimulate sustainable development, by developing an all-encompassing theoretical model. While frameworks and models are already scarce in this infant field, we uniquely contribute to the knowledge/ understanding in two new ways that areinseparable (Austin & Seitanidi, 2012; Von Liel, 2016; Husted & Allen, 2007). The first is by gaining an in-depth understanding of the process of sharing values in the field's richness. The second is by providing a causal model to show practitioners and researchers which variables tomanipulate to get more or less shared value. This phenomenon has been addressed by interviewing eight energy cooperatives in the Netherlands and Belgium. The primary findings were the following. In general, the cooperatives are moving from cell 1 to cell 2 in the Multi- Value-Multi-Actor model, while a higher variety of values and including more actors is considered to lead to more sharing values, which was in line with existing research. However,after looking into the dynamic processes of sharing a variety of values with different actors, this research identified new moderating variables: differing needs of the members, involvementof the members and the success of cooperation. Lastly, two new independent variables were identified: professionalization and kind of institutional context, that explain the ability of cooperatives to create shared value.

5.3 Implications

This research contributes to the existing literature in two ways. First by developing a new theoretical model, which could be used to map the dynamics, causal linkages and the process of creating shared value in an organization. Second, it informs researchers and practitioners about the (new) variables that play a role in the creation of shared value. For theory, this provides a direction to apply the model in other types of organizations or in other research designs/ methods to substantiate the identified causal linkages or to find alternative causal linkages and eventually establish propositions that are more valid. Consequently, this could afford more insights into the conditions, success factors, and characteristics of the shared value process. This could eventually have managerial implications, because this provides more guidance for managers in influencing/manipulating certain variables to successfully create shared value.

5.4 Limitations

A theory based on the eight case studies was developed, however, the authors cannot generalize to populations. Furthermore, our triangulation tactic was limited, since we used limited variation in data collection procedures and we did not use investigator triangulation dueto covid-19 and time constraints (Johnson, 1997). This could lead to a higher risk of bias in thisstudy which could impose threats on reliability and validity (Johnson, 1997). Additionally, by mainly interviewing people that are managing a cooperative, the added value may have been missed of different data sources that provide additional reasons or different perspectives (Johnson, 1997). This can also negatively influence the internal validity. Moreover, using case study research to test causal hypotheses is risky, since cases studies are considered to have a low internal validity, making it difficult to rule out competing causal explanations and generalize the findings from a single case to the population at large (Runyan, 1982; Stoecker, 1991). However, case studies are considered to be useful for suggesting causal relationships which should be tested through more rigorous experimental research (Runyan, 1982). Additionally, two different countries were compared based on only their regulative institutionaldifferences whereas other factors like cultural differences were excluded which could provide alternative explanations. Lastly, the relationship between the creation of shared value and sustainable development has remained largely underexposed.

5.5 Avenues for future research

Conclusively, in the future, it would be valuable to shed light on the relationship between the creation of shared value and sustainable development. Also, it would be beneficialif the suggestions for causal relationships were tested in a more rigorous experimental setting, or even in other research designs/ organizational contexts to exclude alternative rival causal explanations. Furthermore, the institutional context is identified as a new independent variable,therefore it would be intriguing to explore the influence of the institutional context of other (non) European countries on the creation of shared value. It would also be an opportunity to look beyond the regulative institutional context and also analyze the cognitive and normative pillar. Additionally, professionalization has been identified as a new independent variable, which could be valuable to conclude in future research. Lastly, in this research, the author's examined the shared value process in cooperatives, but it would be interesting to capture other actors' perspectives in the network and see whether their process, dynamics and moderatingvariables differ.

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Envisioning Value(s) / Championing Complexity

Situating Ethnography in the Presence of Business Model Innovation

Peter A. Lutz[1,*] and Maya Hoveskog[1]

[1]Halmstad University, Halmstad, Sweden

*peter.lutz@hh.se

Abstract

This paper presents a study of how qualitative ethnographic data contributes to sustainable business model innovation. It draws on empirical examples from an interdisciplinary and multi-stakeholder workshop in the context of a research project concerning the design of an open services platform for sustainable multimodal mobility. Of particular interest here is how complexity—addressed through qualitative ethnographic data—is translated in a business modelling context. The paper concludes with a set of recommendations to better enable the uptake of complexity for business model innovation in multi-stakeholder, interdisciplinary project teams.

Keywords

Ethnography, business model innovation, complexity, value, mobility.

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INTRODUCTION

Business model frameworks are traditionally used to figure chains of value (aka profit) between the business and its consumers. More recently, scholars of business model innovation challenge these profit-normative and linear conceptions of value. Instead, they argue for more nuanced notions in both kind and scope—in other words, a better account of complexity. One driver is how multi-stakeholder interests generate different and even competing value perspectives. Another is how the lens of sustainability sheds light on previously unrecognized but nevertheless essential elements of the business landscape. For some time now, businesses have employed ethnographic-inspired methods to gain insight into customer behaviors and attitudes, thereby strengthening their strategies and offerings. Yet the study and adoption of said approaches for business model innovation more explicitly has remained limited. This paper contributes to such a move. It draws on empirical examples from an interdisciplinary and multi-stakeholder research project (OSMaaS) that explores the design of an open services platform for sustainable multimodal mobility, including the innovation of appropriate business models. In focus here is how complexity—addressed through qualitative ethnographic data—is translated in a business modelling context. It concludes with recommendations for better enabling the uptake of complexity for business model innovation in multi-stakeholder, interdisciplinary project teams.

Business models for sustainability is an emerging field of study with an exponentially growing number of publications. It focuses on the research and practice of understanding and developing new forms of value creation which offer sustainable propositions to customers and all other stakeholders, and which allow firms to generate economic value while maintaining or even regenerating natural, social, and economic capital (Lüdeke-Freund *et al.*, 2019). In one sense, business models for sustainability go beyond a mere customer value proposition (Patala *et al.*, 2016) and try to address a range of complexities and external factors (Lüdeke-Freund *et al.*, 2019). Similarly, Breuer *et al.* (2018) define several guiding principles for sustainability-oriented business model innovation. These include sustainable orientation, extended value creation, system thinking and stakeholder integration. The authors also outline several process-related criteria for achieving such business model development including extended business model components, context-sensitive modelling, collaborative modelling, and impacts and outcomes management.

The adoption of ethnography and other qualitative methods show promise along these lines (Laasch, 2018). An ethnographic approach can render visible complex systemic relations and contextual dimensions that challenge preconceptions about customer values as well as implicit tensions between customer and producer values. It may also elucidate diverse stakeholder voices which easily become silenced in traditional business modelling processes. This paper follows suit. It relates a study involving the translation of qualitative insights for a business modeling process, specifically using a conventional business modelling tool - the Value Proposition Canvas (Osterwalder *et al.*, 2014) in the context of a multi-stakeholder research project.

METHODOLOGICAL APPROACH

An interdisciplinary research project OSMaaS (Open and Self Organizing Mechanisms for Sustainable Mobility as a Service), based at Halmstad University, served as the context of this study. OSMaaS brings together several Swedish industrial partners from the transportation industry and three research groups including Business Model Innovation, Design Ethnography and Technical Design. With this interdisciplinary approach, the project aims to develop open platforms that offer individuals a choice of transportation means depending on their needs, as well as to explore ways to shift from personally owned modes of transportation towards mobility as a service (MaaS).

In this project context, a two-hour, multi-stakeholder workshop was facilitated to explore the translation of complex qualitative research material consisting of semi-structured interview data. The workshop took place in spring 2021, during the COVID-19 pandemic. Accordingly, the workshop was held remotely with video conferencing and an online whiteboard application for the group work. A total of 16 participants (eight industry representatives and eight university academics) participated in the workshop. The participants were divided in three groups for the group work, each consisting of at least one industrial representative and one academic. All participants were familiar with the OSMaaS project, including knowledge of the MaaS concept and business model innovation.

A two-page personal summary of “Jamilah” (pseudonym), extracted from one of 12 semi-structured interviews about local travel routines, was provided for the workshop. The summary presented details about her daily life. Jamilah is a 37-year-old woman, married, with three children (ages three, seven and nine). She has no other family in Sweden and arrived as a Somalian refugee ten years ago. She prefers walking and use of public transportation for her long-distance commute to work and university studies. She does not drive or own a car. She is careful about her diet and exercise due to her type 2 diabetes. She also spends a significant amount of time grocery shopping.

To avoid possible confidentiality issues among the industrial partners, the authors developed a hypothetical business case – EZ-Rides – to better facilitate the group work and workshop discussions. EZ-Rides was presented as an international pioneer in driverless vehicle solutions including autonomous passenger and goods transportation. Their clients include transport operators, city authorities, airports, corporations, business parks, and universities. Product and service include driverless passage shuttles, autonomous tow tractors, and multiplatform software solutions.

With this information, the workshop participants were instructed to translate Jamilah’s story into the Value Proposition Canvas, a conventional business modelling tool, during the two-hour workshop. This exercise consisted of a.) annotating Jamilah’s story; b.) identifying Jamilah’s key gains, pains, and needs; c.) agreeing on an actionable focus; and d.) creating a value map by formulating the gain creators, pain relievers and a product-service bundle for EZ-Rides. Following this, each group presented short summaries of their group process, and finally a roundtable discussion concluded the workshop. The workshop was recorded and transcribed, and the transcripts were coded for the interpretive analysis.

KEY INSIGHTS

This exercise produced several interesting insights regarding the question of how complex qualitative ethnographic data relates with sustainable business model innovation. While all groups used the same qualitative data and followed the same modelling process, distinct similarities but also differences emerged. One similarity was that all groups highlighted Jamilah's shopping routines. In her interview, for instance, she expressed a habit of grocery shopping several times a day: "When you go shopping the thing is that you don't buy everything at once. You forget a few things and then you remember, 'Oh no, I forgot something again!'" This inspired all groups to consider how they might develop products and services around shopping. However, some groups offer additional ideas. Since she enjoyed walking so much, one group considered a home delivery service that could deliver in real time to allow her more walking and shopping time while relieving the effort of carrying her purchases home. While all groups considered shopping as an appropriate activity for ideation, one group in particular made it their sole focus. As they explained during their group presentation: "We didn't take commuting to school or work into consideration. Our point of focus became the grocery and goods shopping." However, the other groups made an effort to understand and reflect on the broader context of Jamilah's life. For instance, one group considered how an autonomous vehicle might assist her with the transportation of her children as they grow up, since she does not drive.

Additional discussions emerged around the inconsistencies and complexities of qualitative ethnographic data. This prompted one group to question the reliability of the data since it was based solely on personal statements. Admittedly, Jamilah's interview offered rich details about her life, but the interview took place on a particular date and time. Ideally the data would have been triangulated in some way, or consist of multiple interviews throughout a week, month, or year. As one participant explained, "It's a static type of information, here and now, but it can change very much just by moving around." Yet, similar questions could and even should be asked of quantitative data, which are often based on narrowly designed surveys, or even big data which can discern general patterns, but which often only make sense at the more general or large-scale level. This is arguably also one of the strengths of complex and situated qualitative ethnographic data, which demand contextual and interpretative reflexivity.

A good example of such reflexivity surfaced during the roundtable discussion. For instance, the members of one group commented particularly on how Jamilah's story inspired them to begin questioning their own assumptions about efficiency and cultural differences in relation to the business modelling activity:

We have these assumptions that everything must be very efficient. When we started to think about value propositions, they were based on the idea of efficiency, but then we realized that [Jamilah] really wants to go to the shop four times a day. In Sweden, efficiency is a key ideal but in [other countries it may be] very different. […] So, it's like efficiency is a cultural thing.

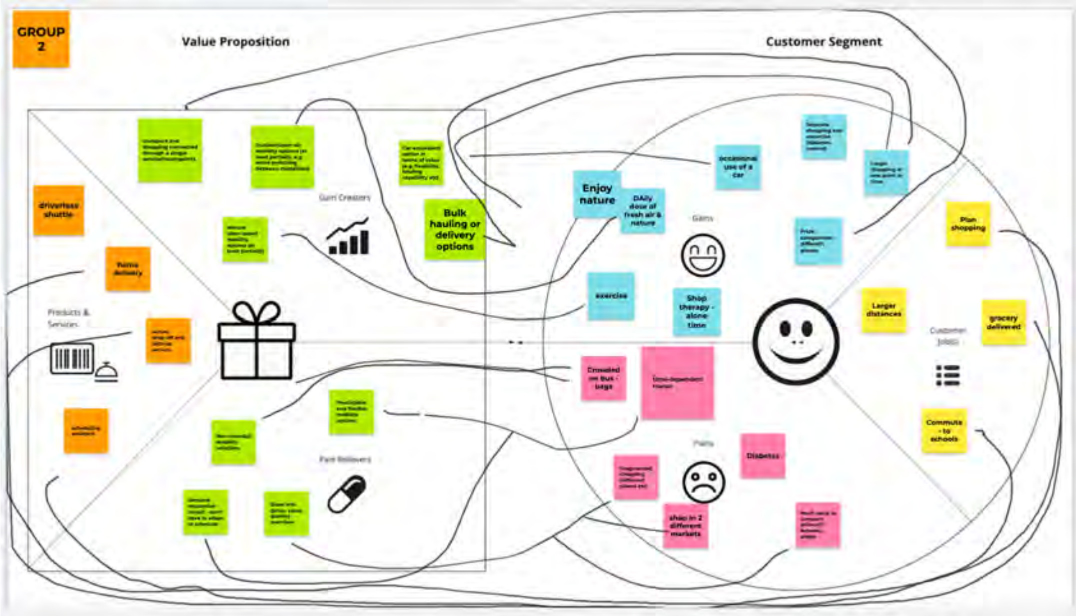

Figure 1. Translating ethnographic data in the Value Proposition Canvas.

Such reflexive moments, similar to what Strathern (1999, p. 6) has coined "the ethnographic moment", was a key outcome of the workshop and illustrates the value ethnographic-inspired approaches can produce for business modelling.

DISCUSSION AND CONCLUSIONS

This paper provides a sketch of how the translation of complex qualitative ethnographic data may offer unique challenges and opportunities for sustainable business model innovation. Echoing Breuer *et al.*'s (2018) argument, it shows how such data may provide a contextual and reflexive space for stakeholder integration and collaboration, as well as context-sensitive modelling that can extend beyond the short-term financial viability (i.e., business-as-usual). In closing, this paper offers a few recommendations for enabling the uptake of ethnographic complexity for sustainable business model innovation in multi-stakeholder, interdisciplinary project teams.

A. Ensure the qualitative data is sufficiently complex to produce reflexive discussions, yet not overly complex to produce confusion. Jamilah's story consisted of excerpts about various aspects of her life including her family, daily routines such as shopping, commuting, and more. Obviously, more data could have been introduced for triangulation purposes or otherwise. Yet, given the two-hour workshop format, additional data would also require more time and attention for analysis. In "agile" business settings, this is often an unrealistic luxury. More is not necessarily better. The real value here is the quality and depth of reflections that contextual, qualitative and/or ethnographic data can trigger in business modelling settings.

B. Similarly, qualitative data may produce resistance among stakeholders more accustomed to working with quantitative data. Discussions about the pros and cons of both data types, as well as their different purposes and depths of field, are essential to imbue a more thoughtful and reflective discussion. At the same time, it is important to remind participants that all data are inherently situated and contextual.

C. Business-minded participants will likely gravitate towards familiar topics, assumed generalizable for a majority of consumers. In this case, the topic of shopping offers one such example. While shopping has obvious business implications for product and service design, reflections on the environmental impact of such activities remained absent in the discussions. For instance, at no point was there a connection made between grocery shopping and how a more sustainable diet or consumption could be achieved. A lesson learnt here then is that systemic perspectives must be introduced explicitly to ensure the consideration of ecological relations and how business modelling can resonate with them.

D. Complex qualitative data, in the form of ethnographic vignettes or stories, can provoke business modelers to reflect not only on the values and lives of the research subjects (or "informants") but equally important, it can also provoke reflection and questioning of how their own values and assumptions may bias the business modelling process in unintentional ways. In this case, different perspectives on "efficiency" and its value for business model innovation were problematized. Additional experimentation with a variety of ethnographic sources could help surface such latent values, easily presumed universal.

This paper has argued that the adoption of qualitative ethnographic studies in the business model innovation process holds promise for providing both practitioners and researchers with new ways of analyzing and theorizing the proposition, creation, exchange, and capture of value(s). Additional research will show how ethnography can best enable the consideration of complex socio-technical relations for sustainable business model development, as well as the diversity of alternative logics and perspectives that position our world(s) with hopes for a better future. Herein lies the value of ethnography: it offers glimpses into the ongoing and increasing complexities which we all must face.

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Epilogue

We have less than ten years left to successfully meet the United Nation's 17 Sustainable Development Goals (SDGs) and many researchers, business leaders and policy makers are aware that there is a serious risk that we will not achieve these objectives in time.

We, as the NBM research and practice community, have together accumulated a large and valuable knowledge base which we have further advanced through the discussions at every single conference from the International New Business Models Conference series. This knowledge can support the advancement of the speed and scale of the progress towards the urgently needed radical social and economic transformation. Therefore, we carry a great responsibility to further and widely disseminate our work during and beyond the 6th International New Business Models Conference, organized by Halmstad University, dedicated on the SDGs - New Business Models in a Decade of Action: Sustainable, Evidence-based, Impactful.

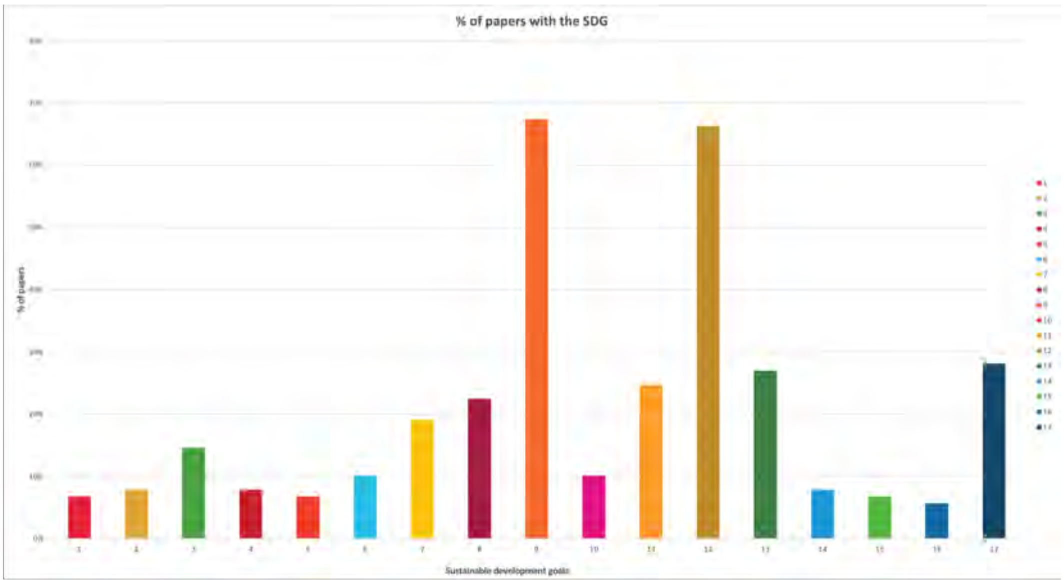
During the two pre-conference and three conference days that make up the NBM@Halmstad2021, great contributions and innovative ideas were organized into four themes, six keynote speeches, four panel debates, six action-oriented workshops and a doctoral workshop:

- Theme 1: Exploring the system level
- Theme 2: Exploring the sectoral and organizational levels
- Theme 3: Exploring organizational impact
- Theme 4: Exploring theoretical and methodological foundations
- Workshop 1. A new digital tool for gender equal organizations and operations
- Workshop 2. Power Tools for Collaborative Modelling of Socioeco-Sustainment
- Workshop 3. Using Patterns to Design Sustainable Business Models
- Workshop 4. The future of sustainable entrepreneurship research
- Workshop 5. The future of sustainable entrepreneurship teaching and consultancy
- Workshop 6. Co-Creating a collection of sustainable business model design practices to support start-ups

The ideas presented in these proceedings of NBM@Halmstad2021are valuable contributions to the field. It is visible that the collection of papers touches upon all 17 SDGs. However, two SDGs seem to be more in focus of the work presented in these proceedings with over 60% of the papers each – SDG9: Industry, Innovation and

Infrastructure, and SDG12: Responsible Consumption and Production. See Figure 1 for detailed distribution of the papers, organized by SDG as reported by the authors themselves.

Figure 1: Distribution of papers



Since its start the International New Business Models Conference series have explored different topics which are also making valuable contributions. The first NBM-conference, NBM@Toulouse2016, was organized at Toulouse Business School and focused on Exploring a changing view on organizing value creation. The second, NBM@Graz2017 at the University of Graz, covered the topic of Exploring a changing view on value creation: Developing New Business Models. The third, NBM@Sofia2018 at the University of National Word Economy in Sofia, discussed the subject New Business Models with impact: focused, scalable and international. The fourth, NBM@Berlin2019 at ESP Europe Business School in Berlin, had the theme New Business Models for Sustainable Entrepreneurship, Innovation, and Transformation and the fifth, NBM@Nijmegen2020 hosted by Radboud University in Nijmegen focused on New Business models – Sustainable, Circular and Inclusive. However, in the research field of New Business Models for Sustainability, there are still many topics in which our community can contribute to with more research as well as with knowledge dissemination. This is where the vital role of the International New Business Models Conference series is - to convene the NBM research and practice community and channel the advancement of the knowledge base in topics such as, for example:

- Providing more empirical studies using the concept of collaborative sustainable business modelling to increase the chances of successful sustainability transition.
- Better understanding of how consumers' sustainability orientation and engagement contribute to the transition to a sustainable and circular economy.

- Learning from existing good practices about how to support the implementation of sustainable business model innovations based on digital platforms.
- Exploring new insight to the current discussion on business model innovation for sustainability on different levels (firm, network, ecosystem).
- Gaining a deeper understanding about transformation design methods and tools for all kinds of organizations to generate long term sustainability effects and impacts.
- Further stimulating the theoretical development of new business models for sustainability by combining different points of views in an interdisciplinary setting
- Carry out more empirical research on business model experimentation and implementation in different industries to facilitate a successful transition to sustainable development and a circular economy

Based on the already existing and excellent research in the broader topic of new business models contributing to sustainable development, we are already planning and looking forward to next year´s conference: The 7th International Conference on New Business Models in Rome, Italy - NBM@Rome2022. More detailed information will be disseminated as soon as possible throughout the next year! If there are any questions, please feel free to contact Professor Laura Michelini and her team: l.michelini@lumsa.it.

Finally, during the preparation of this conference and while reviewing all submissions, we understood the importance of the community, teamwork and the need for many different skills. That's why we want to say thank you to the NBM community and many people without whom this conference would not have been possible. Special thanks go to Christa Amnell, Ulrika Hult, Fredrik Panzio, Jenny Högström, Ulf Karlsson, Slobodanka Arsenic, Alireza Esmaeilzadeh, and Harvey Blanco Rojas. Of course, special thanks also go to Romana Rauter and Florian Lüdeke-Freund, as well as to NBM Conference board who have been supporting us on the journey of organizing this conference!

We are looking forward to seeing you next year in Rome!

Fawzi Halila and Maya Hoveskog, Conference Chairs

Conference Founder

Jan Jonker
Professor of Sustainable Entrepreneurship
Nijmegen School of Management
Radboud University Nijmegen
The Netherlands

Radboud University

Our Common Future 2.0
ROADMAPS FOR OUR FUTURE SOCIETY

Conference Team @ Halmstad University

Maya Hoveskog – Conference Chair
Associate Professor in Innovation Management
maya.hoveskog@hh.se

Fawzi Halila – Conference Chair
Associate Professor in Industrial Organisation
fawzi.halila@hh.se

Christa Amnell
Communications Officer

Ulrika Hult
Event Co-ordinator

Harvey Blanco
FabLab Innovation Halmstad

Alireza Esmaeilzadeh
FabLab Innovation Halmstad

The bord of the International Conference series on New Business Models

Romana Rauter (Co-Chair)
Assistant Professor at the Institute of Systems Sciences, Innovation and Sustainability Research
University of Graz, Austria

Nikolay A. Dentchev
Associate Professor of Entrepreneurship and CSR at Vrije Universiteit Brussel (VUB) and KU Leuven, Belgium

Florian Lüdeke-Freund (Co-Chair)
Professor for Corporate Sustainability
ESCP Europe Business School, Berlin

Niels Faber
Assistant Professor at Circular Entrepreneurship at the Centre of Sustainable Entrepreneurship, University of Groningen, Netherlands

About Halmstad University

Halmstad University prepares people for the future by creating values, driving innovation and developing society.

Since the beginning in 1983, the University has been characterised as forward-thinking and cross-border. Halmstad University is known for its popular and reality-based programmes and small student groups.

Profile areas

Halmstad University conducts education and research within two profile areas, Health Innovation and Smart Cities and Communities, with a basis in three prominent doctoral education areas: Information Technology, Innovation Sciences, and Health and Lifestyle.

Education for the future

Halmstad University is known for its popular and reality-based programmes and small student groups. The University offers around 50 programmes and over 130 courses within several subject fields.

Research for innovation

The research at Halmstad University is internationally renowned and is pursued in interdisciplinary innovation and research environments. The University takes an active part in the development of society through extensive and recognised collaboration with both the private and public sector.

Collaboration for development

Halmstad University actively participates in social development through collaboration with both industry and the public sector. The University is repeatedly ranked among the best in the country in collaborating with employers. In Confederation of Swedish Enterprise's latest survey three of the top ten educations, in all categories, were at Halmstad University.

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Professors 53
PhD-students 82

Responsible Conference Chairs:
Associate Professor Maya Hoveskog
Mail: maya.hoveskog@hh.se

Associate Professor Fawzi Halila
Mail: fawzi.halila@hh.se

nbm2021@hh.se

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Kristian IV:s väg 3
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