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Sharing Economy Business Models

Addressing the design-implementation gap

Curtis, Steven

2021

Document Version:

Early version, also known as pre-print

[Link to publication](#)

Citation for published version (APA):

Curtis, S. (2021). *Sharing Economy Business Models: Addressing the design-implementation gap*. [Doctoral Thesis (compilation), The International Institute for Industrial Environmental Economics]. International Institute for Industrial Environmental Economics, Lund University.

Total number of authors:

1

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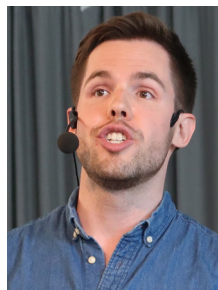
Addressing the Design-Implementation Gap

STEVEN KANE CURTIS | IIIIEE | LUND UNIVERSITY



The sharing economy is said to take advantage of under-utilised goods and services in our economy, contributing to more sustainable consumption. Yet, despite widespread claims in academia and the media, the sharing economy is not sustainable by default. Accommodation sharing may gentrify neighbourhoods and contribute to over-tourism; ridesharing can lead to congestion; and bikesharing and e-scooters have crowded our city streets and reduced pedestrian safety.

STEVEN KANE CURTIS engages in prescriptive and design-oriented research to support the design and implementation of sharing economy business models for sustainability. His research provides detailed elaboration to advance knowledge of the sharing economy and sustainable business models, while supporting managers, entrepreneurs, policy-makers, investors, and users interested in the sharing economy.



SHARING ECONOMY BUSINESS MODELS
Addressing the Design-Implementation Gap

Sharing Economy Business Models

Addressing the Design-Implementation Gap

Steven Kane Curtis



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DOCTORAL DISSERTATION

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To be defended at the International Institute for Industrial Environmental
Economics, Lund University. 14 June 2021 at 14:15

Faculty opponent

Frank Boons

Professor of Innovation and Sustainability
Director of the Sustainable Consumption Institute
University of Manchester

Organization LUND UNIVERSITY	Document name: DOCTORAL DISSERTATION	
	Date of issue: 14.06.2021	
Author(s): Steven Kane Curtis	Sponsoring organization: N/A	
Title and subtitle: Sharing Economy Business Models: Addressing the design-implementation gap		
<p>Abstract</p> <p>Despite sharing being a long-practiced form of consumption, the concept 'sharing economy' has emerged only recently. New business models have proliferated, utilising technology to reduce transaction costs and facilitate shared access. Societal actors have taken interest in the sharing economy, to reduce resource consumption, foster social cohesion, and support the economy. However, sharing economy business models facilitate a wide array of consumption practices, including sharing, renting, borrowing, lending, bartering, swapping, trading, exchanging, gifting, buying second-hand, and even buying new goods. Past academic research and media attention tend to focus on unicorns such as Airbnb and Uber. There is greater need to explore the diverse permutations of business models within the sharing economy, especially considering sustainability.</p> <p>However, a gap exists between the design and successful implementation of sharing economy business models. This research aims to advance and structure knowledge about the sharing economy and sustainable business models, by using business modelling methods to study the design and implementation of sharing economy business models. Inspired by design science, this research engages in prescriptive theory-building and design-oriented research to construct and evaluate design artefacts. Incorporating data materials from people, documents, and literature, the research strategies of grounded theory and desk research are utilised to support methods for data collection and data analysis.</p> <p>The research proposes a prescriptive definition of the sharing economy as a socio-economic system that leverages technology to mediate two-sided markets, which facilitate temporary access to goods that are under-utilised, tangible, and rivalrous. From this, four design principles guide the formation of the sharing economy business model framework, which capture three value dimensions, sixteen business model attributes, and eighty-nine configuration options. This research proposes a coherent design theory to support the conceptualisation of sharing economy business models for sustainability.</p> <p>Additional artefacts are developed to support the successful implementation of these business models. First, business model patterns provide the justificatory knowledge to select relevant business model attributes in specific contexts. Then, a systematic framework measures the social impact of sharing platforms across four aspects – trust, empowerment, social justice, and inclusivity. Finally, organisational response strategies to COVID-19 are established in the sharing economy.</p> <p>The primary contribution of this research is <i>conceptual</i>, with additional modest <i>methodological</i> and <i>empirical</i> contributions. Furthermore, the artefacts are intended to be useful for research and practice, including scholars, entrepreneurs, managers, policymakers, investors, users, and concerned citizens.</p>		
Keywords: sharing economy, sharing economy business models, sustainable business models, design science research		
Classification system and/or index terms (if any)		
Supplementary bibliographical information		Language: ENGLISH
ISSN 1402-3016 IIEE Dissertation 2021:2		ISBN 978-91-87357-70-1 (Print) 978-91-87357-71-8 (PDF)
Recipient's notes	Number of pages 275	Price
	Security classification	

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Addressing the Design-Implementation Gap

Steven Kane Curtis



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The International Institute for Industrial Environmental Economics
Faculty of Engineering | Lund University

ISBN 978-91-87357-70-1 (Print)

ISBN 978-91-87357-71-8 (PDF)

ISSN 1402-3016

Printed in Sweden by Media-Tryck, Lund University, Lund 2021



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Table of Contents

Acknowledgements	xiii
Abstract	xv
Popular Science Summary	xvii
List of Articles	xix
Article Contributions	xx
Other Publications & Presentations	xxi
Figures and Tables	xxiii
List of Figures	xxiii
List of Tables	xxiii
Abbreviations	xxiv
1 Introduction	1
1.1 Sharing Economy	2
1.2 Knowledge Gaps	3
1.3 Research Objective and Research Questions	5
1.4 Approach	5
1.5 Scope	9
1.6 Contribution	10
1.7 Audience	10
1.8 Disposition	11
2 Literature Review	13
2.1 Design Science Research	13
2.2 Sustainability Science	14
2.3 Business Models	16
2.3.1 Triadic Business Models	17
2.3.2 Business Model Patterns	18

2.4	Sharing Economy.....	19
2.4.1	Contestation	19
2.4.2	Origins in Literature.....	20
2.4.3	Sharing Economy Business Models	21
3	Methodology	25
3.1	Scientific Positioning	25
3.1.1	Philosophy of Science.....	25
3.1.2	Interdisciplinarity.....	27
3.1.3	Pragmatic Constructivism.....	29
3.2	Research Design.....	30
3.2.1	Conceptual Design.....	30
3.2.2	Technical Design	32
3.3	Methods	35
3.3.1	Methods for Data Collection.....	35
3.3.2	Methods for Data Analysis	39
3.4	Reliability and Validity	43
3.5	Ethical Considerations	44
3.5.1	Ethical Considerations in My Research Project.....	44
3.5.2	Ethical Considerations of My Research Field	45
3.5.3	Ethical Considerations in Academia.....	45
3.6	Methodological Reflection	46
4	Findings	49
4.1	Design Principles for Sustainable Consumption and Production.....	49
4.1.1	Definition.....	50
4.1.2	Concepts	51
4.1.3	Design Principles	53
4.1.4	Scoping the Sharing Economy.....	54
4.2	Design of Sharing Economy Business Models	55
4.2.1	Value Co-Creation	56
4.2.2	Value Dimensions.....	57
4.2.3	Business Model Attributes and Configuration Options	58
4.2.4	Additional Business Model Considerations.....	60
4.3	Implementation of Sharing Economy Business Models	61
4.3.1	Sharing Economy Business Model Patterns	61
4.3.2	Social Impact Framework.....	65
4.3.3	Organisational Response Strategies to COVID-19.....	67

5 Discussion	71
5.1 Addressing the Design-Implementation Gap.....	71
5.2 Environmental and Social Sustainability	74
5.3 Reflection	76
5.4 Future Research	77
6 Research Impact	79
6.1 Project Communication.....	80
6.2 Popular Science Publications.....	81
6.3 Presenting.....	82
6.4 Podcasting	82
6.5 Social Media	83
6.6 Teaching.....	83
7 Conclusion	85
7.1 Summary of Main Findings	85
7.2 Recommendations	87
7.2.1 Sharing Platforms	87
7.2.2 Users	87
7.2.3 Policymakers.....	88
7.3 Contribution to Research and Practice.....	88
7.4 Limitations	89
7.5 Concluding Remarks	90
References	93
Glossary	113

Acknowledgements

The PhD journey is not a solitary endeavour. I have had amazing people in my life who supported me in this journey, both professionally and personally. I feel so privileged to work with and learn from so many amazing people.

I would like to acknowledge my supervisors Oksana Mont and Yuliya Voytenko Palgan. I am especially grateful for their guidance and mentorship. I also want to thank the Urban Sharing team, including Andrius Plepys, Matthias Lehner, Jagdeep Singh, Lucie Enochsson, and Ana Maria Arbelaez Velez. Looking back, it is astounding what we accomplished together.

I would also like to thank all of my co-authors and collaborators, including Matthias, Oksana, Jagdeep, and Yuliya, as well as Alexandra Kessler. In addition, I am grateful for the support and inspiration provided by Professor Aurélien Acquier and Professor Florian Lüdeke-Freund. From them, I received valuable feedback on my PhD research during my midterm and final seminars, and whose work continues to inspire me today.

Thank you to the researchers and staff at the IIIIEE! The Institute has provided an enriching environment for research, learning, and self-discovery. I treasure the people and all of the moments we shared during my PhD, especially those among my officemates – Björn, Roland, Karolina, Frans, and Lucie – and other amazing PhD colleagues through the years – Emma, Katherine, Lisa, Anna-Riikka, Ana, Heather, Sofie, Leon, Julia, Katherine, Jessika, Jonas, Lars, and Alvar. Specifically, support buddies and our weekly check-ins have helped me survive working remotely.

I must specifically acknowledge the support and friendship of Sofie Sandin. I believe we enriched each other and contributed meaningfully to our community. Together, we were podcast co-hosts and collaborators in education, outreach, and socialisation. Teaching alongside you was a treasure and a treat. And, of course, I am continually inspired by our students, with their passion and determination to contribute to a better world.

I am grateful for the financial assistance provided by the European Research Council under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 771872) and Riksbankens Jubileumsfond (The Swedish Foundation for Humanities and Social Sciences) (Grant Agreement No. RIK161055:1). Additionally, a special thanks for the financial contribution from the

Foundation for the International Institute for Industrial Environmental Economics and the Foundation in memory of Lars Inge Grundberg for supporting the finalisation and printing of this PhD thesis.

My journey to Sweden was quite fortuitous, beginning at an Idealist Grad Fair in Chicago, Illinois in October 2012. Through a series of events, I won the *Challenge Your Perspectives* national scholarship competition sponsored by the Swedish Institute. As a result, I received my Master's degree in Environmental Management and Policy from Lund University. I am grateful to Håkan Rodhe and Maria Lindblad for taking a chance on me then, which led me to pursue my PhD at the IIIIEE. Now, I have met my partner, bought a house, and made a home in Sweden!

Throughout my PhD, I have received encouragement, support, and acceptance among my closest family and friends. Thanks to friends Charlotte, Carro, Sandro, David, Devon, Florian, Audrey, Molly, Brandon, Andy, Jessica, Peter, Augusto, and others. Thanks to my family – especially my Mom, Dad, and sister. Your willingness to listen and provide encouragement was necessary, especially in the last months while working remotely. Finally, thank to Johannes – my husband and best friend – who understood the long hours and when I just needed to talk.

Steven Kane Curtis

Båstad, Sweden
April 2021

Abstract

Despite sharing being a long-practiced form of consumption, the concept ‘sharing economy’ has emerged only recently. New business models have proliferated, utilising technology to reduce transaction costs and facilitate shared access. Societal actors have taken interest in the sharing economy, to reduce resource consumption, foster social cohesion, and support the economy. However, sharing economy business models facilitate a wide array of consumption practices, including sharing, renting, borrowing, lending, bartering, swapping, trading, exchanging, gifting, buying second-hand, and even buying new goods. Past academic research and media attention tend to focus on unicorns such as Airbnb and Uber. There is greater need to explore the diverse permutations of business models within the sharing economy, especially considering sustainability.

However, a gap exists between the design and successful implementation of sharing economy business models. This research aims to advance and structure knowledge about the sharing economy and sustainable business models, by using business modelling methods to study the design and implementation of sharing economy business models. Inspired by design science, this research engages in prescriptive theory-building and design-oriented research to construct and evaluate design artefacts. Incorporating data materials from people, documents, and literature, the research strategies of grounded theory and desk research are utilised to support methods for data collection and data analysis.

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Additional artefacts are developed to support the successful implementation of these business models. First, business model patterns provide the justificatory knowledge to select relevant business model attributes in specific contexts. Then, a systematic framework measures the social impact of sharing platforms across four aspects – trust,

empowerment, social justice, and inclusivity. Finally, organisational response strategies to COVID-19 are established in the sharing economy.

The primary contribution of this research is conceptual, with additional modest methodological and empirical contributions. Furthermore, the artefacts are intended to be useful for research and practice, including scholars, entrepreneurs, managers, policymakers, investors, users, and concerned citizens.

Popular Science Summary

The sharing economy is said to take advantage of under-utilised goods and services in our economy, contributing to more sustainable consumption. Yet, despite widespread claims in academia and the media, the sharing economy is not sustainable by default. Accommodation sharing may gentrify neighbourhoods and contribute to over-tourism; ridesharing can lead to congestion; and bikesharing and e-scooters have led to an overcapacity of underutilised assets (search “bike graveyards in China”!). We must be deliberate and strategic in how we design sharing economy business models to ensure improved sustainability performance.

Yet, the sharing economy is defined and operationalised differently by actors across society, which has implications for entrepreneurs, managers, policymakers, consumers, and citizens. How is car rental different from carsharing via ShareNow? How is a taxi service different from ridehailing via Uber? How are hotels or apartment leasing different from short-term accommodation rental via Airbnb? All of these examples facilitate access over ownership, largely the unifying characteristic of the sharing economy, but car rental, taxi service, or hotels would not be considered part of the sharing economy. Why? I suggest that sharing platforms should facilitate *temporary* access to an *existing stock of goods* in a *two-sided* market. In this way, the sharing platform improves material efficiency and increases the intensity of use of space, mobility, and goods that otherwise would be idle.

However, sharing economy business models struggle to remain financially and socially viable, scale operations, and/or retain prosocial and environmental motivation. In fact, popularised claims suggest that 70-90% of business models fail. Therefore, this research proposes knowledge and tools to support the design and implementation of sharing economy business models for sustainability.

To support the *design* of sharing economy business models for sustainability, I developed a framework that includes eighty-nine business model choices, including twenty-five revenue streams, which are all described in detail with examples. The framework prioritises platform types that facilitate a two- or multi-sided market (e.g. peer-to-peer, business-to-business, crowd cooperative), excluding business-to-consumer companies, which purchase new goods to create an artificial idling capacity. The framework describes several shared practices (e.g. shared space, shared mobility,

shared goods, shared consumables, shared resources), excluding the gig economy, time banking, and filesharing.

I also sought to develop knowledge and tools to support the *implementation* and continued success of sharing platforms. This includes business model patterns, which provide a language and structure to design and implement sharing economy business models, drawing on what has worked in practice. With growing criticism of the social impacts of the sharing economy (e.g. gentrification, discrimination, exploitation), I developed a tool for understanding and measuring these social impacts, motivated by “if you can’t measure it, you can’t improve it”. Finally, recognising the impact of the COVID-19 pandemic on the continued survival of sharing platforms, I contributed to research on organisational response strategies aimed at the organisation, its users, and society more generally.

I conducted research over the course of four years as part of the Urban Sharing project, funded by Riksbankens Jubileumsfond and the European Research Council. I used multiple methods, both qualitative and quantitative in nature, including literature review, qualitative content analysis, morphological analysis, and quantitative cluster analysis. The research puts forward a strong and coherent conceptualisation of sharing economy business models, with balanced focus on design and implementation. The findings are intended for both researchers and practitioners, to advance and structure knowledge about the sharing economy and sustainable business models. It is my hope that these tools may continue to prove useful for sharing platforms, to enhance their service offering, to ensure economic viability, and to improve sustainability performance.

List of Articles

- Article I** Curtis, S. K., & Lehner, M. (2019). Defining the Sharing Economy for Sustainability. *Sustainability*, 11(3), 567. <https://doi.org/10.3390/su11030567>
- Article II** Curtis, S. K., & Mont, O. (2020). Sharing economy business models for sustainability. *Journal of Cleaner Production*, 266, 121519. <https://doi.org/10.1016/j.jclepro.2020.121519>
- Article III** Curtis, S. K. (2021). Business model patterns in the sharing economy. *Sustainable Production and Consumption*, 27, 1650–1671. <https://doi.org/10.1016/j.spc.2021.04.009>
- Article IV** Curtis, S. K., Singh, J., Mont, O., & Kessler, A. (2020). Systematic framework to assess social impacts of sharing platforms: Synthesising literature and stakeholder perspectives to arrive at a framework and practice-oriented tool. *PLOS ONE*, 15(10), e0240373. <https://doi.org/10.1371/journal.pone.0240373>
- Article V** Mont, O., Curtis, S. K., & Palgan, Y. V. (2021). Organisational Response Strategies to COVID-19 in the Sharing Economy. *Sustainable Production and Consumption*. <https://doi.org/10.1016/j.spc.2021.03.025>

Article Contributions

- Article I** Conceptualisation (SKC, ML), Methodology (SKC) Software (SKC, ML), Formal Analysis, (SKC, ML), Resources (SKC, ML), Data Curation (SKC), Writing—Original Draft (SKC), Writing—Review and Editing (SKC, ML, OM), Visualisation (SKC), Supervision (OM), Funding Acquisition (OM)
- Article II** Conceptualisation (SKC, OM), Methodology (SKC), Validation (SKC), Data Curation (SKC), Writing—Original Draft (SKC), Writing—Review & Editing (SKC, OM), Visualisation (SKC), Supervision (OM), Funding Acquisition (OM)
- Article III** Conceptualisation (SKC), Methodology (SKC) Software (SKC), Formal Analysis, (SKC), Resources (SKC), Data Curation (SKC), Writing—Original Draft (SKC), Writing—Review and Editing (SKC), Visualisation (SKC), Supervision (OM), Funding Acquisition (OM)
- Article IV** Conceptualisation (SKC, JS, OM), Methodology (SKC, JS, AK), Formal Analysis, (SKC, JS, OM), Validation (SKC, JS), Data Curation (SKC, JS, OM, AK), Writing—Original Draft (SKC, OM, AK), Writing—Review & Editing (SKC, JS, OM, AK), Visualisation (SKC, JS), Project Administration (SKC, OM), Supervision (OM), Funding Acquisition (OM)
- Article V** Conceptualisation (OM, SC, YVP); Methodology (OM, SC); Analysis (OM, SC, YVP); Data Curation (OM, SC, YVP); Framework Development (YVP, SC, OM); Writing—Original draft (OM, SC, YVP); Writing—Review and Editing (OM, SC, YVP); Visualisations (SC); Supervision (OM); Funding Acquisition (OM, YVP)

Other Publications & Presentations

Project Reports and Outputs

- Mont, O., Plepys, A., Voytenko Palgan, Y. V., Lehner, M., Curtis, S. K., Zvolska, L., & Arbelaez Velez, A. M. (2020). *Urban Sharing in Shanghai* (No. 978-91-87357-68-8). Lund University.
- Mont, O., Plepys, A., Voytenko Palgan, Y. V., Singh, J., Lehner, M., Curtis, S. K., Zvolska, L., & Arbelaez Velez, A. M. (2020). *Urban Sharing in Toronto* (No. 978-91-87357-63-3). E-print.
- Mont, O., Plepys, A., Voytenko Palgan, Y. V., Singh, J., Curtis, S. K., Zvolska, L., & Arbelaez Velez, A. M. (2019). *Urban Sharing in Amsterdam* (No. 978-91-7895-321-9). Lund University.

Pedagogical Contributions

- Palm, J., Richter, J. L., Curtis, S. K., Wickenberg, B., & Schoonover, H. (2018). *Article Incubator: Building interdisciplinary academic writing skills amongst PhD students*. 3.
- Reindl, K., Curtis, S. K., & Smedby, N. (n.d.). How interdisciplinary are Master's programmes in sustainability education? *Interdisciplinary Pedagogy in Higher Education*, 61.

Rejected Journal Article

- Curtis, S., Lehner, M. "Coming to Terms: An assessment of the maturity of the sharing economy research field".

Conference Papers

- Curtis, S., Lehner, M., (2018). "Conceptual Development of the Sharing Economy from the Field of Linguistics and Semantics". Cambridge Scholars Publishing.
- Curtis, S. & Mont, M. (2019). "Towards a Prescriptive Framework of Sharing Platform Models". New Business Models Conference.

Conference Presentations

- Curtis, S. (2021). "Business Model Innovation in the Sharing Economy". The 7th International Workshop on the Sharing Economy (7IWSE). Barcelona, Spain. 24-26 February 2021
- Mont, O., Curtis, S. & Voytenko-Palgan, Y. (2021). "Sharing platforms and the pandemic: impacts, response strategies and future". The 7th International Workshop on the Sharing Economy (7IWSE). Barcelona, Spain. 24-26 February 2021
- Curtis, S. (2020). "Social impacts from accommodation sharing". ShaRe Webinar Series hosted by the University of Leeds. Online. 8 July 2020.
- Curtis, S. (2020). "Identifying Business Model Patterns in the Sharing Economy". New Business Models Conference. Online. 1-3 July 2020.
- **AWARDED BEST PRESENTATION****
- Curtis, S. (2019). "Towards a Prescriptive Framework of Sharing Platform Models". New Business Models Conference. Berlin, Germany. 1-3 July 2019.
- **AWARDED BEST PAPER – 3rd PLACE****
- Curtis, S. (2019). "Value Co-Creation Practices Facilitated by Sharing Platforms". The 6th International Workshop on the Sharing Economy (6IWSE). Utrecht, Netherlands. 28-29 June 2019.
- Curtis, S. (2018). "A Conceptual Development of the Sharing Economy from the Field of Linguistics and Semantics". The 5th International Workshop on the Sharing Economy (5IWSE). Mannheim, Germany. 28 - 29 June 2018.
- Curtis, S. (2017). "A Critical Analysis of the Sharing Economy". The Swedish National Laboratory on Sustainable Lifestyles. Umeå, Sweden. 15-16 November 2017.
- Curtis, S., Lehner, M., (2017). "Conceptualising the Dimensions of the Sharing Economy". The 4th International Workshop on the Sharing Economy (4IWSE). Lund, Sweden. 15-16 June 2017.

Figures and Tables

List of Figures

Figure 1. Delineating the Sharing Economy from Similar Phenomena

Figure 2. Categories of Business Model Pattern

Figure 3. Research Design Framework

Figure 4. The Sharing Economy Business Model Framework

Figure 5. Key Activities in the Sharing Economy

Figure 6. Systematic Framework to Assess Social Impact of Sharing Platforms

Figure 7. Organisational Response Strategies in the Sharing Economy to COVID

List of Tables

Table 1. Summary of Research Articles

Table 2. Alternative Paradigms of Inquiry

Table 3. Overview of Methods for Data Collection and Data Analysis

Table 4. Prototypical Patterns in the Sharing Economy

Table 5. Solution Patterns in the Sharing Economy

Abbreviations

B2B	Business-to-Business
B2C	Business-to-Consumer
B2P	Business-to-Peer
ITC	Information and Communication Technologies
P2P	Peer-to-Peer
PSS	Product-Service Systems
SEBM	Sharing Economy Business Model
UNFCC	United Nations Framework Convention on Climate Change

1 Introduction

Imagine a power drill – many of us have one at home that sits unused most of the time. The average use time of a drill is only a few minutes throughout its lifetime (Fremstad, 2016). This statistic is used time and again to demonstrate the potential of the sharing economy (Apte & Davis, 2019; Belk, 2014b; Botsman & Rogers, 2010; Gerwe et al., 2020; Ravenelle, 2017; Ustyuzhanina et al., 2018). By facilitating shared access instead of ownership, it is claimed that sharing economy business models (SEBMs) can reduce the production of new drills, subsequently lessening the extraction of raw materials as well as greenhouse gas emissions resulting from its avoided production.

Shared access to a drill is just one example of countless products that are used at a household level that have the potential to reduce environmental impact, for example, clothes, sports equipment, luggage, and other small appliances. It is estimated that household consumption contributes more than 60% of the total greenhouse gas emissions and between 60-80% of the total environmental impact globally (Ivanova et al., 2016). Unrestrained extraction of raw materials, production, distribution, use, and disposal of household goods exacerbates climate change, biodiversity loss, pollution, land-use change, and so on. In addition, with social pressures stemming from population growth and urbanisation, there is great need to transform our systems of production and consumption.

In principle, sharing seems like an attractive consumption practice to reduce environmental and social impacts from household consumption. Business models that facilitate shared access have proliferated, but the design and implementation of these business models may not lead to improved sustainability performance (Curtis & Mont, 2020; C. J. Martin, 2016; Plepys & Singh, 2019), nor are they necessarily financially or socially viable (Apte & Davis, 2019).

Again, let's consider the drill – the intention is that an individual will make a drill they already own available to rent in a marketplace. However, the business models that proliferate in the sharing economy often do not operate in that way, for example, business-to-consumer models. In an unregulated market, rent-seeking behaviour and competition can result in an overcapacity of underutilised assets (Pies et al., 2020). In other words, a company may purchase hundreds of cheap drills simply to rent on the market. Alternatively, an individual may purchase a new drill with the hopes of making additional income by providing shared access. Without careful design and

implementation, SEBMs may induce unwanted rebound effects, for example, excess capacity, unnecessary end-of-life processing, additional spending, gentrification, and discrimination (Edelman et al., 2017; Plepys & Singh, 2019; Schor et al., 2016). Many consumers report excessive transaction costs associated with locating, picking up, and returning a shared item (Apte & Davis, 2019). Some individuals indicate that it is simply easier to buy the product new (Apte & Davis, 2019). Therefore, business model design and implementation are essential to mitigate unwanted negative environmental and social impacts and to ensure long-term financial and social viability of platforms that facilitate sharing.

1.1 Sharing Economy

Despite sharing being a long-practiced form of consumption, the concept of the ‘sharing economy’ has emerged only recently. New business models have been developed, utilising information and communication technologies (ICT) to reduce transaction costs to facilitate shared access (Curtis & Lehner, 2019). The sharing economy has only existed as a research phenomenon since 2012 (Henry et al., 2021), when scholars started to respond to popular science publications on collaborative consumption, two-sided business models, and online marketplaces (Henry et al., 2021). Since then, research interest has grown; according to Scopus records, in 2020, 617 peer-reviewed journal articles in English were published, representing a 34% increase compared to the previous year.

Literature portrays the sharing economy as an umbrella term to describe disparate social and economic practices (Acquier et al., 2017; Dreyer et al., 2017; Frenken & Schor, 2017; Heinrichs, 2013). However, the sharing economy is generally said to facilitate sharing of underutilised goods or services between people (Habibi et al., 2017; Harmaala, 2015), challenging our notions of access and ownership (Curtis & Lehner, 2019; C. J. Martin, 2016).

This understanding overlaps with related concepts of product-service systems (PSS) and the circular economy, which are often studied as part of the research field on sustainable consumption and production. Product-service systems describe business models that deliver “value in use” (Baines et al., 2007), recognising that the value lies in the product’s function rather than product ownership itself (P. Akbar & Hoffmann, 2020; Mont, 2002). The circular economy seeks to transform our linear economy – e.g. take, make, break – with strategies to reduce, reuse, repair, recover, remanufacture, and recycle, among others (Kirchherr et al., 2017; Nußholz, 2017). By placing a focus on resource flows to reduce the need for virgin material extraction and processing, circular business models are designed to slow, close, and narrow resource loops (Bocken et al., 2016; Lüdeke-Freund et al., 2019; Stahel, 1994).

I position the sharing economy as an extension of product service systems – as sharing is an example of use-oriented PSS – and the circular economy – as the sharing economy slows resource loops (Bocken et al., 2016). Specifically, the sharing economy extends product lifetimes and increases the intensity of use, suggesting “reduced resource expenditure for a given level of consumption” (Hawlitschek et al., 2018, p. 1).

Societal actors have taken interest in sharing to spur the economy (Cheng, 2016a; Sinclair, 2016), reduce resource consumption (Frenken & Schor, 2017), and foster social cohesion (Luckner et al., 2015; Sharp, 2018). For example, the European Commission initially proposed a *Circular Economy Action Plan* in 2015 and an updated plan in 2020 (European Commission, 2020). The updated *Action Plan* identifies the sharing economy specifically as “accelerating circularity”, leading to dematerialisation and reduced dependence on primary materials (European Commission, 2020, p. 2). Officials at the European Union have stated that the circular economy is “the number one priority” of the forthcoming EU New Green Deal, representing “half” of all efforts to achieve its net-zero goals (F. Simon, 2019). A little closer to home, Sweden’s innovation agency Vinnova has funded *Sharing Cities Sweden*, a national programme to develop nodes to test sharing solutions and promote national and international cooperation and exchange of ideas to advance the sharing economy (Vinnova, 2019).

With increased interest in the sharing economy, the business models that facilitate sharing are increasingly studied. Yet, business models under its banner facilitate a wide array of consumption practices, including “...sharing, renting, borrowing, lending, bartering, swapping, trading, exchanging, gifting, buying second-hand, and even buying new goods” (Curtis & Mont, 2020, p. 1). Past academic research and media attention tend to focus on unicorns such as Airbnb and Uber (Muñoz & Cohen, 2018; Ritter & Schanz, 2019). As such, there is greater need to explore the diverse permutations of business models within the sharing economy (Chasin et al., 2018).

1.2 Knowledge Gaps

While there has been significant interest in the sharing economy to usher in new modes of sustainable consumption and production, it is not devoid of criticism. It has been called “neoliberalism on steroids”, as the sharing economy is both seen as a part of the capitalistic system and as an alternative to it (L. Richardson, 2015). The sharing economy, at the same time, promotes “more sustainable consumption and production practices” while reinforcing the “current unsustainable economic paradigm” (C. J. Martin, 2016). I understand this paradox to suggest that the sharing economy may encourage excess consumption via access instead of ownership, while framing consumption within the sharing economy as fundamentally more sustainable. If sustainability remains the motivation, we need to be more deliberate and strategic in

how we design and implement sharing economy business models to ensure improved sustainability performance.

The sharing economy remains poorly defined, which hinders the ability to delineate or differentiate between the various business models and consumption practices. Sharing platforms vary greatly in their shared practices, platform types, value orientation, and geographical scale (Curtis & Mont, 2020). Among academics and practitioners, related but separate practices are conflated within the sharing economy, for example, collaborative consumption and production, access-based consumption, and the gig economy. There is no clear delineation in the design of business models attributed to the sharing economy, such as those of Airbnb, Uber, and ShareNow and their counterparts of a hotel, taxi service, or car rental company, despite all facilitating access over ownership. There is a clear need to articulate design principles that guide the design and implementation of sharing economy business models.

Ongoing semantic confusion leads to inconsistent and incomplete sharing economy business model conceptualisations, which are difficult to put into practice – a so-called design-implementation gap. Research overemphasises *design* of business models (Breuer et al., 2018), including frameworks and tools that focus on ideation or experimentation (Bocken et al., 2019). Business model design focuses on the *choices* that an individual or team make about the content, structure, and governance of their firm (Zott & Amit, 2010). Designers ask the questions *what, how, and who*, reflecting all possible “building blocks” of the business model.

While design dictates implementation and performance, there is growing interest in studying the *processes* and *outcomes* of implementing new business models (Baldassarre et al., 2020; Breuer et al., 2018; Ritala et al., 2018; Upward & Jones, 2015), but business model implementation remains understudied (Amit & Zott, 2012; Geissdoerfer et al., 2018). In practice, new business models are rarely implemented on the market, and often fail once they are (Tukker, 2015). Popularised claims suggest between 70-90% of business models fail (Griffith, 2014; David Miller, 2001; Patel, 2015).

Sharing economy business models struggle to remain financially viable, scale operations, and retain their pro-social and environmental motivation (Acquier et al., 2017; Laukkanen & Tura, 2020). Many sharing platforms simply fail in the first few years, as customers are unwilling to participate in the marketplace if the transaction costs are too high (Apte & Davis, 2019). Experimentation is often unsuccessful because businesses lack the knowledge and tools to support business model innovation (Remane et al., 2017; Spieth et al., 2014). The design-implementation gap can therefore be expressed two ways – the **research gap** and the **practice gap** – between the design and successful implementation of sharing economy business models.

Business models within the sharing economy are lauded as a pathway to improve resource efficiency, prevent idling of goods, and develop meaningful peer-to-peer interactions. However, with competing perspectives on the sharing economy, research is needed in order to address the design-implementation gap and provide guidance to entrepreneurs, policy makers, users/consumers, and academics to realise a sharing economy for sustainability!

1.3 Research Objective and Research Questions

In an attempt to overcome this purported design-implementation gap, this research aims to advance and structure knowledge about the sharing economy and sustainable business models by using business modelling methods to study the design and implementation of sharing economy business models. The outcome of this research provides prescriptive knowledge and tools to guide academics and practitioners to more critically reflect on the design and implementation of SEBMs that support more sustainable consumption and production.

To achieve this, the dissertation explores the following research questions:

RQ1: What design principles can guide the design and implementation of sharing economy business models for sustainability?

RQ2: How may sharing economy business models be designed for sustainability?

RQ3: What constellation of business model attributes and organisational strategies support implementation?

1.4 Approach

I engaged in prescriptive theory-building and design-oriented research to construct and evaluate design artefacts, e.g., morphological box, business model patterns. This research approach is suitable, as prescriptive research ensures “value in context and use” (Winter & Aier, 2016, p. 479), with the artefacts intended to have utility in academia and practice to address a design-implementation gap in the sharing economy. Throughout my research, I am inspired by, and borrow concepts and methodologies from, design science research, for example, artefacts, design principles, and design theory. With roots in engineering and other applied sciences (H. A. Simon, 1996), design science research seeks to change or make improvements to a given system (Dresch et al., 2015). The output of design science research is both material and abstract artefacts (e.g. constructs, models, frameworks), which structure prescriptive knowledge about the phenomenon in question (Vaishnavi et al., 2004). These artefacts

“...define the ideas, practices, technical capabilities, and products through which the analysis, design, implementation, management, and use ... can be effectively and efficiently accomplished” (Hevner et al., 2004, p. 76).

I conducted research on the design and implementation of SEBMs over the course of four years. I used multiple methods, both qualitative and quantitative in nature, including interviews, literature review, qualitative content analysis, morphological analysis, and quantitative cluster analysis. A multi-method approach such as this is a defining feature of design science research (Teddle & Tashakkori, 2003). The choice of methods is based on the appropriateness to answer the research questions, suggesting a pragmatic paradigm of inquiry (Siedhoff, 2019; Teddle & Tashakkori, 2003).

Despite clear parallels to design science research, I refrain from positioning my research squarely as design science research, because the research process was a new lens with which to structure already completed research. Nonetheless, I think it is valuable to frame my approach as being inspired by design science because of the underlying ontology, multi-method approach, and resulting artefacts. This research took the form of peer-reviewed journal articles, which I summarise below:

Article I

Defining the Sharing Economy for Sustainability

This first article proposes a definition of the sharing economy, including five semantic properties: ICT-mediated; non-pecuniary motivation for ownership; temporary access; rivalrous; and tangible goods. These properties were proposed as a result of a systematic literature review of 255 articles and subsequent qualitative content analysis of the various definitions of the sharing economy. The findings confirmed continued semantic confusion, as many authors offered conflicting definitions or chose not to define the sharing economy at all. While scholars promoted the sharing economy as contributing to sustainable consumption, there were no conceptualisations that supported this outcome specifically. Thus, the five semantic properties were proposed with sustainability in mind, and served as the initial work to develop design principles, responding to RQ1.

Article II

Sharing Economy Business Models for Sustainability

Building on the definition presented in Article I, this second article primarily contributes to RQ2 by presenting a sharing economy business modelling tool. The tool presents three value dimensions, sixteen business model attributes, and sixty-seven business model choices, all of which are described conceptually. The tool is intended

for academics and practitioners, to support the design of SEBMs. The article also proposes preconditions (i.e. design principles) in the design of SEBMs to realise improved sustainability performance, again contributing to RQ1.

Article III

Business Model Patterns in the Sharing Economy

Business model patterns bridge the design-implementation gap by examining existing business models to identify successful combinations of business model attributes. These combinations reflect the design attributes of business models, and are useful to support experimentation and implementation. This article examined sixty-three sharing platforms using an adapted framework from Article II. Using quantitative cluster analysis, the findings present three types of business model patterns: a sharing economy business model framework, prototypical patterns, and solution patterns. While the framework captures the design of SEBMs (contributing to RQ2), prototypical and solution patterns support experimentation and successful implementation of SEBMs (contributing to RQ3).

Article IV

Systematic Framework to Assess the Social Impacts of Sharing Platforms

Literature and user experience demonstrate both positive and negative social impacts resulting from the actions of sharing platforms and practices of their users. This article proposes a systematic framework to assess the social impacts of sharing platforms across four social aspects: trust, empowerment, social justice, and inclusivity. By combining insights from a stakeholder workshop and a narrative literature review, this article proposes indicators and measurable variables for each social aspect, to support social impact assessment of sharing platforms. This article contributes to RQ3 by suggesting aspects of the business model that, when implemented, lead to improved social impacts. For example, to promote trust on the platform and among users, the sharing platform should implement a meaningful review system, identity verification system, and dispute resolution mechanisms. The choice of governance model (e.g. corporate, collaborative, cooperative) and value orientation (e.g. commercial, social, environmental, societal) also have implications on empowerment, inclusivity, and social justice.

Article V

Organisational Response Strategies in the Sharing Economy to COVID-19

The COVID-19 pandemic presents challenges for all of us, not least sharing platforms, which are forced to alter their business models and activities in line with public health guidance and changing consumer needs. This article examines the organisational response strategies to the pandemic among 30 sharing platforms representing shared mobility, shared space, and shared goods. The research conducts web analysis of platform websites and social media data to empirically derive a framework for structuring response strategies. We proposed eight strategies targeting the organisation, its users, and the broader society. This research represents an early attempt to describe responses and proposed learnings to support sharing platforms in remaining viable throughout and beyond the COVID-19 pandemic. This article therefore contributes to RQ3 and the implementation of sharing economy business models.

Table 1. Summary of Research Articles

Publication		Empirical Data	Methods for Data Analysis	Relevant RQ
Article I	Curtis, S.K. & Lehner, M. (2019). Defining the Sharing Economy for Sustainability	Literature	Systematic Literature Review; Qualitative Content Analysis	RQ1
Article II	Curtis, S.K. & Mont, O. (2020). Sharing Economy Business Models for Sustainability	Literature, Interviews, Websites	Narrative Literature Review, Morphological Analysis	RQ1, RQ2
Article III	Curtis, S.K. (Under Review). Business Model Patterns in the Sharing Economy	Literature, Interviews, Websites, Social Media	Narrative Literature Review, Business Model Patterns, Quantitative Cluster Analysis	RQ2, RQ3
Article IV	Curtis, S. K., Singh, J., Mont, O., & Kessler, A. (2020). Systematic framework to assess social impacts of sharing platforms	Literature, Stakeholder Workshop	Narrative Literature Review, Qualitative Content Analysis	RQ1, RQ3
Article V	Mont, O., Curtis, S.K., Voytenko-Palgan, Y. (Under Review). Organisational Response Strategies to COVID-19 in the Sharing Economy	Literature, Websites, Social Media	Narrative Literature Review, Web Analysis	RQ3

1.5 Scope

The research included in this dissertation supports a larger interdisciplinary research programme called *Urban Sharing*, funded by Riksbankens Jubileumsfond (Grant No. RIK161055:1) and now the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 771872). Motivated by increasingly extreme urban challenges spurred by climate change, urbanisation, and population growth, the programme recognises the need to examine innovative approaches to promote sustainability transitions in cities. One such approach is examining the role of 'sharing' as a way to capitalise on the idling capacity of everyday goods to improve resource efficiency and reduce consumption.

The team has consisted of three senior researchers, two postdoctoral researchers, and three PhD students with the overarching research objectives to study the design, practices, and processes of the sharing economy:

- **DESIGN:** To present best practices in which sharing economy business models are designed, and how they operate and vary in cities.
- **PRACTICES:** To study the sustainability impacts of sharing platforms and how they vary across cities.
- **PROCESSES:** To advance theoretical understanding of institutionalisation processes of sharing platforms across cities.

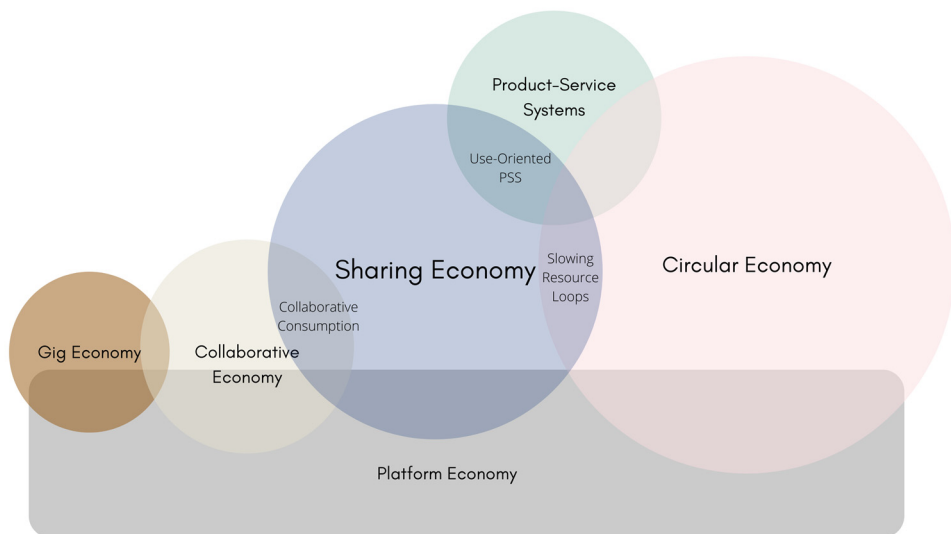


Figure 1. Delineating the Sharing Economy from Similar Phenomena
Inspired by Görög (2018)

Corresponding to these research objectives, I focused my research on the design of sharing economy business models. However, I am aware of similar and overlapping concepts, for example, product-service systems, circular economy, and collaborative economy (**Figure 1**). There are similarities between these concepts and the sharing economy (Curtis & Lehner, 2019; Görög, 2018); for example, the sharing economy slows resource loops by extending product lifetimes, contributing to the circular economy, and use-oriented product-service systems facilitate sharing, renting, and pooling of resources. However, I chose to delimit my research to the sharing economy only, reflecting my prescriptive and design-oriented approach. Instead of descriptive research of how these overlapping phenomena occur in practice, I offer a normative position of how sharing economy business models may be designed to support sustainability.

1.6 Contribution

I see the primary contribution of this research as *conceptual*, proposing a design theory, which includes design principles, constructs, frameworks, and architectures, that describe the design of sharing economy business models. Using a multi-method approach, I also make a modest *methodological* contribution, using morphological analysis and quantitative cluster analysis to develop business model patterns in the sharing economy. These approaches are emerging as rigorous methods to design and describe business models. Finally, I am not aware of other efforts to empirically study the sharing economy using these methods, which I suggest warrants an *empirical* contribution to theory and practice.

1.7 Audience

The dissertation and related journal articles target primarily an academic audience, including the research communities working on the sharing economy and sustainable business models. The dissertation may be of interest to academics conducting business model and design science research, using recent business modelling methods including morphological analysis and business model patterns. Most notably, I interact with the literature and methods used by Professor Florian Lüdeke-Freund at ESCP Berlin, and Professor Nancy Bocken at the Maastricht Sustainability Institute at Maastricht University.

However, because my work is inspired by design science research, I intend the findings presented here to be relevant for and used by practitioners, including sharing platforms, entrepreneurs, managers, investors, and policy-makers. For example, sharing platforms, entrepreneurs, and managers may be interested in the detailed design descriptions

presented. Investors may be interested in the social impact framework to assess the beneficial effect of their investments. Finally, policymakers may wish to reflect on the design principles in light of their motivation to promote or regulate the sharing economy. Additional support organisations may be interested in this research, including Sharing Cities Sweden, Sharing Cities Alliance, ShareNL, OuiShare, Shareable, among others.

1.8 Disposition

This dissertation comprises seven chapters and five appended peer-reviewed journal articles. In the remainder of this thesis, I review relevant background literature (**Chapter 2**) and present my overarching methodology (**Chapter 3**). I then summarise my research findings and subsequent design artefacts to support the design and implementation of sharing economy business models (**Chapter 4**). I connect my research with ongoing discourses pertaining to business model innovation and sustainability, as well as offer some overall reflections and proposals for future research (**Chapter 5**). I reflect on my research impact, including impact pathways and types of impact, by discussing the reach and significance of my research (**Chapter 6**). Finally, I conclude this thesis by summarising my key findings, providing general recommendations, reviewing my contribution, and offering some concluding remarks about the sharing economy (**Chapter 7**).

2 Literature Review

2.1 Design Science Research

Design science should not be thought of as a science, per se, but a rigorous approach that involves building artefacts and evaluating those artefacts in context and use (Au, 2001). However, a distinction must be made between research that involves design, and design science research. Scholars suggest this distinction lies in: 1) the underlying purpose for design; 2) a rigorous research process; and 3) output in the form of an artefact.

Firstly, the purpose of design science research is to produce prescriptive knowledge to address a stated problem, intended to be useful for a given audience. Broadly, this knowledge is referred to as design theory, which encompasses *prescriptive* knowledge “for design and action” (Gregor & Hevner, 2013, p. 339), in contrast to descriptive, explanatory, or predictive knowledge (Gregor, 2006). A nascent or grand design theory must include a collection of artefacts that interrelate, as well as the justificatory knowledge to inform design and implementation, including academic, expert, and practitioner knowledge (Gregor & Hevner, 2013; Vaishnavi et al., 2004).

Secondly, design science is characterised by a rigorous research process. Peffers et al. (2007) put forward a suggestion of the design science research process: 1) identify problem and motivation; 2) define objectives of the solution; 3) design and develop artefact(s); 4) demonstrate the use of artefact(s) in context; 5) evaluate the usefulness, effectiveness, and/or efficiency; and 6) communicate the artefacts as solutions to the identified problem. This process is increasingly used by scholars, for example, Gregor & Hevner (2013), Turber et al. (2014) and Baldassarre et al. (2020).

Thirdly, the output of design science research is both material artefacts and relevant situated knowledge that supports the use of these artefacts (Gregor & Hevner, 2013). An artefact refers to the entity that has or can be transformed into a material *object* or *process*, for example, decision support systems, modelling tools, governance strategies, methods, and interventions (Gregor & Hevner, 2013). March & Smith (1995) propose four generic artefact types: constructs, models, methods, and instantiations. *Constructs* or concepts refers to the specialised vocabulary and conceptualisations needed to describe the design domain. *Models* express the relationship among constructs through a set of propositions, statements, or representations. *Methods* propose a set of steps to

perform a task, which build on the constructs and models. Their final generic type of artefact, *instantiation*, describes the implementation of any of these artefacts in their intended environment.

Vaishnavi et al. (2004) propose additional artefact types to include *frameworks*, *architectures*, and *design principles*, based on the ongoing work of Puro (2013), Gregor & Jones (2007), and Gregor & Hevner (2013). Relevant for this research, *frameworks* describe more elaborate conceptualisations that build on constructs and models, which serve the purpose to guide or support design and implementation. Finally, *design principles* are the conditions or protocols in line with the stated objectives, which constrict or direct the design process.

Design science research is often applied in the disciplines of information technology and information systems to "...address design tasks faced by practitioners" (March & Smith, 1995, p. 251). However, with origins in engineering (Au, 2001; March & Smith, 1995), the methodology has gone on to be used in other disciplines such as architecture, computer science, and other applied sciences (Beck et al., 2013). Design science research has also been used in business research, including entrepreneurship (Romme & Reymen, 2018) and business model research (Osterwalder, 2004; Siedhoff, 2019). Design science has also informed research to develop knowledge and tools to overcome the design-implementation gap of sustainable business models (Baldassarre et al., 2020). A *systemic* design science approach is suggested when integrating sustainability and business model research to capture the interconnected system, drawing on diverse disciplinary perspectives (Upward, 2013).

While design science research applied in the context of business models may involve the analysis or evaluation of existing models, a primary goal is the development of new business models and more successful alternatives to support implementation (Au, 2001, p. 3). For these reasons, I suggest design science research is a useful approach for structuring the work of this thesis, to produce prescriptive and design-oriented knowledge that addresses the design-implementation gap in the sharing economy.

2.2 Sustainability Science

The need for radical and urgent transformation across every aspect of our society cannot be overstated! In the most recent warning, the United Nations Framework Convention on Climate Change (UNFCCC) (2021b) suggests we are on track to reduce global greenhouse gas emissions by 1% by 2030 compared to 2010 levels, based on nationally determined contributions as of December 2020. In contrast, the Intergovernmental Panel on Climate Change (IPCC) (2018) in their Special Report on 1.5 °C suggests we need to see an emissions reduction of around 45% by 2030. The disparity between reality and necessity is wide. The incoming COP26 President Alok Sharma warns,

“[w]e must recognise that the window for action to safeguard our planet is closing fast” (UNFCCC, 2021a).

Similar warnings echo increasing strain on our environment. For example, Steffen et al. (2015) suggest four of the nine planetary boundaries have been breached by human activity, beyond natural variability. These include climate change, biosphere integrity (e.g. biodiversity), biogeochemical flows (e.g. nitrogen and phosphorus cycles), and land-system change (Steffen et al., 2015).

Recent trends are not hopeful. As of 2017, we consume more than 100 billion tonnes of natural resources annually, the most ever and more than quadrupling consumption compared to 1970, despite the population only doubling (Carrington, 2020). Since, consumption has increased 8% between 2017 and 2019, while the global recycling rate has *decreased* from 9.1% to 8.6% (Carrington, 2020). The impact of the COVID-19 pandemic is not yet known, nor whether this global event may reverse these negative trends and jumpstart a truly green recovery. With careful consideration – including the design and implementation of policies and business models – circular strategies of narrowing, slowing, and closing resource loops may reduce emissions by up to 39% (Circle Economy, 2021). Likewise, the sharing economy may reduce net production and improve material efficiency, while providing other social benefits (Curtis & Mont, 2020).

If design science research starts with a problem – for example, unsustainable consumption and production, among others addressed in this thesis – sustainability science is the interdisciplinary perspective I depart from to examine the problem further. Sustainability is said to be many things – a motivation, a goal, an ideal, an umbrella, and a discipline (Stock & Burton, 2011). Sustainability science describes an emerging interdisciplinary discipline “...that seeks to understand the fundamental character of interactions between nature and society” (Kates et al., 2001).

Sustainability science recognises sustainable development as the goal, achieved only by the systemic use of the scientific method (de Vries, 2012). Systemic? Yes, this inter- and transdisciplinary discipline seeks to “...understand and act upon causal mechanisms and behavioural responses across several time- and space-scales” by integrating qualitative and quantitative methods, natural and social sciences, and theory and practice (de Vries, 2012, p. 4). Research in the sustainability sciences is inherently problem-driven, generating normative and prescriptive knowledge to address our sustainability challenges (de Vries, 2012).

For this reason, I suggest sustainability science and design science research have complementary goals – to develop prescriptive knowledge to solve a problem, and with the intention for this knowledge to be applied in context. I integrate knowledge and methods from literature describing sustainability, business models, and the sharing economy. In the remainder of the literature review, I elaborate further on my understanding on these areas.

2.3 Business Models

Business models have garnered commercial and academic attention as an abstract representation of the activities and function of a firm (Massa et al., 2017; Osterwalder et al., 2005; Teece, 2010). The ‘business model’ concept arose during the late 1990s, with the growth of the internet and its impact on how organisations conducted business (Timmers, 1998; Weinberger et al., 2016; Zott et al., 2011). However, despite broad application of the concept, there are few common definitions and interpretations among scholars (George & Bock, 2011; Goyal et al., 2017; Massa et al., 2017; Tangour et al., 2019; Weinberger et al., 2016; Weking et al., 2019). The lack of any such clarity in research is likely a result of two corresponding factors: 1) the business model concept originated in practice and is widely-used in the media (George & Bock, 2011); and 2) business model research engages scholars from diverse disciplines, including information technology, strategy, business management, innovation management, service science, and sustainability science, with the concept being independently developed and applied among scholars (Zott et al., 2011).

In their critical review of business model literature from the field of management, Massa et al. (2017) propose three interpretations of the business model concept: 1) as “attributes of real firms”; 2) as “cognitive/linguistic schemas”; and 3) as “formal conceptual representations”. I prefer the latter interpretation, appropriate for design science research, which sees the business model as a representation of specific business model attributes, written down and codified in the form of an artefact. When conceptualising the business model this way, scholars propose three business model dimensions: value proposition, value creation and delivery, and value capture (Bocken et al., 2014; Osterwalder et al., 2005; J. Richardson, 2008). *Value proposition* describes the primary product/service offering; *value creation and delivery* explains the structure and activities in the value chain, including how value is provided to customers; and *value capture* depicts the mechanisms to convert customer value to profit for the firm and society.

While value plays a central role in business modelling (Chesbrough & Rosenbloom, 2002), the notion of *sustainable business models* articulates the need to capture value beyond only economic or shareholder value (Bocken et al., 2014; Boons & Lüdeke-Freund, 2013; Schaltegger et al., 2016). Geissdoerfer et al. (2018, pp. 403–404) synthesise the following definition of sustainable business models: “...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”. Instead of shareholders, there is a stronger emphasis on stakeholders, including the environment and society (Bocken et al., 2014). I suggest that sustainable business models describe how businesses, non-traditional organisations, and grassroots initiatives function in order to reduce negative environmental and social impacts, while maintaining economic and social viability.

While there are many different conceptualisations of sustainable business models, Lüdeke-Freund et al. (2018) note the need to synthesise and consolidate the disparate body of knowledge on sustainable business models. The most cited contribution proposes eight archetypes, which target technological, social, and organisational innovations, depending on the nature of the business model (Bocken et al., 2014). Sharing economy activities relate to more than one archetype, for example, increasing intensity of use, access over ownership, cooperative and alternative ownership models, and crowdsourcing (Bocken et al., 2014).

Two areas of research within business model literature are worth mentioning to contextualise the contribution of this thesis: triadic business models, and business model patterns.

2.3.1 Triadic Business Models

Literature on business models primarily describes dyadic or pipeline business models, applicable to firms that create value by producing and selling goods and services. These models are emblematic of traditional business models employing goods-dominant logic (Vargo & Lusch, 2004), where value is created through the production and exchange of goods in a single-sided market, often through retailers. Dyadic business models are characterised by relatively high sunken costs in tangible assets, as well as high capital requirement for production, distribution, and/or marketing as well as high transaction costs (Kumar et al., 2018).

However, business model literature has expanded to describe new business models operating as two-sided markets, such as those in the sharing economy. For example, triadic business models create a two-sided market involved in mediating or matchmaking transactions between a supply- and demand-side of a market (Andreassen et al., 2018; Choudary et al., 2015; Massa et al., 2017). In contrast to dyadic business models, triadic models do not own the assets involved in the exchange. Instead, triadic models facilitate access to goods and services between actors in the market. Service-dominant logic – proposed by Vargo & Lusch (2004) – stipulates that the customer is a co-creator of value, where value is created through actions and activities of customers on each side of the market.

Triadic business models also have limited costs for tangible assets owned by the business, relatively high investment costs in platform IT infrastructure, and few frontline employees, except for those in a customer support function (Libert et al., 2016). Furthermore, triadic business models rely on the trust between actors in the two-sided market and, therefore, often implement reputation and review systems to enhance the perception of value delivered by the platform (Andreassen et al., 2018). The concept of the triadic business model reflects my view of the sharing economy business model operating as a two-sided market, elaborated in **Chapter 4**.

2.3.2 Business Model Patterns

Broadly speaking, patterns recognise trends among implemented solutions to solve a problem, which can be useful to apply in other contexts. Architectural theorist and designer Christopher Alexander first proposed patterns for urban planning and architecture, but the concept has gone on to be used by other design-oriented fields, including software (Gamma et al., 1994) and business models (Lüdeke-Freund et al., 2018). The “Alexandrian form” of describing patterns includes naming the pattern and elaborating the context, problem, solution, and examples.

When applied to business models, patterns describe attributes of existing business models that recur successfully, which are seen as potential solutions supporting business model innovation (Abdelkafi et al., 2013; Lüdeke-Freund et al., 2018; Remane et al., 2017; Weking et al., 2018). Popularised claims suggest 90% of business models are a reconfiguration of existing patterns (Gassmann et al., 2014). As such, business model patterns can bridge design and implementation, by developing a language – a structure – to support creativity, communication, and experimentation among teams and their stakeholders (Abdelkafi et al., 2013; Gassmann et al., 2014; Johnson & Lafley, 2010).

To make business model patterns more concrete, I appreciate the categories of patterns advocated by some scholars: frameworks, prototypical patterns, and solution patterns (Amshoff et al., 2015) (**Figure 2**). Frameworks provide a reference model to describe, plan, analyse, or document entire business models (Amshoff et al., 2015), for example, the business model canvas proposed by Osterwalder & Pigneur (2010). Prototypical patterns describe industry-specific business models, for example, manufacturer, multi-sided markets, or sharing platforms (Amshoff et al., 2015; Remane et al., 2017). Finally, solution patterns describe one or several business model attributes used in combination, which can be replicated easily (Amshoff et al., 2015; Remane et al., 2017).

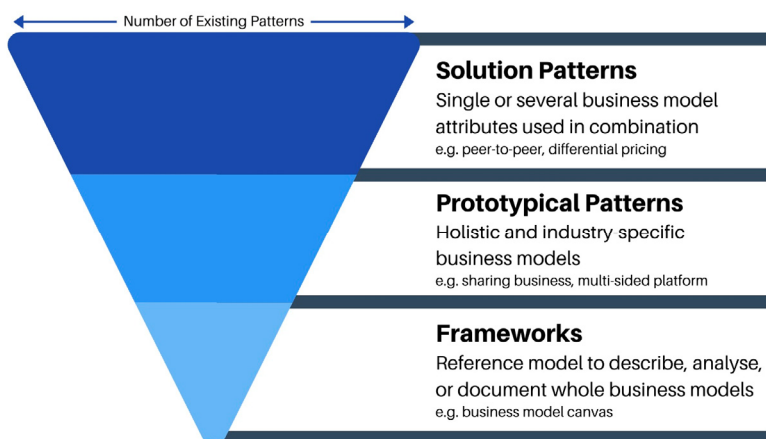


Figure 2. Categories of Business Model Pattern (Curtis, 2021)

2.4 Sharing Economy

The idea of *sharing* increasingly permeates public discourse, but takes on a broad definition. Depending on its context, sharing could mean to share: as an act of division into equal parts; as an act of distribution; as an act of communication; as a form of common ownership; or as a form of individual expression online (John, 2013). In the last decade, there has been increasing focus on sharing as a means to address current unsustainable patterns of production and consumption by utilising the idling capacity of our material world (Frenken & Schor, 2017; Voytenko Palgan et al., 2016). Proponents suggest that sharing may improve resource efficiency, prevent idling of goods, and develop meaningful peer-to-peer interactions, enhancing trust within urban communities (McLaren & Agyeman, 2015; Voytenko Palgan et al., 2016).

Although sharing has been a traditional form of exchange in human history (Belk, 2010), its interest to researchers has recently resurfaced as new business models are emerging, enabled by digital technologies and social media (Schor, 2014). Born from this idea, the ‘sharing economy’ has emerged as the catch-all term to capture divergent business models that leverage ICT to connect people digitally (McLaren & Agyeman, 2015), enabling access to underutilised goods and services, skills and spaces (Frenken & Schor, 2017).

2.4.1 Contestation

To this day, the sharing economy remains a contested concept. The sharing economy is often criticised for framing sharing as an economic activity instead of a social, cultural, or political activity. Among academics and practitioners, the term is defined differently, depending on their discipline or motivation for research. This is not a criticism, but recognition that semantic confusion permeates the discourse and risks loss of meaning (Belk, 2014a; John, 2013; L. Richardson, 2015). This may lead to undesirable outcomes for managers and practitioners working within the domain (Habibi et al., 2017), e.g. lack of clarity, loss of users, additional regulations, other rebound effects. Furthermore, the phenomenon may be co-opted or exploited (Aloni, 2016; Barta & Neff, 2016; Belk, 2016).

Defining the sharing economy is further complicated as it is conflated with similar concepts, including collaborative consumption, collaborative economy, peer economy, gig economy, internet-of-things, the mesh, among others. For example, numerous scholars lump several related terms together: “collaborative economy, also known as collaborative consumption, the sharing economy and peer-to-peer consumption” (Dredge & Gyimóthy, 2015, p. 286); “the main idea around the collaborative economy, or the peer-to-peer/sharing economy is the idea of access” (Begum & Anjum, 2016, p. 141); “[s]haring economy (also called on-demand, access-based or collaborative economy)” (Bálint & Trócsányi, 2016, p. 392).

One last example of the conflation and contestation of the sharing economy in literature: the two most cited articles on Scopus – Belk (2014b) and Hamari et al. (2016) – have both terms “sharing economy” and “collaborative consumption” in their titles.

There are significant overlaps between related concepts within the sustainable business model domain – sharing economy, circular economy, and product-service systems. For example, circular economy strategies to slow resource loops include business models belonging to product-service systems and the sharing economy (Bocken et al., 2016). I am making a deliberate choice to not discuss these overlaps further, instead focusing only on the sharing economy. However, I will take up this issue again in **Section 5.2**, and contextualise my research findings in relation to these related sustainable business model domains.

2.4.2 Origins in Literature

Felson & Spaeth (1978) are often cited as the first to coin the related term “collaborative consumption”; they defined collaborative consumption to describe “...those events in which one or more persons consume economic goods or services in the process of engaging in joint activities with one or more others” (Felson & Spaeth, 1978, p. 614). Despite this early publication and frequent citing in more recent literature, this definition is not consistent with the remainder of the literature on the sharing economy. The term collaborative consumption does not appear again in academic literature until Belk (2010).

Belk (2010) distinguishes between large-scale commercial carsharing organisations and small-scale cooperative carsharing arrangements, suggesting that only the latter is an example of collaborative consumption, citing the work of Felson & Spaeth. Nonetheless, Belk (2010) does acknowledge newer forms of collaborative consumption, facilitated by digital or “virtual” collaboration.

Botsman & Rogers (2010) published the book *What’s Mine Is Yours: The Rise of Collaborative Consumption* in September 2010. This popular science book has played a large role in shaping early academic literature and warrants discussion. They suggest that collaborative consumption captures the groundswell in platforms with a cooperative, collective, and communal focus (Botsman & Rogers, 2010, p. 20). The book organises examples of collaborative consumption into three overarching systems, i.e. product service systems, redistribution markets, and collaborative lifestyles (Botsman & Rogers, 2010).

A competing book was published shortly after, in November 2010, by Gansky (2010) called *The Mesh: Why the Future of Business Is Sharing*. Gansky (2010) took notice of similar trends including improving digital capabilities; she conceived ‘the mesh’ to describe network-enabled sharing that predicated itself on access over ownership,

increasing the opportunity to “sell” the same product multiple times. In reading this work, the framing of “the mesh” appears to be more commercially centred than collaborative consumption.

These works describing collaborative consumption and the mesh are incorporated in early conceptualisations of the sharing economy, an umbrella term that captures an array of activities (Hamari et al., 2016; Heinrichs, 2013; May et al., 2017). The term sharing economy first appears in academic literature in Lamberton & Rose (2012) in their discussion of commercial sharing systems. In addition to citing works by Botsman & Rogers (2010), Gansky (2010), and Belk (2010), the publication only references Sacks (2011), writing for *Fast Company*, when using the term “sharing economy”. *Fast Company* is a “progressive business media brand”, with an editorial focus on technology, innovation, leadership and design (Fast Company, n.d.). The piece by Sacks (2011) does not define the sharing economy; instead, they use examples to exemplify what is meant by the sharing economy. The piece draws upon work by Botsman & Rogers to describe the sharing economy, even though the popular book never makes any mention of the sharing economy specifically.

Another popular science publication is also referenced a number of times in academic literature. Writing for *Forbes*, Geron (2013) published a piece called *Airbnb and the Unstoppable Rise of the Share Economy*. They use terms “sharing economy”, “share economy” and “gig economy” interchangeably, but the share economy is a term that does not appear elsewhere in literature, with the exception of a separate concept described by Weitzman (1984). They provide an estimation of the profitability and growth of the sharing economy, however, without providing a definition of the market they are forecasting.

The advancement of the sharing economy in society seems dominated by entrepreneurs and those interested in its market potential. There are unresolved tensions within the theory and practice, which require further conceptual work, regarding labour rights, health and safety standards, taxation, ethics of technology, and sustainability. Literature on the sharing economy so far has been highly susceptible to popular science literature and perpetuated claims not founded by academic research, especially regarding its sustainability and economic potential. These claims remain largely underdeveloped, although there is increasing effort to study the environmental impact of sharing platforms.

2.4.3 Sharing Economy Business Models

While research on the sharing economy continues to evolve, the predominant focus of literature and media remains on sharing economy unicorns Airbnb and Uber (Muñoz & Cohen, 2018; Ritter & Schanz, 2019). However, these unique stories do not capture the diversity of business model permutations in the sharing economy (Chasin et al.,

2018). While research does elaborate business models for shared mobility (Cohen & Kietzmann, 2014) and shared accommodation (Voytenko Palgan et al., 2016), there are few comprehensive sharing economy business model conceptualisations (Curtis & Mont, 2020). In other words, these few contributions provide diverse and contradictory conceptualisations, which do not convey sufficient knowledge, constructs, or frameworks to support the design and implementation of sharing economy business models more broadly. I suggest three areas the current conceptualisations may be improved: 1) depart from a prescriptive and coherent definition of the sharing economy; 2) provide greater description of business model attributes and associated knowledge to support implementation; 3) incorporate sustainability as a design condition (Curtis & Mont, 2020).

Depart from a prescriptive and coherent definition of the sharing economy – The reviewed conceptualisations continue to wrestle with semantic confusion, which leads to the inclusion of empirical data that influences the research output. For example, Muñoz & Cohen (2018, p. 115) state that the sharing economy must aim to optimise *under-utilised resources*, reflecting a characteristic of the sharing economy largely established within literature. However, their proposed sharing business model compass includes optimising the use of new resources, citing Etsy and InstaCart to exemplify their tool. These platforms demonstrably do not facilitate access to under-utilised assets, facilitating instead access to and distribution of new assets.

In contrast, Plewnia & Guenther (2018) choose not to depart from a definition in developing their business model typology, stating, “[i]nstead of focusing on a clear cut definition which classifies activities as either sharing or not sharing economy, we take a broader literature based approach ...” (2018, p. 572). I assume that if academia or practitioners claim a business or practice is part of the sharing economy, then it is included in their study. Instead of a descriptive approach, with data sources indiscriminate of the practices “...uncomfortably corralled under the term ‘sharing economy’” (Davies et al., 2017, p. 210), I propose a prescriptive approach to design business model conceptualisations to improve outcomes, for example, successful business model implementation and improved sustainability performance.

Provide greater description and associated knowledge – Literature may provide more elaborate descriptions of the concepts and constructs that make up sharing economy business model conceptualisations. Without a clear or consistent definition, it is difficult to demarcate the practices and business models included in the sharing economy. Therefore, the existing conceptualisations lack transparency in the choices made by some scholars. Some conceptualisations include business-to-consumer models operating as a one-sided market (Plewnia & Guenther, 2018; Ritter & Schanz, 2019; Täuscher & Laudien, 2018), while others restrict their focus to only two-sided markets (or triadic business models) (Chasin et al., 2018; Curtis & Mont, 2020). Existing

conceptualisations include physical goods as well as a broad range of services, including Uber, Netflix, Wikipedia, food subscription boxes, and the cinema.

Regarding specific business model attributes, Muñoz & Cohen (2018) propose corporate, collaborative, and cooperative governance in the sharing economy, but provide no definitions or examples to exemplify these governance mechanisms. Täuscher & Laudien (2018) use morphological analysis to describe platform business models, inclusive of the sharing economy; however, they do not justify their inclusion of value proposition as part of value delivery, in contrast to the predominant value dimensions discussed in literature (see **Section 2.3**). They also do not define several business model attributes in their framework, for example, price discovery and pricing mechanisms. With many more examples, it is clear that greater elaboration of the relevant business model attributes and associated knowledge would support understanding in theory and practice.

Incorporate sustainability as a design condition – Despite widespread claims of the sharing economy contributing to improved sustainability outcomes, these claims go largely unchallenged. Sharing economy business models are not sustainable by default, but require deliberate design choices not yet captured among the existing business model conceptualisations (Curtis & Mont, 2020). Muñoz & Cohen (2018) incorporate sustainability as part of the business approach, and Plewnia and Guenther (2018) frame their business model typology as guiding sustainability research in the sharing economy. However, neither provide guidance on how to design sharing economy business models that may lead to improved sustainability performance.

3 Methodology

How you study the world informs what you learn about the world (Patton, 2014). Therefore, I believe there is ample reason to intimately understand and appreciate your methodology as a researcher. Methodology describes a systematic framework of strategies and methods used to conduct research, based on the inquirer's paradigmatic assumptions and corresponding research arena (Guba & Lincoln, 1994). While methodology is inclusive of methods, it also describes the research project in the broader scientific context. This chapter presents the scientific positioning of this research (Section 3.1), the overarching research logic and design (Section 3.2), methods for data collection and data analysis (Section 3.3), reliability and validity (Section 3.4), potential ethical considerations (Section 3.5), and wider methodological reflections (Section 3.6).

3.1 Scientific Positioning

The literature and theory that this research rests upon – sustainability science, business models, and the sharing economy – is inherently inter- and trans-disciplinary. Researchers draw on a toolbox of qualitative and quantitative methods to study the phenomenon from numerous fields of study: environmental science, management, law, economics, and various social science disciplines. However, integrating ontological and epistemological assumptions, as well as knowledge, methods, and tools, across these disciplines presents challenges and opportunities to generate meaningful knowledge.

3.1.1 Philosophy of Science

As an entry point to the philosophies of science, I found Guba and Lincoln (1994) to be very accessible. They describe what they call “an inquiry paradigm”, which designates a metaphysics that delimits the perspective of a researcher while conducting research. They discuss the belief system of four inquiry paradigms: positivism, post-positivism, critical theory et al., and constructivism (Table 1). To understand a particular “inquiry paradigm”, they pose three interconnected questions (1994, p. 108):

1. **The ontological question** – What is the form and nature of reality and, therefore, what is there that can be known about it?

2. **The epistemological question** – What is the nature of the relationship between the knower and what can be known?
3. **The methodological question** – How can the would-be knower go about finding out whatever they believe can be known?

Positivism suggests that the production of scientific knowledge should be derived from fact through direct observation (Chalmers, 2013). Ontologically, positivism postulates an apprehensible reality in which research can converge, regardless of the inquirer involved in the observation (Guba & Lincoln, 1994). Positivism takes a dualistic perspective, in that the subject and object are independent of each other. In other words, observation occurs through a “one-way mirror” in which the inquirer is not impacted or does not impact the characteristics of the object being observed. Chalmers (2013) suggests this is the primary shortcoming of positivism – the inability to separate the knowledge inquiry from the theoretical perspective of the observer.

Post-positivism describes an ontology of critical realism – a philosophy that there is an independent reality that science can study, but recognises the limitations of one’s ability to generate knowledge about it with any certainty.

Critical Theory et. al. encompasses the philosophies of post-structuralism and postmodernism, and their intermingling (Guba & Lincoln, 1994). Ontologically, this paradigm of inquiry accepts a historical realist point of view, in that reality is fashioned over time by societal factors (e.g. social, political, cultural, ethnic, gender), but only describes a static, virtual reality without recognising the ongoing processual changes in that reality (Annells, 1996). Knowledge is generated subjectively through dialectical processes (Guba & Lincoln, 1994). For my own thinking, I see this as a transition away from a realist perspective towards a more relativist view.

Constructivism assumes a relativist ontological point of view, in that realities are subjectively constructed according to differences in perception and interpretation. Constructivism “...asks one to suspend belief that commonly accepted categories or understandings receive their warrant through observation” (Gergen, 1985). Knowledge is created based on local and specific relations the inquirer has with the object under investigation, creating multiple mental constructions of reality that exist collectively (Annells, 1996). This relationship between the researcher and the object of investigation suggests they are ‘interactively linked’ (Guba & Lincoln, 1994). A constructed, relativist reality blurs the distinction between ontology and epistemology in what can be known about reality, based on the inextricably linked relationship of the researcher and the object under study.

Table 2. Alternative Paradigms of Inquiry (adapted from Guba & Lincoln, 1994)

	Positivist	Post-Positivist	Critical Theory et. al.	Constructivist
Ontological	Naïve realism: "real" reality but apprehensible	Critical realism: "real" reality but only imperfectly and probabilistically apprehensible	Historical realism: Virtual reality shaped by social, political, cultural, economic, ethnic, and gender values; crystallised over time	Relativism: Local and specific constructed realities
Epistemological	Dualistic/objectivist; findings views as truth	Modified dualist/objectivist; critical tradition/community; findings probably true	Transactional / subjectivist; value-mediated findings	Transactional / subjectivist; created findings
Methodological	Experimental / manipulative; verification of hypothesis; chiefly quantitative methods	Modified experimental / manipulative; critical multiplism; falsification of hypothesis; may include qualitative methods	Dialogic / dialectical	Hermeneutical / dialectical

3.1.2 Interdisciplinarity

I position my research within the field of sustainability science, an inherently interdisciplinary research field. Several practical and ontological questions arise when conducting such research. For example, I engaged in lively discussions about how to integrate knowledge and methods from different disciplines, with different philosophies, for different motivations (e.g. economic, environmental, social). The research aim, academic and practical contribution, and audience also impact the ontological and epistemological view of the researcher in sustainability science. Therefore, I think it is important to reflect on one's philosophical position, especially when conducting interdisciplinary research.

Unfortunately, there seems to be little acknowledgement of the potential differences in application of qualitative methods in interdisciplinary research. For example, in my PhD courses *Philosophy of Science* and *Qualitative Methods*, the word "interdisciplinary" is found less than ten times throughout all of the course literature (more than 1,500 pages). When it is mentioned, the context is largely unhelpful for interdisciplinary researchers. For example, Barbour (2013) suggests that it is "possible to present findings in a variety of formats for different audiences ... enhanced by the broader scope afforded by interdisciplinary research teams". Esin et al. (2013) provide a rather narrow view of the "interdisciplinary space" as researchers from sociology, psychology, history and anthropology.

Some of the qualitative methods, as developed and used in disciplines within the social sciences, are applied differently in interdisciplinary research. One possible reason for

this is the ontological and epistemological positions of the researcher from these disciplines. These positions have some bearing on the methodological choices and vice versa. For example, constructivism is widely adopted by narrative researchers (Esin, Fathi, & Squire, 2013: 203); discourse analysis reflects the constructivist ontology in interpreting, negotiating and constituting reality (Potter, 1996: 98; Talja, 1999: 461); and constructivist grounded theory “encourages you to theorize in the interpretive tradition ... delv[ing] into implicit meanings and processes” (Charmaz, 2006). Fields like sociology, psychology and anthropology have seen an “ontological turn” in recent decades towards that of constructionism/constructivism (Gergen, 1985; Holbraad et al., 2014). I have worked hard to understand the nuanced differences between constructionism and constructivism. It seems to me that much literature uses these terms interchangeably. However, I have understood constructivism to describe a reality that is constructed individually through cognitive processes. Similarly, (social) constructionism is a social process in which reality is constructed through discourse and conversation via language.

According to Guba & Lincoln (1994), constructivism adopts a relativist ontology in that local and constructed realities exist, drawing from subjective and created knowledge. Constructivists, in addition to studying a phenomenon, also tend to be interested in *how* and *why* questions that seek to understand the way in which participants understand, construct, and interpret the phenomenon (Charmaz, 2006; Potter, 1996).

Jonathan Potter, in *Representing Reality*, raises the metaphor of the mirror and the construction yard to illuminate this. The mirror reflects a reality that is “reliable, factual or literal”, with a focus on the description of a phenomenon (Potter, 1996). In contrast, the metaphor of the construction yard recognises that descriptions construct versions of reality and that these descriptions themselves are constructed (Potter, 1996). While I recognise the merit in approaching the research arena as a construction yard, the processes that lead to the construction of reality seem less relevant for the audience of my research; instead, I seek to develop theory-building and prescriptive knowledge of real-world phenomenon with less emphasis on power and the dialectical processes of construction. In collaborating with diverse societal stakeholders, as is common in inter- and trans-disciplinary research, I think that a “probabilistically apprehensible” reality is more palatable than a relativist ontology.

Research in sustainability sciences is often characterised by addressing “specific real world problems”, usually with the intention of providing decision-making support to key stakeholders (i.e. policy-makers, industry, citizens) (Stock & Burton, 2011). Is the very motivation for sustainability research antithetical to a constructivist ontology? It may be that a relativist outlook contradicts the impetus for sustainability research, especially when research outcomes are used as decision support. For example, policymakers may require or expect more objectivist knowledge than a subjectivist constructivist research approach. This is not to suggest that sustainability researchers

should avoid reflectivity and discount the limitations of their methodologies. Instead, researchers must acknowledge and be forthcoming that the knowledge generated is probably true to the best of their ability (Guba & Lincoln, 1994).

Therefore, I suggest that the research objective and audience dictate the formulation of research questions and the execution of chosen methods in sustainability science, which reflects a more pragmatic ontological and epistemological position as researchers in interdisciplinary sciences.

3.1.3 Pragmatic Constructivism

In answering the ontological question posed by Guba & Lincoln (1994), I first and foremost primarily believe in a subjective, relativist reality. However, in sustainability science – where the knowledge generated is often used as decision-support – I do think there is meaning in reflecting on the realism/relativism divide. As Schwandt (1994, p. 237) stated, “[o]ne can reasonably hold that concepts and ideas are invented (rather than discovered) yet maintain that these inventions correspond to something in the real world.” Therefore, while reality may be subjective, I suggest the design and implementation of knowledge corresponds to an observable reality where individuals make decisions and take action. This must be the case if we are to address our sustainability challenges, which threaten human and non-human life on Earth. To have hope, we must believe that our decisions and actions have meaning in the “real world”.

The philosophical worldviews I considered in the context of this research were critical realism and pragmatic constructivism, each barely straddling the realism/relativism boundary. Ultimately, I suggest *pragmatic constructivism* to be the philosophical worldview guiding me during this research. Firstly, a research objective that seeks to design business model artefacts to improve the status quo suggests an underlying ontological standpoint of constructivism (Romme & Reymen, 2018; Siedhoff, 2019; Winter & Aier, 2016). While the ontological position of researchers utilising a design science approach varies, Lincoln & Guba (2000) propose a relativist ontology to reflect the assumptions made during design science research and to respond to changing conditions affecting artefact design. Secondly, design science research is largely seen as pragmatic in nature (Hevner et al., 2004; Siedhoff, 2019). A pragmatic paradigm supports a multi-method approach to produce theory-building and design-oriented research aimed at changing and improving a “real-world” phenomena (Siedhoff, 2019; Teddlie & Tashakkori, 2003).

Pragmatic constructivism is derived from constructivism and the pragmatic tradition of research (Haas & Haas, 2002), most associated with the writings of John Dewey (Cherryholmes, 1992; Schwartz, 2016) and George Kelly (Adams-Webber, 1989; Paris & Epting, 2015). Such a paradigm places the focus on the research problem, and allows for flexibility in choosing the relevant methods, tools, and techniques to meet the

research objective (Creswell, 2014). While pragmatists acknowledge an “external independent world” as well as a world “lodged in the mind” (Creswell, 2014, p. 11), their concern is with what works to solve problems (Patton, 2014). Finally, they are more interested in *what* and *how* questions, considering the larger system and the impacts or consequences of their research (Creswell, 2014).

My research is less interested in questions of place, self, identity, sociality, etc. Instead, my research focuses on the design of business models for the sharing economy, their indicative impact on sustainability, and strategies to implement sharing as a mode of consumption. Nonetheless, I recognise that my experiences, education, gender, race, age, sexual orientation, and socio-economic status influence my perceptions and observations. Therefore, I see the added value of integrating multiple methods to achieve my research objective.

3.2 Research Design

I draw inspiration from the book *Designing a Research Project* by Piet Verschuren and Hans Doorewaard (2010), which served as a useful resource throughout my PhD. They suggest that designing research involves two distinct aspects: conceptual design and technical design. Conceptual design encompasses demarcating the content and purpose of the research, including the research objective, research framework, and research questions. Technical design describes the means to realise the stated objective, for example, the research strategy and materials. In this section, I elaborate on both aspects of research design.

3.2.1 Conceptual Design

The sharing economy is a contested phenomenon in theory and practice, drawing intellectual and emotional reactions. For example, some authors suggest that the sharing economy is not sharing at all, but a repackaging of neoliberal ideals (C. J. Martin, 2016; Piracha et al., 2019). Likewise, urban residents dislike the impacts of Airbnb on the local housing market (Boutsioukis et al., 2019; Muñoz & Cohen, 2018), Uber on congestion (Plante, 2019), or e-scooters on pedestrian safety (Paton, 2020).

However, I understand the need for more sustainable modes of consumption and production to alleviate our sustainability challenges. My research takes on a normative and prescriptive tone, inspired by design science research. I am motivated to explore the possible ways to conceptualise, design, and implement sharing economy business models to realise improved sustainability performance. Verschuren & Doorewaard (2010) suggest that motivation provides an important steering effect to establish a research objective and influence the technical design and practical implementation of the research.

3.2.1.1 Research Objective

The objective of this research is to advance and structure knowledge about the sharing economy and sustainable business models by using business modelling methods to study the design and implementation of sharing economy business models. The outcome of this research provides sophisticated knowledge and tools to support academics and practitioners to more critically reflect on the design and implementation of SEBMs that support more responsible consumption and production.

3.2.1.2 Research Design Framework

To accomplish the stated research objective, my dissertation engages in both theory- and practice-oriented research. Specifically, my research perspective seeks to advance theoretical knowledge – by offering conceptualisations and propositions – and design frameworks and tools to support implementation of SEBMs for sustainability. Design-oriented research is particularly suited for prescriptive research (Verschuren & Doorewaard, 2010, p. 108), and justifies a design-science approach (Vaishnavi et al., 2004).

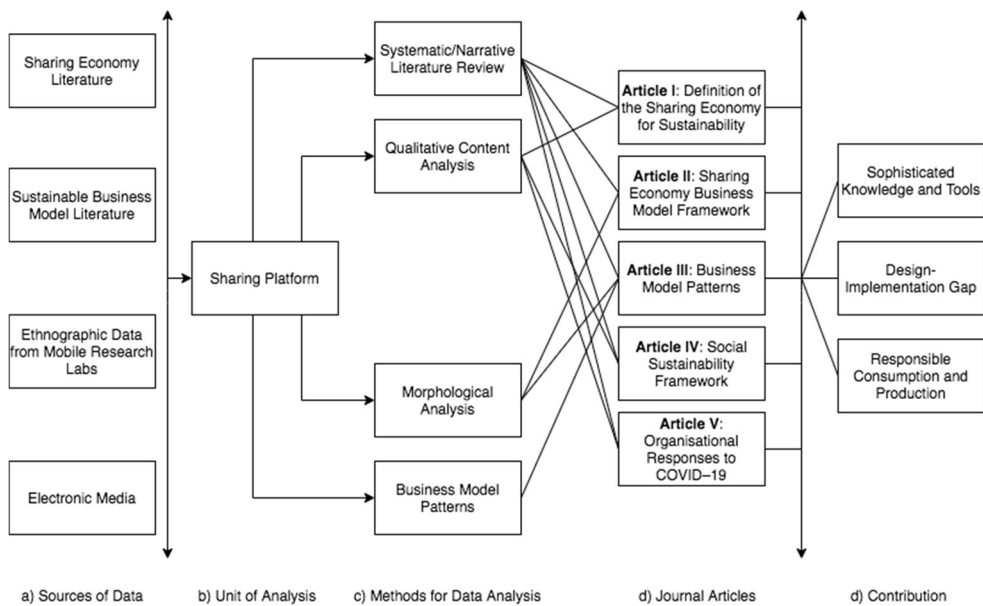


Figure 3. Research Design Framework

Again, with guidance from Verschuren & Doorewaard (2010), I propose the following research framework (Figure 3), which visualises the research objective and the interrelated steps to achieve it. The framework describes (a) the materials that are collected to study the unit of analysis, (b) the methods for data analysis, and (c) their intended output (d), which achieve the research objective and describe the holistic contribution of the research project (e). Each aspect of the framework is described in greater detail in the remainder of this chapter.

3.2.1.3 Research Questions

The formulation of research questions is one of the most important and most challenging aspects of research design (Verschuren & Doorewaard, 2010, p. 108). The primary function of research questions is to have a steering effect on the subsequent technical design, which efficiently addresses the research objective. Engaging in prescriptive theory-building and design-oriented research, the following questions seek to address the design-implementation gap of sharing economy business models.

RQ1: What design principles can guide the design and implementation of sharing economy business models for sustainability?

RQ2: How may sharing economy business models be designed for sustainability?

RQ3: What constellation of business model attributes and organisational strategies support implementation?

3.2.2 Technical Design

The technical design of a research project describes the choices undertaken to carry out the research objective (Verschuren & Doorewaard, 2010, p. 108). These choices include breadth or depth, qualitative or quantitative methods, and empirical or conceptual orientation of the researcher.

Reflecting my ontological position and research perspective, I choose a *broad* theory-building orientation using primarily *qualitative* approaches to research. While I draw on empirical materials, my primary contribution is *conceptual* in nature, reflecting the design-orientation of this research. These choices are reflected in the research strategy and research materials, which constitute the technical design of this research project.

3.2.2.1 Research Strategy

The research strategy describes “... the coherent body of decisions concerning the way in which the researcher is going to carry out the research” (Verschuren & Doorewaard, 2010, p. 155). The selected strategy dictates the methods for data collection and analysis relevant to answer the research questions. Verschuren & Doorewaard (2010) outline five overarching research strategies: survey, experiment, case study, grounded

theory approach, and desk research. For the purposes of my research, I adopt the research strategies of grounded theory approach and desk research.

Where design science research focuses on problem-solving, Beck et al. (2013) posits a theory-generating design science research approach by integrating *grounded theory methodology*. By combining methodologies from design science and social science, such an approach ensures contributions to both solving real-world problems and advancing scientific knowledge (Beck et al., 2013).

While much has been written about *grounded theory*, I see it as an inherently inductive and inquisitive research strategy with careful and consistent procedures to gain empirical insights. In contrast to deductive research and *a priori* assumptions, grounded theory sees its methodology as a way to theorise for the intended purposes of its study (Annells, 1996). Grounded theory is a method in qualitative research that constructs concepts or theories through ‘grounding’ analysis directly from and within the data. Data is most frequently collected via interviews and observations, but may include any type of written, observed, or recorded materials, including videos, journals, blogs, drawings, memos, historical records, and internet content (Corbin & Strauss, 2015).

Grounded theory utilises analytical strategies such as questioning, making comparisons, considering various meanings, flip-flopping contexts, examining language and emotions, among others (Corbin & Strauss, 2015). However, in grounded theory, these dialectical processes are equally important. Researchers preserve their thinking and work with the data using notes, annotations, and memos. This process becomes useful in advancing understanding, but also in further sorting and coding of concepts, which allows researchers to get closer to presenting an integrated theory (Corbin & Strauss, 2015).

The importance of grounded theory is not the construction of the concept or object itself, but the meaning given to it and the action-interaction that ensues (Corbin & Strauss, 2015). In particular, this is salient as the meaning of the sharing economy is imbued onto the concept from actors with competing motivations (e.g. economic growth, sustainable consumption). Ultimately, the goal of grounded theory, and of this research, is “to distil a consensus construction that is more informed and sophisticated than any of the predecessor constructions” (Guba & Lincoln, 1994), in this instance, the design of sharing economy business models.

A grounded theory approach offers versatility on the basis of the ontological and epistemological perspective of the researcher. For a more thorough discussion on the different approaches to grounded theory, I recommend *Contrasting Classic, Straussian, and Constructivist Grounded Theory: Methodological and Philosophical Conflicts* by Kenny & Fourie (2015). I tend to adopt Straussian Grounded Theory, which diverges from the Classical Grounded Theory approach developed by Glaser & Strauss (1967) in that Straussian seeks to *create* concepts rather than *discover* them from the data. In so many ways, this embraces the post-positivist ontology that reality is constructed.

However, I refrain from wholly embracing Constructivist Grounded Theory because of, what I perceive to be, the more elaborate, meticulous, and iterative processes of Straussian Grounded Theory (Kenny & Fourie, 2015). In particular, Corbin & Strauss (2015) describe coding in Straussian Grounded Theory as processes of open coding, axial coding, and selective coding.

I suggest grounded theory for numerous reasons: its adaptive and flexible qualitative methodologies, which include gathering data (e.g. literature, interview, observation), categorising, and coding of concepts; its ability to examine concepts and behaviours from different angles; and its ability to construct culturally sensitive, contextualised theories or more pragmatic, generalisable theories (Bryant & Charmaz, 2007; Corbin & Strauss, 2015). This research approach is relevant for the field research conducted as part of the dissertation, such as the mobile research lab (Section 3.3.1.1).

Desk research serves as an important research strategy throughout my dissertation in that every study collected literature for analysis as part of the research design. Desk research is characterised by using existing material without direct contact with the research object, and is removed from its time of production (Verschuren & Doorewaard, 2010). Three categories of existing material are often used in desk research: literature, secondary data, and official statistical data (Verschuren & Doorewaard, 2010), but here I focus my research on literature and secondary data.

Regardless of the source of material, desk research is able to collect and analyse large amounts of data quickly (Verschuren & Doorewaard, 2010). However, there are some drawbacks to this type of research: 1) the material constituting the data for desk research was prepared by others for purposes beyond the research objective; and 2) desk research assumes that the researcher has access to all relevant materials to fulfil the research objective. To address this, I sought to engage in systematic and narrative literature reviews (Section 3.3.2.2) as well as combine multiple methods to interpret analysis and arrive at design artefacts.

3.2.2.2 *Research Materials*

Based on the above research strategies, I incorporate various sources of data throughout my research. Verschuren & Doorewaard (2010) identify five types of sources including people, the media, observation, documents, and literature. Each of these sources can be categories as either knowledge sources or data sources based on their answering the research question (Verschuren & Doorewaard, 2010). For example, literature may serve as a data source when comparing definitions of the sharing economy among scholars, and as a knowledge source when synthesising barriers to the implementation of SEBMs.

Specifically, I incorporate data materials from *people* (e.g. interviews, stakeholder workshop), *documents* (e.g. webpages), and *literature* (e.g. academic literature on the sharing economy or business models). For greater elaboration of the sources of data, see Section 3.3.1.

3.3 Methods

The methods throughout this dissertation are varied, reflecting the pragmatic and prescriptive orientation of research inspired by design science. However, I think it is important to distinguish between methods for data collection and methods for data analysis. Both of these often constitute discrete and structured approaches to gather research materials, and inductively or deductively analyse the data to arrive at an output. In the following section, I review the methods for data collection and methods for data analysis performed throughout this dissertation. In addition, I summarise the methods that contributed to each article included in this dissertation (Table 3).

Table 3. Overview of Methods for Data Collection and Data Analysis

Article	Method for Data Collection	Method for Data Analysis
Article I	Database Search	Systematic Literature Review; Qualitative Content Analysis
Article II	Mobile Research Lab, Database Search	Narrative Literature Review, Morphological Analysis
Article III	Mobile Research Lab, Database Search, Internet Research	Narrative Literature Review, Business Model Patterns, Quantitative Cluster Analysis
Article IV	Database Search, Stakeholder Workshop, Interviews	Narrative Literature Review, Qualitative Content Analysis
Article V	Database Search, Internet Research	Narrative Literature Review, Web Analysis

3.3.1 Methods for Data Collection

3.3.1.1 *Mobile Research Lab*

As the primary data collection method for the research project *Urban Sharing*, the mobile research lab seeks to provide structure and support to researchers in order to conduct intensive data collection in a short period of time. The intention of the mobile research lab is to observe, interact, and interview stakeholders in the sharing economy by embedding, albeit temporarily, in the city context. I participated in five mobile research labs; three of these took place in person in Berlin, Amsterdam, and Toronto – which lasted five to seven days. These intense days were dedicated to in situ focused ethnographic practices such as observation, participation, and interviews. The other two mobile research labs were conducted remotely due to the COVID-19 pandemic, utilising video conferencing applications to interview participants. The data collected during these labs allow the team to theorise about the sharing economy, including the design of sharing economy business models.

This approach builds on the Infra-Lab approach, originally conceptualised by Harriet Bulkeley, Simon Marvin, and Johannes Stripple. An Infra-Lab brings together an interdisciplinary group of researchers to explore the development, outcome, and contestation of various infrastructure sites in an urban environment in order to study a certain phenomenon in a city. This usually involves a day-long study visit, which includes observations, interviews, and reflections among the group of researchers.

However, instead of examining infrastructure, the mobile research lab executed here explores a complex societal phenomenon and the activities of a variety of organisations and societal actors. The MRL is described as a collaborative process of conducting in-situ data collection with an “ethnographic touch”. In contrast to traditional at-a-distance interviews, the mobile research lab connected the researcher and research context, illuminating “the subject’s stream of experience and practice in relation to a given setting” (Jørgensen, 2016, p. 39), in this instance, the sharing economy in the particular geographical context.

For each city, researchers spent approximately six months collecting primary and secondary data about sharing platforms and local contexts. Research into each city concluded in a mobile research lab, a week-long focused ethnography involving intense data collection by a team of interdisciplinary researchers (Knoblauch, 2005; Mont, 2018). This research culminated in a catalogue of sharing platforms for each city, supplemented by primary data (e.g. interviews with platforms, users) and secondary data (e.g. website, blogpost, news, social media, industry reports, academic literature) about the design of sharing platforms.

The methodological justification is built on *ethnography, participation, and observation* as well as *interviews*. In doing so, my team and I interacted with actors directly and indirectly involved in the sharing economy in cities (i.e. entrepreneurs, users, city governments, incumbent companies, civil society organisations, NGOs).

Ethnography, Participation, and Observation

Ethnography can be described more as an approach or philosophy on how to conduct rather than a set of prescribed methods to be carried out in sequence (O’Reilly, 2012, p. 10). Instead, it harvests methods such as observation, participation, fieldwork, interviews, and conversations (O’Reilly, 2012, p. 10). Prominent features of ethnography include: immersion in context with direct and sustained contact with human participants; recognition and respect of the complexity of the social world; evolution of research design as the study progresses; and knowledge production pertaining to the wider context that is rich and convincing (O’Reilly, 2012, p. 11).

In situating the MRL as the methodological approach for data collection, I describe the approach as “focused ethnography”. Knoblauch (2005) describes focused ethnography as short-term field visits characterised by intense data collection, supported by digital

technologies. For example, due to the intensity and short duration, this includes pictures and videos to complement observation and recording audio of observations or team conversations, instead of writing more elaborate fieldnotes.

I see the value in fieldnotes (as opposed to only audio-recorded spoken observations). In considering the practice of taking fieldnotes, I am inspired by the contrasting discussion between the tourist gaze and that of the ethnographer. Urry & Larsen (2011) describe looking as a “learned ability”. They describe different objects the ethnographer can gaze upon differently than the tourist: 1) seeing a unique object; 2) seeing known signs and symbols; 3) seeing unfamiliar aspects; 4) seeing ordinary aspects in unusual contexts; and 5) seeing extraordinary aspects, which appear not to seem so (Urry & Larsen, 2011).

There are elements of ethnographic research that I think are particularly useful in conducting interdisciplinary research, for example, the use of observation in studying a community of research interest. There are times when observational data is more reliable than interview data, particularly when the object of the study is seeking information themselves (Talja, 1999, p. 471). For example, we experienced this when interacting with entrepreneurs and government officials interested in each other’s activities, and wary of providing information about their own activities.

Traditional aspects of ethnography were included as well, including observing and participating in the sharing economy. However, due to the intensity and the short duration of our embedded mobile research labs, many of the activities and observations were provoked by our presence, and were not an organic or authentic experience.

Interviews

Interviews formed an important basis to collect data during the mobile research labs. Interviews provide already interpreted, secondary data about the research phenomenon (Talja, 1999: 471-472). Generally, I see interview data as largely accurate portrayals of a “probabilistically apprehensible” reality as understood by the respondents (Guba & Lincoln, 1994). However, interviews as a solely information-gathering exercise has its limitations; it relies on the respondents’ ability to accurately remember past situations and events and may be influenced by the research context, surroundings, and the interviewer (Talja, 1999: 471-472).

Interviews are commonly seen as unstructured, semi-structured, and structured. Unstructured interviews give the interviewee most leeway in determining the structure and content of the interview, often performed as a conversation around broad themes where the interviewer is exploring a topic of which the interviewee possesses more knowledge or regarding sensitive subject areas (Justesen & Mik-Meyer, 2013). As a conversation, the interviewer and interviewee are mutually co-constructing meaning (Jacobsson & Åkerström, 2013). Semi-structured interviews, the favourite within my

department, sees the interviewer working from a guide, which outlines the themes and potential questions, but is open to deviation when interesting lines of questioning arise (Justesen & Mik-Meyer, 2013). The semi-structured interview suggests interviewers use neutral, non-leading questions and warns against imposing the researcher's way of thinking on the interviewee (Jacobsson & Åkerström, 2013). Structured interviews follow a strict interview guide dictating the questions and order of the questions asked, typically consisting of closed-ended questions (Justesen & Mik-Meyer, 2013).

As a result of the COVID-19 pandemic, personal accounts of events are being increasingly collected via primarily structured interviews conducted on the internet. Computer-mediated communication (CMC), via email, message boards, and video-messaging platforms, offers a new range of opportunities to social researchers to interview individuals previously inaccessible (Bryman, 2012; Roulston, 2013). However, there are research implications that must be considered when choosing to move the interview online, as outlined by Bryman (2012, p. 667).

I find that the way the interview is conducted is dependent on the research objective, the ontological position of the researcher, and, quite possibly, the personality of the interviewer. I prefer the blending of unstructured and semi-structured interviews, which works from a guide but engages in an open conversation, often called the *active interview* (Holstein & Gubrium, 1995; Justesen & Mik-Meyer, 2013). While this approach possibly builds camaraderie and elicits greater insights, the interviewer's participation and potential influence must be factored in during data analysis (Jacobsson & Åkerström, 2013).

3.3.1.2 Database Search

While the mobile research labs collect primary empirical data, I also incorporate literature as a data source in much of my research. Literature may also serve as data when the researcher sees literature as an objective description of reality, through another author's eyes (Verschuren & Doorewaard, 2010). Due to the ambiguity of the concepts under investigation – e.g. sharing economy, business model, sustainability – literature is fundamental to operationalising key concepts (Verschuren & Doorewaard, 2010).

I primarily used Scopus (except in Article I, where I also include Web of Science); this database has been demonstrated to catalogue more social science research compared to Web of Science, with fewer publications in the social sciences being catalogued only by Web of Science compared to other disciplines (Mongeon & Paul-Hus, 2015).

3.3.1.3 Internet Research

As internet continues to mediate our lives, interesting digital technologies and platforms continue to emerge. Similarly, researchers are finding increasingly novel approaches to study our social interactions and lived experiences on- and off-line (Hine,

2015, p. 15), an emerging research approach called digital ethnography, which merges internet research and ethnography.

Internet research describes a wide-ranging number of practices by researchers: collecting data or information via online interviews, surveys, and data scraping; observing or participating in online communities; engaging in online data processing, analysis, or storage; studying online development of software, codes, and technologies; examining the structures of online systems, interfaces, and features; employing digital, visual, or textual content analysis; and understanding creation, production, consumption, use, and regulation of digital spaces (Markham & Buchanan, 2012, pp. 3–4). I engaged in internet research, by collecting webpages (as documents) and social media data of sharing platforms (**Article III**). This type of internet research may be categorised as data scraping and observing online communities.

Much of our internet usage has “become mundane and unremarkable... becoming simply an infrastructure that offers a means to do other things” (Hine, 2015, p. 46). In order to study these structures and processes, online and offline field sites are created. Researchers interested in local changes and culture relating to increasingly interdisciplinary fields of study now require multi-sited research (Marcus, 1995, pp. 100, 102).

boyd (2015) suggests that a limitation exists in conducting digital content analysis when one does not understand the context that it is produced. As such, I think it is important to understand the motivation of the platform to frame its activities in any one way. Hine (2015, pp. 50–51) highlights the need of the ethnographer to “triangulate their own perceptions with those of other participants”. Lastly, ethical considerations are necessary when researching online social media or community platforms as well as interacting with research participants. Markham & Buchanan (2012) elaborate on numerous ethical tensions to be considered in this study, namely, the interaction with a human subject and the expectation among users that communication is private.

3.3.2 Methods for Data Analysis

3.3.2.1 *Qualitative Content Analysis*

Qualitative content analysis (QCA) is a method to systematically analyse the meaning of qualitative data. The method is best applied to written, spoken, or visual data, and offers flexibility in line with your motivation and research materials (Schreier, 2012). A main feature of QCA is a coding framework, a list of categories that help to focus analysis on relevant information based on the research objective (Miles et al., 2013). The framework may either be deductive or inductive, or both. A deductive coding framework develops a list of categories prior to analysis, often informed by theory,

whereas an inductive coding framework would develop a list of categories iteratively through coding of the data. The process of coding assigns labels to “chunks” of qualitative data to provide symbolic meaning (Miles et al., 2013). There are numerous ways to execute coding of qualitative data, depending on the focus of your research, for example, emotions, cause-effect, magnitude of impact, or evaluation. For the most part, I engaged in inductive coding using the *in vivo*, *processual*, and *holistic* coding techniques. This approach mirrors that of grounded theory presented in **Section 3.2.2.1**.

To support QCA, I used the computer-assisted qualitative data analysis software (CAQDAS) NVivo for Mac, developed by QSR International. Particularly useful for working with large amounts of textual data, NVivo helps to store and structure qualitative data as well as engage in coding (Bazeley & Jackson, 2013; Schreier, 2012). I used NVivo in every article comprising this dissertation, and will continue to do so as a fantastic tool to manage and analyse literature and empirical data.

3.3.2.2 Literature Review

Literature provides important data material throughout this dissertation, with various methods to analyse academic literature. For example, contrasting the annotated bibliography and a literature review, the former provides a summary of individual sources whereas the later analyses, synthesises, and evaluates the content to advance a collective understanding (Efron & Ravid, 2019). A literature review helps to clarify and define terms (**Article I**); to develop research design and critique methodologies (**Article III**); and to demonstrate how the research extends current understanding of the topic (**Article V**) (Efron & Ravid, 2019). This method may be used both as a stand-alone method (**Article I**) or an embedded method (**Articles II, III, IV, V**). I most often used literature review as an embedded method, reflecting the pragmatic use of multiple methods to achieve the research objective.

Differing approaches to literature review are presented by methodological scholars. For example, Sovacool et al. (2018) present the systematic literature review, the narrative literature review, and the meta-analysis; similarly, Efron & Ravid (2019) describe the systematic literature review, the traditional-narrative literature review, and the hermeneutic-phenomenological review. Where the two overlap, I will describe the use of the *systematic literature review* and the *narrative literature review* as a method throughout this dissertation.

Systematic Literature Review

This approach is characterised by a rigorous, highly-structured, and time-intensive review of the literature (Efron & Ravid, 2019). It requires a well-focused research objective and clear research questions to adequately scope the literature included in the review (Sovacool et al., 2018). This type of review sets clear protocols for inclusion and

exclusion of literature in the review, seeking to minimise bias and errors (Efron & Ravid, 2019; Sovacool et al., 2018).

I conducted a systematic literature review of academic literature of sharing economy literature with the objective to analyse and synthesise the diverse definitions of the sharing economy (**Article I**). I relied on methodological literature and similar studies (Efron & Ravid, 2019; Keathley-Herring et al., 2016; Petticrew & Roberts, 2008; Randhawa et al., 2016; Sovacool et al., 2018) to develop a rigorous approach to conduct the systematic literature review, which executed the following phases:

- 1) Clarify research question/objective(s)
- 2) Perform an initial scoping study
- 3) Identify keywords from scoping study for systematic database search
- 4) Develop inclusion/exclusion criteria, informed from scoping study, that reflect the research objective
- 5) Execute database search
- 6) Remove duplicates between the databases and review articles in relation to inclusion criteria
- 7) Data extraction – coding relevant data in NVivo
- 8) Data synthesis – developing descriptive categories
- 9) Report results

The descriptive categories resulting from this analysis represented the broad and conflicting dimensions of the sharing economy. These categories were evaluated, and logical inconsistencies were addressed (e.g. leveraging idling capacity vs. business-to-consumer models). The systematic literature review resulted in a synthesised definition of the sharing economy, including five semantic properties, which served to guide the rest of the research.

Narrative Literature Review

In the remainder of the articles making up the dissertation research, I conducted a narrative literature review. This type of review is exploratory and less rigorous than a systematic literature review. However, proponents of this review approach suggest it allows for more in-depth qualitative insights (Sovacool et al., 2018) by combining theoretical and empirical insights from various disciplines to create a “... fuller understanding of the current state of knowledge on the topic” (Efron & Ravid, 2019, p. 21).

In every case, I executed a database search using keywords, but a narrative literature review makes no attempt to collect all of the relevant literature for analysis (Efron & Ravid, 2019). Instead, this type of review is appropriate when researchers have pre-

existing knowledge in the subject area or literature is insufficient (Sovacool et al., 2018). The limitation of this approach is the impact of researcher bias and a less-rigorous document selection process, which may mean some literature unjustly weighs more heavily in the analysis (Sovacool et al., 2018).

To overcome these limitations, the literature sample was always imported into NVivo and coded qualitatively to improve synthesis of data and description of key categories. Furthermore, in each article, a narrative literature review only complemented other empirical data to support data analysis.

3.3.2.3 Morphological Analysis

Morphological analysis is a customary qualitative modelling method to structure and analyse multidimensional objects (Eriksson & Ritchey, 2002; Zwicky, 1969). This method is increasingly used to research business models, including product-service systems (Kwon et al., 2019), the circular economy (Lüdeke-Freund et al., 2019), and marketplaces (Täuscher & Laudien, 2018). When used to study business models, there are usually three iterative steps: 1) identify and structure the business model attributes and dimensions; 2) conceptualise all possible configuration options for each attribute; and 3) consolidate these elements into a morphological box or schema (Im & Cho, 2013). The output of morphological analysis is the morphological box, or artefact, which serves as a visual representation and classification system (Im & Cho, 2013). This artefact is intended to be directly useful to researchers and practitioners to guide the design of new business models (Kwon et al., 2019).

In **Article II**, I used morphological analysis to develop a sharing economy business modelling tool. The approach combined literature and empirical observations from the mobile research labs in Berlin and Amsterdam to establish an initial artefact. This artefact was tested and evaluated through three rounds of expert feedback to arrive at the final sharing economy business modelling tool.

3.3.2.4 Business Model Patterns (Using Quantitative Cluster Analysis)

Business model patterns are generally understood as attributes of existing business models that recur successfully, which may serve as solutions to a problem in another context (Amshoff et al., 2015; Remane et al., 2017). Scholars typically employ two methodological approaches: a review-based approach, examining existing collections of business model patterns to establish conceptual business model patterns generally (Lüdeke-Freund et al., 2018; Remane et al., 2017), and an empirical-based approach, examining interview and web data to identify novel business model patterns in specific contexts (Abdelkafi et al., 2013; Floerecke & Lehner, 2019; Frankenberger et al., 2014).

In **Article III**, I selected the latter approach to identify novel patterns in the sharing economy. I collected empirical data – including websites, social media, and relevant news articles – representing sixty-three sharing platforms. The qualitative data was

coded in NVivo abductively. The morphological box produced in **Article II** served as the initial deductive coding framework, but I included new configuration options as they emerged from the data. The coded data from NVivo was translated from qualitative data to quantitative data to be useful for quantitative cluster analysis.

I used quantitative cluster analysis in R Studio to group recurring business model attributes into patterns, similar to Amshoff et al. (2015) and Hunke et al. (2017). The k-medoids algorithm was selected to establish clusters, as this algorithm is a partitioning method that seeks to create mutually exclusive clusters rather than hierarchical agglomerative clustering (Kassambara, 2017). This is preferred over the k-means algorithm, as the k-medoids algorithm sets the centre of the cluster as an existing observation and not an average (Kassambara, 2017). This supports characterisation of each cluster when working with nominal data, for example, configuration options.

3.4 Reliability and Validity

Researchers generally want to ensure that their research findings are reliable and valid. *Reliability* describes the procedures to ensure the methods for data collection and data analysis remain consistent and stable over time (Creswell, 2014; Miles et al., 2013), for example, between articles. Reliability also concerns issues of quality, transparency, and integrity. As far as possible, I was clear and complete in my elaboration of sharing economy business models for sustainability (for example, see the **Glossary**). This ensured I was consistent within my analysis, but also that the methods and findings are comprehensible for the audience. When possible, reliability measures were taken, for example, inter-coder reliability in NVivo when coding in a team (**Article I**). Methodological rigour is important to me. My methods are described in detail, and protocols, data, and codes are often made available as supplementary materials. Such research practices also support transparency and replicability.

Validity relates to the accuracy of the research findings from the standpoint of the researcher, participant, or audience (Creswell, 2014), often divided into internal and external validity. *Internal validity* takes the vantage point of the researcher to ensure the accuracy of the findings, including the appropriateness of method and the “goodness” of the findings (Creswell, 2014). Several strategies were employed to ensure internal validity. I mainly triangulated different data materials (e.g. people, documents, literature) and used multiple methods to build coherent and complete conceptualisations. Following a grounded theory approach, I sought theoretical saturation in coding empirical data in NVivo to develop “thick” descriptions of all concepts and categories. When possible, I engaged in member checking, including three rounds of feedback among experts in **Article II** and a stakeholder workshop in **Article IV**. Rival explanations are considered, especially considering existing conceptualisations of sharing economy business models as well as various sustainability

claims. I feel I have been transparent about the academic discipline guiding my research, and any personal bias to advance sustainability. Finally, the research has been reviewed by my peers and accepted for publication by various journals.

External validity considers the generalisability and transferability of the research to other contexts from the vantage point of a participant or audience (Creswell, 2014; Miles et al., 2013). However, Creswell (2014, pp. 203–204) and others suggests the value of qualitative research “... lies in the particular description and themes developed in context of a specific site”. Nonetheless, generalisability is considered possible in grounded theory (Corbin & Strauss, 2015) and case study research (Yin, 2014). However, Corbin & Strauss (2015) make the distinction between generalisable and representative, in that the findings are representative but may not be generalisable to all cases. Because this research is prescriptive and design-oriented, there is something to be learned but, clearly, the findings will not be descriptive of all sharing economy business models. To address external validity, the sampling is theoretically and empirically diverse. However, I should add that only English language literature was reviewed, and sharing platforms investigated were primarily operating in the North American and European contexts. Nonetheless, I provide sufficient elaboration for others to develop, test, or implement the findings further.

3.5 Ethical Considerations

As a politically-active researcher, I see my research responding to the challenges of our time. Prescriptive research inspired by design science guides my research on the sharing economy to promote more sustainable modes of consumption and production. As specifically as possible, I want to review the ethical considerations needed of my research and of academia at large.

3.5.1 Ethical Considerations in My Research Project

In reflecting on the potential ethical quandaries in my research, I arrive at two specific areas for further review: the collection and analysis of sensitive personal data as well as the apparent risk of harming a research participant and the need for ethical review.

During the mobile research labs, there was the chance of collecting sensitive personal information, defined by law to be any potentially identifiable information. According to Section 3 of the Swedish Ethical Review Act (and subsequent definition of sensitive personal data in Section 21 of the Personal Data Act), personal data may be sensitive in nature if the data reveals ethnic group affiliation, religious beliefs, political beliefs, philosophical beliefs, membership of a trade union, sex life, and data regarding health (Swedish Ethical Review Act, 2003). Although not expressly asked, there was a risk

research participants shared sensitive personal data when sharing opinions about the sharing economy.

I conducted interviews with representatives of organisations. Some of our findings may have negative financial implications on these organisations, although not necessarily for the representatives themselves. The Swedish Ethical Review Act is not clear on when financial harm comes to research subjects, stating only that ethical review is needed when an apparent risk of physical or mental injury may be incurred by the research subject (Swedish Ethical Review Act, 2003).

Our data collection via mobile research labs takes place outside Sweden; the Swedish Ethical Review Act states that the statute is only applicable to research that is conducted in Sweden (Swedish Ethical Review Act, 2003). However, the exact understanding of 'conducted' remains contested. The data was stored and analysed in Sweden, which may warrant ethical review.

As a result of these ethical considerations, the *Urban Sharing* research programme applied for ethical approval from the Swedish Ethical Review Board. Their decision was returned on 9 January 2019, stating there was no need for ethical approval. The Review Board determined the project did not process personal sensitive data or cause harm to research participants. Therefore, to minimise any further ethical concerns, I took necessary steps to anonymise the data and store data according to GDPR compliance.

3.5.2 Ethical Considerations of My Research Field

In conducting interdisciplinary research in sustainability, researchers (at least myself) have a particular motivation to study those interventions that promote a more just, ethical, equal, and sustainable world. A researcher may state that they have no agenda and will remain objective and neutral. However, I caution that this is overstating the ability of the researcher. Similar to disclosing a conflict of interest, I think it is important to be forthcoming about any normative motivation or agenda one has as a researcher. This allows the researcher to ensure proper reflectivity in research design, methods, analysis, and communication of results to eliminate or control for bias or, at the very least, allow an audience to reflect on research findings and put them into context. This is something I am aware of and already see myself controlling for in my own research, but I encourage others in the field to reflect in a similar manner.

3.5.3 Ethical Considerations in Academia

Researchers are increasingly juggling mounting roles and responsibilities, with increasing expectations and demands on our time. I vehemently support any effort to consider ethical and methodological reflectivity in our research but, in the light of time constraints, I believe more support must be provided by academic institutions and administration.

I see a continued risk of negative results not being reported due to the perverse incentives currently within academia to publish and receive citations. In my limited experience, funding is provided to those that chase the “hot” topics and overpromise research results or publications. Ultimately, I feel to my core that we have a moral responsibility to challenge existing norms in academia. I do not want to become complacent of and in a system plagued with systemic issues that threaten the foundation of academia and truth in society. As such, I see my role as an interdisciplinary researcher to be critical of existing societal institutions and, when appropriate/asked, propose normative solutions to real-world problems for real-world actors.

3.6 Methodological Reflection

As with any methodology, there is a need to be reflective in understanding the limitations and underlying assumptions of the methods and techniques used to fulfil the research objective. I am particularly vulnerable to the challenges of ethnography as described as the kindly ethnographer, the friendly ethnographer, and the honest ethnographer (Fine, 1993). What may be a result of my North American upbringing, I find that I am often too agreeable and potentially disingenuous towards research participants, which may misrepresent my intentions in conducting research. At least, by acknowledging this, I can be aware of its potential implications and, better yet, take steps to prevent it from happening.

In particular, Fine (1993) warns of becoming a “participant observer”, taking charge and influencing events in a desirable direction, suggesting a transition away from an observer towards that of a manager. Personally, I am more comfortable behind the computer than in front of it, and I do believe that research can explore meaning-making by observing, participating, and interacting with research materials at a distance. Nonetheless, I am moved by the arguments of Miller & Slater (2000), boyd (2015, pp. 83–84), and Hine (2015, p. 6), in particular, that face-to-face interaction helps to establish context, to better understand participants’ mediated practices.

During the mobile research labs, one challenge I had is the need to begin to analyse what I am seeing as I am seeing it. This seems like a natural process of meaning-making. Within the literature, I think Katz (2018) provides the most guidance, although limited, on the practice of fieldnote-taking, suggesting that researchers must decide for themselves what type of researcher they wish to be, stating that “the hallmark of ethnographic fieldwork ... is to commit to writing comprehensive fieldnotes quickly after leaving each trip to the field” (Katz, 2018, p. 11). However, the nature of the mobile research lab as focused ethnography leaves little space and time to observe, write, and think, instead relying on the pictures, video, and audio recorded during the trip. I suggest more thought is needed to process the audio-visual data captured onsite and incorporate this in future research.

One challenge I see to leveraging theory, conceptualisations, or analytical frameworks stems from the contrasting or competing definitions of the sharing economy within the literature stream. My thinking on what constitutes the sharing economy is vastly different from other academics in other disciplines. Therefore, in actuality, I am challenging much of the published literature about the sharing economy. This is largely because I see it as the role of academia, especially in relation to sustainability science, to be normative and critical of existing structures and institutions (Sovacool & Hess, 2017). To address this tension, I position my research as prescriptive and design-oriented, thereby contributing to conceptualisations and frameworks. I hope that my research is useful in supporting platforms, entrepreneurs, and policymakers to conceptualise, design, implement, and assess sharing platforms.

In what may be seen as my half-defiance of the philosophy of sciences, I take issue on how the field idolises the individual and their thinking. This was most apparent in the opening line of *Understanding Poststructuralism*: “Poststructuralism is the name for a movement in philosophy that began in the 1960s. ... The movement is best summed up by its component thinkers: Derrida, Deleuze, Lyotard, Foucault and Kristeva” (Williams, 2005). Where I was hoping to get a better insight about poststructuralism, instead I was presented with the names of the component thinkers on the philosophy, as if to infer meaning. Maybe this says more about me but, in philosophy, I do not understand the importance placed on the person instead of the knowledge or idea. I feel uncomfortable about the idolisation of these philosophers, and I think it limits a holistic conceptualisation of the philosophies and their application in research.

Butler suggests some greater value in questioning philosophy, and a resistance to its institutionalisation (Butler, 2004). This confrontation in itself has philosophical virtue. It is this half-acceptance/half-defiance that I take with me in my research and in my writing, to acknowledge, to appreciate, to be critical, and to re-evaluate those past scholars who have come before me. While I conduct research, I recognise my individual journey in knowledge discovery, and continually seek to learn, grow, and make a meaningful real-world impact.

4 Findings

Existing conceptualisations of sharing economy business models presented in research do not sufficiently consider sustainability in the design of constructs, frameworks, and other artefacts (Curtis & Mont, 2020). This presents a problem, as academics, practitioners, and policymakers continue to promote the sharing economy as contributing to more sustainable consumption (Gupta & Chauhan, 2021). The findings of my research seek to present a prescriptive definition of the sharing economy for sustainability, sophisticated descriptions of business model attributes, and elaborated artefacts to support implementation.

Inspired by design science research, this chapter presents an overarching design theory to describe sharing economy business models for sustainability, including defining concepts, constructs, design principles, frameworks, and patterns. Each section of this chapter directly responds to the overarching research questions of this research.

In order for a selection of design artefacts to constitute a design theory, several conditions must be met: utility, novelty, and effectiveness (Hevner et al., 2004; March & Smith, 1995). It is these criteria that I will seek to demonstrate in the remainder of this thesis when justifying my design theory relevant for sharing economy business models.

4.1 Design Principles for Sustainable Consumption and Production

Further elaboration of core concepts and guiding propositions is needed in order to clarify sharing economy business models for sustainability. Design principles are an example of a design science artefact that helps to control the design of additional artefacts (e.g. models, frameworks, theories) (Vaishnavi et al., 2004). Therefore, RQ1 asks *how may design principles guide the design and implementation of sharing economy business models for sustainability?* To address this question, I present a coherent definition of the sharing economy, related concepts, and design principles, all of which guide subsequent artefact design.

4.1.1 Definition

Conducting research often requires defining key concepts under investigation (Verschuren & Doorewaard, 2010). The definition(s) must scope the nature of the study and support operationalising the research approach to include or exclude concepts, participants, or data. The definition must be clear enough to the researcher and others in order to communicate the findings clearly, enabling others to replicate the research. Here is a problem. What is the sharing economy? Attempts have been made to define the sharing economy, but with little agreement and limited success in operationalising a definition within academia or practice. While any definition of the sharing economy remains contested, reflecting our socially-constructed reality, I suggest there is need for a more workable definition for prescriptive research involving design motivated by sustainability.

I define the sharing economy for sustainability as “... a socio-economic system that leverages technology to mediate two-sided markets, which facilitate temporary access to goods that are under-utilised, tangible, and rivalrous” (Curtis & Mont, 2020, p. 4). This definition restates the five semantic properties – the characteristics of a term that contribute meaning – resulting from a systematic literature of sharing economy literature. These semantic properties of the sharing economy include ICT-mediated, non-pecuniary motivation for ownership, temporary access, rivalrous, and tangible goods (Curtis & Lehner, 2019).

ICT-mediated – Compared to traditional forms of sharing, the sharing economy leverages technology to mediate exchanges among strangers (C. J. Martin, 2016; Schor et al., 2016). Technology is important for reducing transaction costs associated with sharing (Henten & Windekilde, 2016; Weber, 2014), improving access to information (Pisano et al., 2015), facilitating payments (Cartwright, 2016; Cheng, 2016b), implementing review systems (Chen et al., 2020; Kim & Yoon, 2016; Liang et al., 2020), and increasing access to the market (Begum & Anjum, 2016; Butenko, 2016; Šiuškaitė et al., 2019). This also implies the sharing economy creates a two- or multi-sided market (Kung & Zhong, 2017).

Non-pecuniary Motivation for Ownership – A dominant feature of the sharing economy is that it leverages idling, excess, surplus, or underutilised capacity (Curtis & Lehner, 2019; Harmaala, 2015; Heinrichs, 2013; Philip et al., 2015). A logical deduction is that the sharing economy facilitates sharing among an existing stock of goods, instead of creating *artificial* idling capacity through the purchase of new goods. While compensation is possible in the sharing economy, users must not purchase new goods to make money through sharing.

Temporary Access – The sharing economy is said to facilitate “access over ownership” (Harmaala, 2015; Light & Miskelly, 2015; C. J. Martin, 2016; Milanova & Maas, 2017). I suggest that the sharing economy facilitates consumption practices that do not lead to the transfer of ownership, e.g. share, rent, borrow (Curtis & Lehner, 2019). I

also distinguish the sharing economy from other long-term rental markets – for example, a car lease or apartment rental – by facilitating *temporary* access.

Rivalrous – This property dictates that sharing in the sharing economy prevents the simultaneous use by another. Therefore, this excludes public transit, parks, and roads, as well as filesharing and video streaming, as these exchanges facilitate practically unlimited access and low idling capacity, in conflict with other properties (Curtis & Lehner, 2019).

Tangible Goods – The sharing economy facilitates shared space, shared mobility, shared goods, shared consumables, and shared resources (Curtis & Lehner, 2019; Curtis & Mont, 2020). This semantic property aligns with the others, as tangible goods possess idling capacity, clear mechanisms for access and ownership, and are rivalrous (Curtis & Lehner, 2019). However, this excludes other practices often conflated with the sharing economy, including time banking and the gig economy.

4.1.2 Concepts

The definition and related semantic properties necessitate further elaboration of concepts to make sense of sharing economy business models. These constructs are the conceptual vocabulary necessary to understand the design research domain (Vaishnavi et al., 2004).

First, I propose a hierarchy of terms that capture the breadth of the sharing economy and involved stakeholders. I describe the *sharing economy* as a “socio-economic system” to capture the ecosystem of actors involved in the phenomenon, including the platform, its users, governments, and other societal actors (Curtis & Mont, 2020). Next, like others (Y. H. Akbar & Tracogna, 2018; Ciulli & Kolk, 2019; Hou, 2018; Kumar et al., 2018; Piscicelli et al., 2018), I use the term *sharing platform* to designate the entity facilitating the sharing practice (Curtis & Mont, 2020). A platform describes the infrastructure a business provides to enable two distinct groups of people to come together, creating value by reducing transaction costs associated with matchmaking or mediation (Evans, 2009). The term sharing platform may include any business, not-for-profit, non-traditional organisation, or grassroots initiative, so long as they operate as a two-sided market (Curtis & Mont, 2020). Then, the term *sharing economy business model* is used to describe the business model of the sharing platform (Curtis & Mont, 2020). Finally, I use the term *shared practice* to describe the consumption practice mediated by the business model, for example, sharing, renting, borrowing (Curtis & Mont, 2020).

Thus far, I have used the term *user* to capture both the supply-side and demand-side of the two-sided market. To distinguish this term further, I describe a *resource owner* and a *resource user*: the resource owner on the supply-side grants temporary access to their resources; and the resource user on the demand-side gains temporary access to others’ resources. This depart from other scholars, which prefer the terms ‘service provider’ and

‘consumer’ (Andreassen et al., 2018; Benoit et al., 2017). However, I suggest that the terms resource owner and resource user are more precise when speaking to the level of the sharing economy business model and shared practice. For example, from the perspective of the resource user, the ‘service provider’ may be the platform or the resource owner, where the asset may be given to the resource user by either, depending on the business model (Curtis & Mont, 2020). The term ‘consumer’ may be more suitable to describe business-to-consumer models. I feel the term is passive, and does not account for the role of the resource user in value co-creation with the resource owner.

I use the term *platform type* to describe the constellation of actors involved in the two-sided market (Curtis & Lehner, 2019; Curtis & Mont, 2020). This includes *peer-to-peer (P2P)*, *business-to-peer (B2P)*, *business-to-business (B2B)*, and *crowd cooperatives*. P2P platforms mediate exchanges between peers, having equal standing in terms of, for example, rank, class, or age (Curtis & Mont, 2020). Similarly, B2B platforms also mediate exchanges between peers, but among other businesses or organisational entities (Curtis & Mont, 2020). Goods exchanged by B2B platforms tend to be niche and specific to their business sector (e.g. construction or medical equipment). In instances when businesses have useful assets to share with an individual, I refer to this as a B2P platform. Finally, a crowd cooperative platform describes “... mediation from one to many, from many to one, or from many to many... e.g. car cooperatives, renewable energy cooperatives, or crowdsourcing of classroom art supplies or borrowed costumes for a theatre production” (Curtis & Mont, 2020, p. 7).

My final contribution to clarifying concepts is describing the ‘sectors’ of the sharing economy. Many scholars use this terminology to refer to the “accommodation sector” (Alrawadieh & Alrawadieh, 2018; Zhang et al., 2019), “mobility sector” (Guyader & Piscicelli, 2019; Ma et al., 2018), and “goods sector” (Ellen MacArthur Foundation, 2013) to categorise the areas in which sharing platforms contribute to the economy. Taking a traditional economic perspective, I suggest that the business models and associated practices in the sharing economy span across sectors.

Economic historians have long used the term ‘sector’ to describe groups of industries that exhibit distinguishing characteristics, including dominant production methods, productivity rates, consumer demand, etc. (Clark, 1940; Wolfe, 1955). Building on previous work on sectoral-structure of economies, business sectors are most often categorised as primary, secondary, tertiary, and quaternary (Kenessey, 1987). The primary sector includes agriculture, mining, forestry; the secondary sector captures construction and manufacturing; the tertiary sector includes transportation, resource distribution (e.g. water, gas), wholesale trade, and retail; and the quaternary sector includes finance, insurance, real estate, and services (Kenessey, 1987). The description of sectors remains somewhat fluid, with an additional quinary sector being extended to medical care, research, education, and culture (Foote & Hatt, 1953); to government administration and other decision-making bodies (Abler & Adams, 1977); and to artificial intelligence, blockchain, and other digital technologies disrupting the economy.

In contrast to sector, I use the terminology *shared practice* to describe the different practices facilitated by sharing platforms. For example, the community organisation *Not Far from the Tree* – based in Toronto, Canada – takes advantage of “idling” fruit on trees. They map available stock, coordinate picking, share the harvest, and donate to local food pantries. This spans agriculture, distribution, and public-service, examples of primary, tertiary, and quaternary sectors. Instead, I suggest this business model facilitates the practice of *shared consumables*. Instead of sectors, what these business models have in common is the idling resource. Therefore, I describe the shared practices of *shared space*, *shared mobility*, *shared goods*, *shared consumables*, and *shared resources*.

4.1.3 Design Principles

The definition, semantic properties, and connected concepts help lead to the following guiding propositions that dictate the subsequent design artefacts relevant for sharing economy business models. These principles are derived conceptually to delineate those sharing economy business models with the potential to contribute to improved sustainability performance. Specifically, I intend these design principles to prioritise “...the reduction of net resource extraction, reduced greenhouse gas emissions, and enhanced social interaction as a result of sharing” (Curtis & Mont, 2020, p. 4).

4.1.3.1 Operate as a Platform

Sharing economy business models must utilise technology to operate as a two- or multi-sided platform. The key activity of a sharing platform is mediating exchanges and facilitating economic transactions between the resource owner and resource user, allowing for access to underutilised goods (Curtis & Mont, 2020). Typically, platforms do not own the physical goods involved in sharing (Fraga-Lamas & Fernández-Caramés, 2019; Vătămănescu & Pinzaru, 2017). I make an important distinction compared to the traditional understanding of business value creation – value is not created by the platform, but *facilitated* by the platform through market mediation, review systems, etc. Instead, the platform facilitates value co-creation, which is only possible when its users enter the marketplace (see **Section 4.2.1**).

4.1.3.2 Leverage Idling Capacity of an Existing Stock of Goods

It is generally acknowledged that the sharing economy must leverage idling capacity of under-utilised goods. However, I clarify this further to delimit sharing to an existing stock of goods. I propose this principle to avoid inducing unnecessary production. For example, in a market economy, businesses in the sharing economy compete on the basis of availability and convenience. There is economic incentive to purchase new goods to provide greater access to users, which in turn leads to overcapacity of under-utilised assets.

4.1.3.3 Possess Non-Pecuniary Motivation for Ownership

While I see compensation or profit-motivation as acceptable, I suggest it should not be the primary motivation for ownership in the sharing economy (Curtis & Mont, 2020). Building on the previous principle, resource owners must not purchase new goods for the express purpose of making money by providing shared access. This principle prevents inducing an artificial idling capacity. For example, I suggest short-term accommodation hosts must not purchase multiple apartments in the city centre for the sole purpose of renting on Airbnb, vehicle owners must not purchase new cars to provide access via Turo, or resource owners must not purchase a new drill for the purpose of sharing on Peerby.

4.1.3.4 Facilitate Temporary Access Over Ownership

Sharing economy business models facilitate exchanges that do not lead to a transfer of ownership, instead enabling shared access via consumption practices such as sharing, renting, and borrowing. By providing shared access, I suggest increasing the number of people that are involved in using the good, thereby increasing the intensity of use and material efficiency (Curtis & Mont, 2020).

However, I suggest that shared consumables – those goods characterised by one-time use – are included in the sharing economy. These goods include food, personal care products, art supplies, and motor oil, all of which require transfer of ownership to use. Instead of these products going to waste, they may be shared because their one-time use dictates transfer of ownership.

4.1.4 Scoping the Sharing Economy

I am very aware of more inclusive definitions of the sharing economy. I do not intend my approach to be a critique of others' work, as they are motivated differently in different disciplines. I am also aware of similar phenomena conflated with the sharing economy, for example, platform economy, gig economy, collaborative consumption, access-based consumption, etc. Yet, I contend that if the sharing economy is to deliver improved sustainability outcomes, we must be deliberate and strategic in how we design these business models. I briefly want to reflect on the impact of my definition in scoping business models in the sharing economy.

Business-to-consumer rental companies are excluded from my analysis, as they do not operate as a platform / two-sided market. They generally purchase new goods for the purpose of providing access. I suggest business-to-consumer rental companies are more akin to use-oriented product-service systems. If the goods are donated from an existing stock, to be managed by the platform, I include these as crowd cooperatives.

Just as various platform types are excluded as a result of the above design principles, several other consumption practices that lead to transfer of ownership are also excluded.

For example, consumption practices including exchanging, trading, bartering, gifting, swapping, or buying second-hand are, in most cases, excluded from my conceptualisation. Although facilitating access, I also generally exclude leasing, as it describes more long-term exchanges compared to renting.

4.2 Design of Sharing Economy Business Models

In Section 2.4.3, I suggested several ways in which the existing sharing economy business model conceptualisations could be improved: 1) depart from a prescriptive definition of the sharing economy; 2) provide greater elaboration of business model attributes; and 3) incorporate sustainability as a design condition. The Sharing Economy Business Model Framework (Figure 4) developed as part of this dissertation delivers on all three. Firstly, the framework is consistent with the definition presented in Section 4.1.1, which is used throughout the thesis. Secondly, the framework includes more than one hundred definitions, including examples, all of which are summarised in the Glossary and subsequent articles. Finally, the framework includes the design principles presented in Section 4.1.3 as design conditions guiding the design and implementation of sharing economy business models.

Design Conditions		Operates as a platform			Leverages idling capacity of an existing stock of goods			Possesses non-pecuniary motivation for ownership			Facilitates temporary access over ownership			
Value Facilitation	Attribute	Configuration Options												
	Key Activity	Platform mediation allowing for access to under-utilised goods												
	Platform Type	Peer-to-Peer			Business-to-Business			Business-to-Peer			Crowd / Cooperative			
	Practice	Shared Space		Shared Mobility		Shared Goods		Shared Consumables		Shared Resources				
	Intellectual Property	Open Source				Communal				Proprietary				
	Governance Model	Cooperative				Collaborative				Corporate				
	Price Discovery	Free	Pay What You Can	Negotiation / Bargaining		Auction	Bartering	Set by Resource User		Set by Resource Owner		Set by Platform		
Value Delivery	Key Value Proposition	Reduction of transaction costs in sharing												
	Mediating Interface	Smartphone App			Website			Third-Party App or Integration			Other			
	Venue for Interaction	Offline			Hybrid			Online			None			
	Review System	Resource Owner Reviews			Resource User Reviews			Platform Reviews			None			
	Geographical Scale	Existing Community		Local		Regional		National		International		Nodes		
Value Capture	Value Orientation	Societal / Public			Social			Environmental			Commercial			
	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	
	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	
	Revenue Source	None		Volunteer		Other		Resource Owner		Resource User		3rd-Party		

Figure 4. The Sharing Economy Business Model Framework (Curtis & Mont, 2020; Curtis, 2021)

I submit the Sharing Economy Business Model Framework as a response to RQ2 – *how may sharing economy business models be designed for sustainability?* The framework consists of three value dimensions, sixteen business model attributes, and eighty-nine configuration options. In the remainder of this section, I will elaborate on these three levels of the framework. I also contribute to the greater design theory described in this thesis by elaborating on the key activities of the sharing platform, the resource owner, and the resource user, all of which co-create value on the platform.

4.2.1 Value Co-Creation

Value co-creation describes the practices and processes that the firm and its customers engage in collaboratively to create value as part of the firm’s offering (Prahalad & Ramaswamy, 2004). Restated in the context of the sharing economy, sharing platforms engage in activities collaboratively with their users to co-create value captured by each other and society (de Oliveira & Cortimiglia, 2017). For example, I suggest the key activity of the sharing platform is *platform mediation allowing access to underutilised assets*. While sharing platforms engage in other important activities, I suggest this key activity is essential for value to be created on the platform. However, the sharing platform cannot create value alone. Operating as a two- or multi-sided market, its users must also engage in key activities (Figure 5).

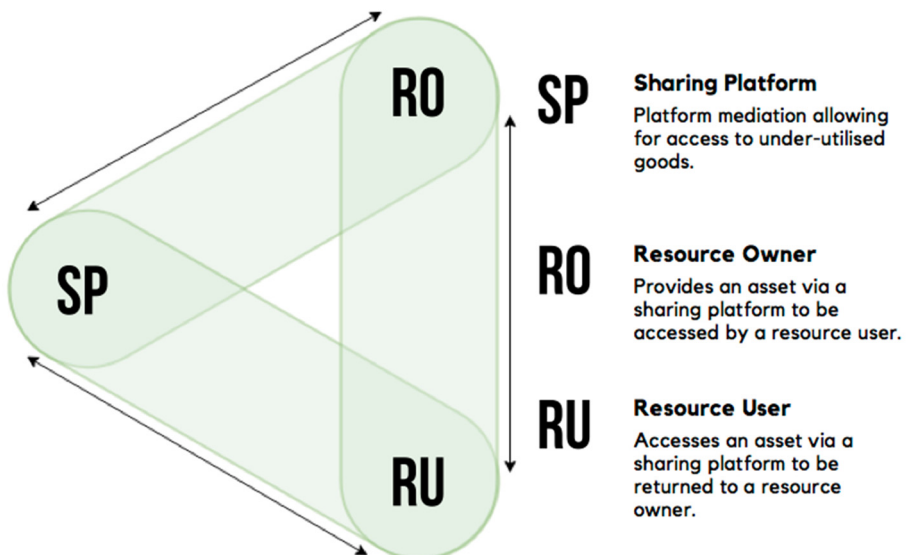


Figure 5. Key Activities in the Sharing Economy (Curtis & Mont, 2020)

I suggest that the resource owner and resource user must also engage in key activities if they are to benefit from using the sharing platform. For example, the resource owner *makes an asset available via a sharing platform* and the resource user *accesses an asset via a sharing platform and returns the asset to the resource owner*. This has implications for the design of sharing economy business models.

Firstly, in contrast to the traditional understanding of value creation (see **Section 2.3**), I propose the business model dimension of *value facilitation* to describe the practices by which the business mediates the exchange in a two-sided market, including the extent of customer input in shaping the product or service offering. In this way, value is not created by the business but rather facilitated and co-created in collaboration with the actors in the two-sided market.

Furthermore, I conceptualise the value proposition embedded within value delivery. This is something that Täuscher & Laudien (2018) initially did in their work on platform business models and marketplaces, but without providing justification. My choice is motivated by the argument that a triadic business model does not in itself fulfil the customer need; this is only done through co-creation between the users in the two-sided market. I suggest that the value proposition for a triadic model should describe the value delivered by the business to its customers. I propose the value proposition of sharing economy business models is often *a reduction of transaction costs associated with mediating and/or matchmaking*. For users looking to provide or access a shared asset, the sharing platform removes barriers to access the market, improves communication, and facilitates payment, along with other activities to reduce transaction costs.

Finally, sharing platforms recognise the contribution of their users' key activities to generate platform revenue. Ensuring positive user experience is important on both sides of the market. Therefore, platforms adopt business model attributes and activities that foster and support value co-creation, for example, review systems, identity verification, dispute resolution, insurance, etc (see **Section 4.2.4**). This is in addition to specialised services offered to their users based on the business context.

4.2.2 Value Dimensions

I include three value dimensions that comprise the breadth of business model attributes in the sharing economy: value facilitation, value delivery, and value capture. *Value facilitation* describes the practices by which the sharing platform mediates the exchange in a two-sided market. Since value is co-created on the platform, value facilitation describes the extent of user input in shaping the shared practice. *Value delivery* depicts the way in which the platform delivers value and acts out its contribution of the value proposition. *Value capture* describes the mechanism for capturing economic value for

itself and its shareholders/stakeholders. However, I expand this dimension to include additional value orientations including environmental, social, and societal/public value.

4.2.3 Business Model Attributes and Configuration Options

Business model attributes are the ‘building blocks’ of the business model, describing the material or immaterial functions, features, or actions of the firm (Osterwalder, 2004, p. 30). The various known alternatives for each attribute are often called configuration options (Amshoff et al., 2015; Echterfeld et al., 2015). For instance, a sharing platform may implement any configuration option, for example, choosing to operate within an existing community, or at a local, regional, national, or international scale, characterised by the business model attribute *geographical scale*. Again, the framework proposes sixteen business model attributes and eight-nine configuration options. These are elaborated in detail in **Article II** as well as the **Glossary**. While all are important, I elaborate on the following because of their relevance to sustainability: value orientation, governance, and intellectual property.

Motivation among sharing platforms varies greatly, insinuating various value orientations. The prescriptive definition used in this thesis includes for-profit and not-for-profit sharing platforms operating as companies, non-traditional organisations, or grassroots initiatives, as long as technology is used to mediate sharing between two actors. *Value orientation* describes the underlying motivation of the sharing platform, and preferred type of value created, including commercial, social, environmental, and societal / public value. *Commercial value* sees economic value capture as the primary motivation for existence, whereas the other forms of value creation reflect other types of value consistent with sustainable business models, social innovation, or mission-driven organisations. Platforms motivated by *social value* seek to foster cohesion, inclusivity, community development, and resilience. *Environmental value* prioritises environmental sustainability and sustainable consumption practices. Finally, *societal* or *public value* capture normative or philosophical motivation of how things ought to be, returning to simpler and more communal forms of consumption.

The business model attribute *governance* is defined as “...the approach adopted by the platform with respect to decision making and value exchange” (Muñoz & Cohen, 2018, p. 132). The associated configuration options include corporate, collaborative, and cooperative governance. *Corporate governance* sees decision-making rest with the platform, with limited input from users, mirroring traditional management practices. This governance model is associated with commercial value orientation as well as more sophisticated technology for mediation and proprietary intellectual property. Perhaps the strongest expression of value co-creation, *cooperative governance* sees users steering and even leading essential business functions and decision-making processes, including setting strategy, managing finances, and organising the workforce / volunteers. This governance model is most relevant for the *crowd cooperative platform type*. Bridging both

governance models, *collaborative governance* sees increased opportunity for user involvement, at the same time often exhibiting some form of commercial value orientation.

The choice of governance model influences the potential social impact of the platform and dictates the extent of risk and reward sharing. A more collaborative or cooperative governance model empowers users to influence platform activities, while allowing and including diverse voices in the decision-making process, and addressing social equity issues. The greater the involvement of users, the more equitable distribution of economic and non-economic benefits. However, this may also expose users to greater economic and social risk depending on the user's positionality in society. I suggest any trade-offs must be considered against the value orientation of the sharing platform when designing the business model.

Because sharing platforms operate a two- or multi-sided market, they do not own physical resources involved in the shared practice; instead, the key resources of the platform lie in its digital infrastructure, including matching algorithm, booking management, or review system. Sharing platforms must choose how they wish to share or protect this *intellectual property*. Intellectual property itself describes ideas and other creations of the mind, including innovations, literature, artwork, designs, symbols, photographs, as well as company names and logos (Tietze & Vimalnath, 2020). It is up to the platform to decide how it wishes to manage and/or protect their key resources. The framework proposes three configuration options relevant for the attribute *intellectual property*: open source, communal, and proprietary. *Open source* sees platforms sharing their intellectual property widely, often with anyone able to download or request access to key resources. Similarly, *communal* intellectual property allows access to key resources, but is restricted to known actors within the community, for example, users and other stakeholders. Finally, *proprietary* intellectual property describes actions taken by the platform to protect its key resources, often formally through registration with the relevant organisation, for example, a patent office.

Again, the motivation and value orientation of the sharing platform often dictates the choice of intellectual property rights. Commercial sharing platforms like Airbnb exercise strict intellectual property rights articulated in their terms and conditions, whereas niche peer-to-peer sharing platforms have more open or communal forms of intellectual property. They may be motivated to create and capture social or environmental value; for example, platforms like BikeSurf and Karma share their knowledge and resources with others interested in starting a *node* in their local community. Franchising may be another way that platforms manage their intellectual property, influencing other attributes including *geographical scale* and *revenue streams*.

4.2.4 Additional Business Model Considerations

The framework captures the building blocks for designing sharing economy business models, but sharing platforms may reflect on other considerations to enhance their service offering or improve their sustainability potential. For example, several additional actions by the sharing platform emerged when researching their social impact. Sharing platforms may offer insurance, introduce identity verification systems, facilitate dispute resolution, and ensure ethical data management. Communication of these actions is important, to ensure transparency and trust, contribute to the user experience, and protect the platform's interests.

Sharing platforms may provide insurance against risk for the assets involved in the exchange, in the event of damage caused by the actions of resource users. Platform-provided insurance may be necessary to incentivise resource owners to share their assets, especially high-value items such as cars and homes. The insurance industry is only just beginning to develop products that extend to sharing platforms. As such, there are few known examples in literature and practice. Luo et al. (2020) describe platform-level buyer protection insurance that provides a blanket safeguard programme to protect assets caused by the resource user. However, who bears the cost and how the cost is passed along to either the resource owner or resource user requires further consideration by the platform in line with their value orientation.

More established platforms have implemented identity verification systems to facilitate trust and ensure safety on their platforms. Sharing platforms may consider the need or utility of such systems based on their context and associated risk. Platforms may consider one or a combination of mechanisms to authenticate user identity, including something as simple as uploading a photo. Additional mechanisms include verifying contact information via email or text, uploading official identification documents (e.g. driver's licence, passport), or relying on an existing user to confirm the identity of a new user. While largely seen as a way to improve trust and safety, sharing platforms must also consider how to manage personal data used in the verification process. Furthermore, platforms may need to take extra steps to prevent discrimination based on any revealed information at any point prior to, during, or after the exchange – for example, gender, sexual, ethnic, or racial identity. For instance, there is evidence that race or sexual orientation impacts booking and reviews on Airbnb (Ahuja & Lyons, 2019; Edelman et al., 2017).

Data management and privacy are increasingly becoming important considerations of the business model (Lutz et al., 2018). Where personal identifiable information is used to improve trust and ensure safety, there is also a need to protect and manage personal data in accordance with legal and ethical standards expected by users and the broader society. However, sharing platforms are increasingly monetising personal data as a potential revenue source (Murillo et al., 2017; Srnicek, 2017). Of the more established commercial sharing platforms, privacy policies are routinely provided upon sign-up and

available on their websites. A general privacy policy includes information about managing personal data, including the information that is collected automatically, how personal data is used and stored, including sharing with third parties, and how personal data is used to improve advertising and analytics by the platform and other parties.

Finally, sharing platforms may wish to implement procedures for conflict or dispute resolution, especially to improve trust and reduce the appearance of bias or discrimination (McGinnis, 2018; Piracha et al., 2019). These mechanisms may deal with non-compliance, complaints, or user dissatisfaction. While sharing platforms often rely on within-platform mechanisms, they are often not explicit or transparent, leading to uneven treatment. Therefore, I suggest sharing platforms should consider making their dispute resolution mechanisms apparent for users, which may include third-party mediation or arbitration in severe cases.

4.3 Implementation of Sharing Economy Business Models

This Section answers RQ3 – *What constellation of business model attributes and organisational strategies support implementation?* With the objective to address the design-implementation gap, this research elaborates knowledge, frameworks, and activities to support the implementation of sharing economy business models. The artefacts presented here are intended to be used – by sharing platforms, entrepreneurs, managers, policy-makers, investors, and other relevant actors – with the purpose of remaining financially and socially viable. Therefore, the focus is more on the *outcome* rather than the *process* of implementing the business model.

4.3.1 Sharing Economy Business Model Patterns

Broadly speaking, patterns recognise trends among implemented solutions to solve a problem, which can be useful to apply in other contexts. In relation to business models, patterns describe attributes of existing business models that recur successfully. Since innovation largely imitates existing attributes observed elsewhere, business model patterns are useful for structuring experimentation, supporting creativity, and fostering collaboration. Business model patterns may act as a bridge to support the design and implementation of SEBMs.

The sharing economy or sharing are scarcely mentioned in academic literature on business model patterns. The sharing economy is linked to *reuse and redistribution* (Lüdeke-Freund et al., 2019), a generic *sharing businesses* pattern is proposed without further elaboration (Lüdeke-Freund et al., 2018), and carsharing is mentioned as an example of the *peer-to-peer* pattern (Abdelkafi et al., 2013; Remane et al., 2017).

Therefore, there is a clear knowledge gap regarding sharing economy business model patterns to support successful design and implementation of SEBMs.

There are three categories of patterns offered in this dissertation: framework patterns, prototypical patterns, and solution patterns (see **Section 2.3.2**). The Sharing Economy Business Model Framework presented in **Section 4.2** is an example of a framework pattern, as it provides a reference model to describe, plan, analyse, or document entire business models. I have also established eight prototypical patterns and nineteen solution patterns in the sharing economy.

Prototypical patterns describe industry-specific business models, for example, manufacturer or multi-sided market. They are more specific than frameworks, but not as precise as solution patterns. Relevant examples from literature include *intermediation* (Remane et al., 2017; Weking et al., 2018), *multi-sided platforms* (Osterwalder & Pigneur, 2010; Yablonsky, 2017), and *online brokers* (Remane et al., 2017). While relevant, these are not specific and sufficiently elaborated to support the design and implementation of SEBMs. I propose eight prototypical patterns in the sharing economy (**Table 4**).

These eight prototypical patterns were developed by studying sixty-three SEBMs using the Sharing Economy Business Model Framework. The k-medoids clustering approach in R Studio, a quantitative method used by Hunke et al. (2017) to establish business model patterns, enabled me to generate a list of business model attributes that occur together successfully in practice. Each prototypical pattern is described in detail, with examples, in **Article III**. However, I thought it relevant to elaborate on some interesting observations, for example, differences in *revenue streams* and *governance* based on *shared practice*.

I observed that peer-to-peer space sharing platforms most often implemented a *commission*-based revenue model. In contrast, peer-to-peer mobility sharing platforms implemented *transaction fees, fines or other fees, usage rates*, as well as *commission*. The shared mobility platforms had more revenue streams than the observed space sharing platforms. In contrast, niche peer-to-peer platforms were much more reliant on donations to remain financially viable, but often operated a *cooperative* governance model, reflecting this community orientation. One last example – there is a lot of discussion of review systems in the sharing economy, but it was only those *commercially* oriented, *corporate*, and *international* platforms that seemed to use review or rating systems. The niche and community platforms I studied did not rely on these systems in the same way as the sharing economy giants, which I think suggests a lack of need given their operation in a hyper-local context and less use of formalised technology.

Table 4. Prototypical Patterns in the Sharing Economy (Curtis, 2021)

Collaborative Community Platforms (e.g. Toronto Tool Library)	Niche Peer-to-Peer Platforms (e.g. BKSYS, WarmShowers)	Niche Corporate Platforms (e.g. FreshRents, Seats2Meet)	Commercial Peer-to-Peer Platforms (e.g. Poparide, Swimply)
4B Collaborative	1A Peer-to-Peer	3C Proprietary	1A Peer-to-Peer
5H Set by Platform	3C Proprietary	4C Corporate	3C Proprietary
7B Website	4A Cooperative	5H Set by Platform	4C Corporate
8A Offline	4C Corporate	7B Website	5G Set by Resource Owner
9D None	5A Free	9D None	7A Smartphone App
10B Local	5C Negotiation / Bargaining	11D Commercial	7B Website
11A Societal / Public	7B Website	12B Transaction Fee	8B Hybrid
11C Environmental	8B Hybrid	12L Fines or Other Fees	9A Resource Owner Reviews
12E Membership	9D None	12N Usage Rates	9B Resource User Reviews
12I Donations	10F Nodes	13D Differential Pricing	10D National
12J Public Project Funding	11A Societal / Public	15E Resource User	11D Commercial
12K Private Project Funding	12I Donations		12C Commission
15B Volunteer	13A None		12L Fines or Other Fees
15E Resource Use	14A None		13A None
	15B Volunteer		14A None
			15D Resource Owner
			15E Resource User
Peer-to-Peer Space Sharing Platforms (e.g. Airbnb, RoverPark)	Peer-to-Peer Mobility Sharing Platforms (e.g. Turo, BlaBlaCar)	Business-to-Consumer Sharing Platforms (e.g. ZipCar, DonkeyRepublic)	Coworking Space Platforms (e.g. WeWork, ImpactHub)
1A Peer-to-Peer	3C Proprietary	3C Proprietary	3C Proprietary
1C Business-to-Peer	4C Corporate	4C Corporate	4C Corporate
3C Proprietary	5G Set by Resource Owner	5H Set by Platform	5H Set by Platform
4C Corporate	5H Set by Platform	7A Smartphone App	7A Smartphone App
5G Set by Resource Owner	7A Smartphone App	7B Website	7B Website
5H Set by Platform	7B Website	8D None	8D None
7A Smartphone App	8B Hybrid	9D None	9D None
7B Website	9A Resource Owner Reviews	10E International	10E International
8C Online	9B Resource User Reviews	11C Environmental	11A Environmental
9A Resource Owner Reviews	10E International	11D Commercial	11D Commercial
9B Resource User Reviews	11D Commercial	12B Transaction Fee	12E Transaction Fee
10E International	12B Transaction Fee	12D Subscription Fee	12M Subscription Fee
11D Commercial	12C Commission	12L Fines or Other Fees	12S Fines or Other Fees
12C Commission	12L Fines or Other Fees	12N Usage Rates	12V Usage Rates
14A None	12N Usage Rates	13D Differential Pricing	13D Differential Pricing
15D Resource Owner	13C Dynamic Pricing	14C Location-Based	14B Feature-Based
15E Resource User	13D Differential Pricing	14F Access-Based	14C Location-Based
	14B Feature-Based	15E Resource User	14F Access-Based
	14C Location-Based		15E Resource User
	15D Resource Owner		
	15E Resource User		

Table 5. Solution Patterns in the Sharing Economy (Curtis, 2021)

Solution Pattern	Description	Examples
Servitisation (Product-to-service)	Offers renting options to access products instead of purchasing new products (e.g. B2C platforms)	ZipCar, ShareNow, Mobike
Rent instead of buy	Temporarily lends a product for a fee, instead of transfer of ownership (e.g. goods sharing platforms)	LENA Library, Toronto Tool Library
Unbundling	Focus on customer relationship management, facilitating access to shared assets (e.g. carsharing)	MyWheels, Dropbike, WeWork
Peer-to-peer	Platform mediation between users having equal standing based on rank, class, age, etc.	Swimply, SnappCar, JustPark, Peerby
Fractional ownership (cooperative ownership)	Shared ownership of an asset among a group of consumers (e.g. crowd cooperative)	Connectcar, de Windcentrale
Open source	Offers to make available platform's intellectual property (e.g. matching algorithm, booking management, review system)	BikeSurf
Community governance*	Sees users involved to a greater degree in the daily operations and strategic decisions of the platform	Karma, ImpactHub, Toronto Seed Library
Pay what you want	Invites users to set the fee to access the platform (e.g. transaction fee, commission, donation)	BikeSurf, SwapSity, WarmShowers
Barter	Allows users to exchange non-monetary compensation for a product or service	Bunz, SwapSity
Free	Allows users free access to the platform and its primary offering, using additional sources to generate revenue (e.g. donation, crowdsourcing, advertising)	BKSY
Price set by users*	In a multi-sided market, either the resource owner or resource user sets the price of the exchange	FlipKey, Spacefy, Turo
Review system*	Provides feedback about the service quality or social interaction	Airbnb, BlaBlaCar, GoBoat
Existing community*	Introduces platform among a group of people possessing something in common (e.g. neighbourhood, school)	Poparide, Zimride
Nodes*	The fragmented diffusion of sharing platforms geographically, driven by interested actors wanting to start operations in their own contexts	BikeSurf, ImpactHub
Subscription	Recurring cost to users for access to goods or services	Communauto, GreenWheels, ShareNow
Membership	Recurring cost to users for access to the platform	LoveHomeSwap, Peerby, WeWork
Pay per use (Transaction fee)	One-time charge to users each time the good or service is accessed	Bike Share Toronto, FaceDrive, VRBO
Franchising	Allows franchisees to licence the business concept – including training, branding, technical infrastructure – for a recurring fee and/or revenue sharing	Spaces, SailTime
Crowdfunding	Financing the platform by soliciting contributions from the larger community, often offering a non-monetary reward	Toronto Tool Library
Add-on (Additional services)	Platform offers extra or additional services beyond their primary offering, typically for a higher margin	BlaBlaCar, SnappCar, WeWork
Differential pricing	Offers the same product to users at different prices, based on the market and user characteristics or behaviour	Djeepo, Spaces, ZipCar
Mixed revenue source*	Revenue in a multi-sided market may come from a multitude of sources	Airbnb, Peerby, SnappCar

Furthermore, I identified nineteen solution patterns, which describe one or several business model attributes used in combination and easily replicated (Table 5). Some of these are already described in literature for other contexts in relation to the business model's key activity and value proposition (e.g. *servitisation, rent instead of buy, unbundling*); value networks (e.g. *peer-to-peer, fractional ownership*); price discovery (e.g. *free, barter, pay what you can*); revenue streams (e.g. *subscription, membership, pay per use, crowdfunding*), and price discrimination (e.g. *differential pricing*). However, a further six solution patterns had not yet been described in the wider body of literature: *community governance, price set by users, review system, existing community, nodes, and mixed revenue source*.

4.3.2 Social Impact Framework

While popular claims suggest the sharing economy democratises consumption, empowers people, and promotes social cohesion (McLaren & Agyeman, 2015; Schor et al., 2016), growing empirical evidence and user experience suggest negative social impacts as a result of the activities of sharing platforms. Evidence from Airbnb (Caldicott et al., 2020; Edelman & Luca, 2014), Uber (Rosenblat et al., 2017) and various mobility sharing platforms (Geissinger et al., 2020) suggest sharing platforms may simply be exploiting time and resources of their users to their detriment (Sundararajan, 2017). Consequently, there is a need to understand the social impacts of sharing platforms.

I conducted research developing a systematic framework to assess social impacts of sharing platforms (Figure 6), detailed in Article IV. The framework measures four social aspects – trust, empowerment, social justice, and inclusivity – across eighteen indicators. Along with the framework, we define each indicator, and elaborate measurable variables for each. The measurable variables target the actions and experiences of the platform, resource owner, resource user, and society. This reflects our conceptualisation of the SEBM operating as a two- or multi-sided market as well as seeking to understand the broader societal impacts (e.g. gentrification, discrimination, noise, safety, congestion).

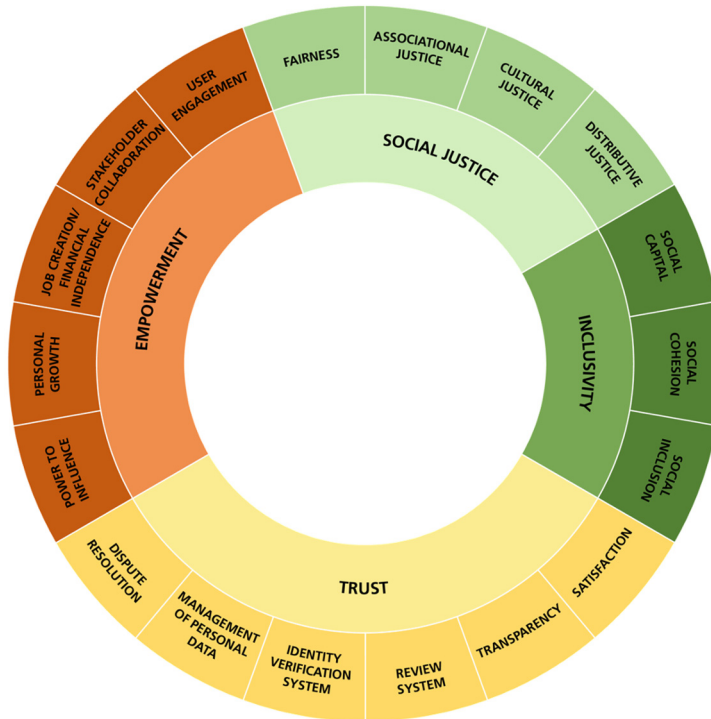


Figure 6. Systematic Framework to Assess Social Impact of Sharing Platforms (Curtis et al., 2020)

The development of the framework, aspects, indicators, and measurable variables was informed by a systematic literature review and stakeholder workshop. These artefacts were evaluated among researchers and practitioners, and developed into a practice-oriented tool for use by a sharing platform based in the Netherlands. Building on this experience, we developed concrete suggestions to support actors in implementing the tool in their context:

1. Define your purpose for assessing social impact
2. Determine your ambition, time, and other resources for data collection
3. Prioritise aspects, indicators, variables, or actors based on your purpose and ambition
4. Develop an inclusive data collection protocol and take steps to safeguard and manage data ethically
5. Analyse data to determine issues or hotspots
6. Triangulate data across relevant indicators, seeking to identify any cause-effect relationships

7. Communicate the results of your analysis
8. Develop an action-plan to address any issues
9. Reassess as necessary

Again, the artefact and resulting knowledge have deep implications for the design and implementation of SEBMs. Firstly, the design choices, including business model attributes and configuration options, reflect the value orientation of the sharing platform, with specific attributes better suited to deliver improved social sustainability performance. Some business model design considerations that affect the potential social impact are already mentioned in **Section 4.2.4**, for example, identity verification systems and data management protocols, with several more considerations mentioned in **Article IV**.

Secondly, the implementation of these attributes also impacts the experience of users and society. Whether choosing to govern cooperatively or to have a review system, these choices must also be operationalised in such a way that prevents discrimination and ensures inclusion of all stakeholders. For example, a review system is said to foster trust on the platform by reducing the perceived risk of participating in sharing. However, reviews are largely positive and often do not provide sufficient feedback to distinguish between service quality and social interaction (Bridges & Vásquez, 2018). Review systems have also been said to fuel discrimination and racial tension (Edelman et al., 2017). Therefore, the implementation of SEBMs must also consider the impact on social sustainability outcomes.

4.3.3 Organisational Response Strategies to COVID-19

The final artefact to support the continued success of sharing economy business models articulates response strategies to the COVID-19 pandemic in the sharing economy (**Article V**). The COVID-19 pandemic has disrupted our lives, impacting businesses, and shifting production and consumption practices. The pandemic represents a victim crisis – in contrast to an accidental or preventable crisis – with organisations forced to respond and alter their operations through no fault of their own (Coombs & Holladay, 2002). With sharing platforms already struggling to remain financially and socially viable, I see this work as contributing to improved learning and resilience among sharing platforms.

The contribution draws on crisis management literature to establish empirically observed response strategies. Mithani & Kocoglu (2020) offer a recent conceptualisation to categorise organisational response strategies that mirror individual responses: *hypervigilance*, *exiting*, *growth*, and *dormancy* (paralleling freeze, flight, fight, or fright). However, few studies have explored organisational response strategies to

victim crises, especially specific responses in a particular business domain. As such, we chose to inductively code organisational responses based on website and social media data of thirty sharing platforms facilitating shared space, mobility, and goods in diverse geographical contexts.

Once again, the research considers the platform, its users, and the broader society. Doing so reflects the two-sided nature of sharing platforms and the users' contribution to value co-creation. For example, platform responses targeting their users – for example, a sanitary mask mandate – ensures user safety, reduces exposure to liability, and protects the value co-creation experience for continued value capture. Specifically, the empirical framework articulates platform-oriented responses, user-oriented responses, and society-oriented responses. Each of the response strategies presented in **Figure 7** are described in detail, with examples, in **Article V**.

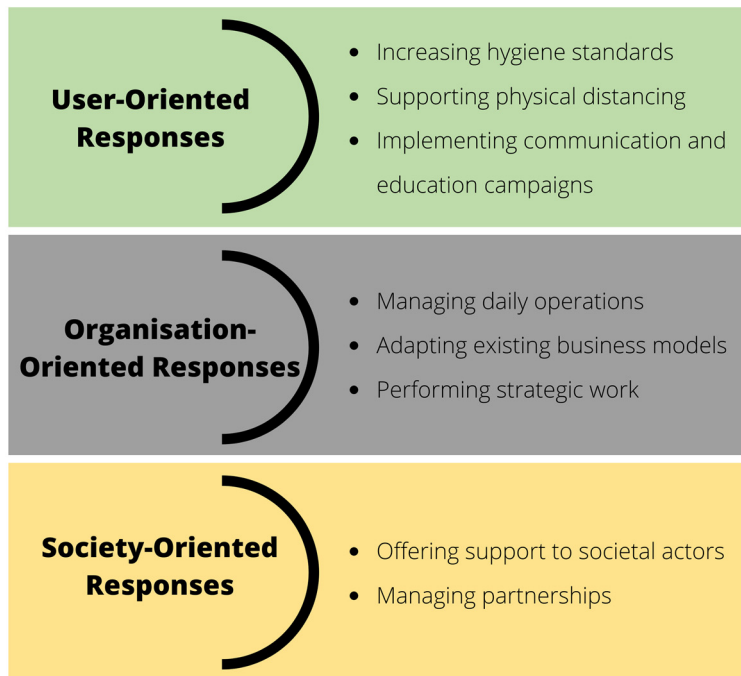


Figure 7. Organisational Response Strategies in the Sharing Economy to COVID-19 (Mont, Curtis, Voytenko-Palgan, 2021)

Interestingly, the observed response strategies varied according to the design of SEBMs investigated. For example, the *shared practice* dictated responses. Peer-to-peer carsharing increased for platforms like Turo (2020), as people avoided collective traffic, which prompted the introduction of new measures to quarantine cars between use and

advanced cleaning guides. Peer-to-peer accommodation sharing saw a dramatic reduction in bookings, upwards of 90% (Chadwick, 2020), which necessitated flexible cancellation policies, support for hosts, and strategic work. Responses in those goods sharing platforms investigated appeared to be more improvised, including less formalised communication via blog posts, social media, or newsletters. In contrast, commercially-oriented shared space and shared mobility platforms had more professional communication materials and advanced information on websites. This also demonstrates differences based on value orientation and geographical scale, among other examples found in the study.

Comparing our empirical response strategies to the categories proposed by Mithani & Kocoglu (2020), the majority corresponded to hypervigilance and growth. There were very few examples of sharing platforms closing or reallocating resources elsewhere, (exiting) or pausing their operations (dormancy). However, the framework represents a snapshot of response strategies as of November 2020, which are evolving as our society overcomes the pandemic and adjusts to our new reality. Individual responses during the pandemic such as teleworking and more localised travel is likely to continue, with additional ramifications for commercialised and international sharing platforms like Airbnb. Changing mobility patterns may also lead to more bikesharing and continued advancement of autonomous electric vehicles may upend carsharing business models. And, a looming financial crisis may drive people towards sharing more goods within their communities, while increasing wealth disparity may force greater social and economic change. The sharing economy, along with society itself, is likely to continue to evolve. This attempt to explore organisational response strategies within the sharing economy provides a point of departure for learning and inspires organisational resilience to the next unknown crisis.

5 Discussion

I have framed my research contribution as addressing the design-implementation gap in the sharing economy, providing an overarching design theory and related artefacts guiding the design and supporting the implementation of sharing economy business models. However, I did not study the *process* of implementing business models choices, but rather provided knowledge and tools that support the successful *outcome* of implementation. In this section, I briefly discuss the process of implementation by connecting the discourse to business model innovation. I reflect on the design principles proposed in **Section 4.1.3** as a means to enhance environmental and social sustainability. Finally, I provide some humble reflections and propose important future research.

5.1 Addressing the Design-Implementation Gap

Design is inextricably linked with the processes of implementation (Leih et al., 2015). Increasing empirical evidence suggests those managers who make coherent design choices experience better performance (Amit & Zott, 2012; Baden-Fuller & Haefliger, 2013). The corollary suggests that “...innovation without clarity in the business model leads to modest or negligible performance outcomes” (Gronum et al., 2016, p. 601). While business model design is seen as a key managerial or entrepreneurial task, it does not often receive the attention or resources it deserves in practice (Zott & Amit, 2010). Business models often fail due to a lack of requisite knowledge or understanding to enable successful experimentation (Johnson et al., 2008; Weking et al., 2019). Therefore, to improve the utility of my artefacts, I elaborate briefly on business model innovation to address the processes of design and implementation.

Business model innovation describes the dynamic process of experimentation for creating and capturing new value (Chesbrough, 2010; Gassmann et al., 2014; Richter, 2013; Wirtz et al., 2016), typically by adopting, copying, or imitating aspects of other business models that have proven successful previously (Amit & Zott, 2015; Doganova & Eyquem-Renault, 2009; Teece, 2010). An innovation occurs when an organisation “... modifies or improves one or several elements of its business model” (Remane et al., 2017, p. 25) as well as “...the architecture linking these elements” (Foss & Saebi, 2017, p. 201). As such, business model innovation recognises that “... business models are

not first designed and then implemented” (Mason & Spring, 2011, p. 1033) – business models are dynamic, emergent, and evolving.

First, let us consider both perspectives – design and implementation – separately in relation to business model innovation. In their review of business model innovation literature, Foss & Saebi (2017) suggest design is necessary to enact business model innovation. For example, selecting the appropriate design choices requires specific actions by the firm, often involving experimentation. To help structure the process of business model design, Amit & Zott (2015; 2010) describe design antecedents, design elements, and design themes. Design antecedents speak to the necessary input, knowledge, and conditions that affect business model design. They suggest the following antecedents: 1) goals to create and capture value; 2) templates and examples to recycle or borrow from; 3) collaborations that support the content and process of business model design; and 4) internal and external design constraints (Amit & Zott, 2015).

Design elements constitute the content, structure, and governance of a firm (Zott & Amit, 2010). In relation to this work, Peters et al. (2015) suggest that design elements reflect the configuration options contained within a morphological box, for example, the Sharing Economy Business Model Framework (**Figure 4**). However, Zott & Amit (2010) suggest design should also consider how these elements will be linked and who has the responsibility to implement such elements. As such, design themes are configurations of design elements, describing the degree to which these elements are structured or connected (Zott & Amit, 2010). In the context of the sharing economy, design themes may include shared practice, platform type, and price discovery, among others (Sanasi et al., 2020).

The process of implementing business models is less articulated in literature. It seems to be something that you just *do*. Osterwalder (2004) suggests implementation is a strategic process associated with execution of the business model. Mason & Spring (2011) suggest that business models are more usefully thought of as “strategy-as-practice”, supporting this notion that implementation is taken for granted. Strategy and decision-making are influenced by rationality and intuition (Calabretta et al., 2017). In my work too, I see the process of implementation as intuitive, and instead focus my research on developing the requisite knowledge and design artefacts that support the outcome of successful implementation.

By combining these perspectives on business model design and implementation with the systematic approach of design science research (see **Section 2.1**), I suggest several actions sharing platforms can take to address the design-implementation gap. I suggest the process of business model innovation is continuous, and one can start or end at any of these actions, depending on the context and motivation.

Gather Information – One of the largest barriers to business model innovation is a lack of knowledge and understanding about the business model and the market. Sharing

platforms may collect information about their potential or existing users, including their motivations, needs, and willingness to engage in co-creation activities. A market study may capture the potential of any new business model innovation as well as identify competitors and collect examples to borrow from. Awareness of current technological solutions and forthcoming trends may be helpful, for example, backend developers like Jungleworks or ShareTribe. A review of existing academic and practice-oriented literature may also contribute information and support learning.

Form Collaborations – Meaningful collaboration and cooperation has been shown to be an important *process* to advance the *content* of business models (Amit & Zott, 2015). I suggest collaborations should focus on the team, stakeholders, and contractors. A team should be able to work well together, complementing each other’s expertise and skills. The team should be able to identify and foster relationships with the important stakeholders, for example, apartment associations, community groups, local regulatory agencies, and other relevant boards. Stakeholders may also be volunteers or other organisations that can provide key knowledge or services to support the implementation of the business model. Platforms should also identify paid contractors for needs beyond the expertise of the team and networks.

Decide on Key Strategy – At the same time, sharing platforms should discuss with the team and its stakeholders to determine the key strategy to guide their activities. This includes identifying the value orientation of the platform and other questions about motivation, impact, or contribution from its activities. This should also include identifying the market, its users, and necessary resources that may guide or restrict decisions on the design elements of the business model.

Decide on Design Elements – Sharing platforms should take into account any internal or external design constraints – identified when gathering information or forming collaborations – that may influence the decision-making process on design elements – the content, structure, and governance of a business model. First, the content refers to the business model attributes and the necessary activities to implement them. Next, the structure captures interlinkages, sequencing, and priority of the activities, which guides how the business model should be implemented. Finally, the governance model dictates roles and responsibilities to oversee and implement the other elements.

Measure What is Important – Regardless of whether the objective is social sustainability or growth projections, sharing platforms should collect data to evaluate the usefulness, effectiveness, and/or efficiency of their operations. The data collected should reflect the value orientation or motivation of the sharing platform, for example, use data should be collected to determine any positive environmental impact. Measuring what is important is a necessary first step, but sharing platforms may also need to process the data either using open-source tools (e.g. the Systematic Framework to Assess Social Impact of Sharing Platforms) or by contracting/collaborating with such services.

Communicate Data and Direction – Sharing platforms may consider communicating data to substantiate any marketing claims made about their sustainability impacts. They may wish to communicate their strategic direction to their users and the market more generally. This improves trust in their activities, and protects themselves from reputational risks associated with bad-faith actors using the sharing economy to exploit labour or resources unsustainably. Finally, leading by example helps to steer the industry and shows a willingness to collaborate with regulators.

5.2 Environmental and Social Sustainability

Influenced by the work of Professor Florian Lüdeke-Freund and Professor Nancy Bocken, they suggest research on sustainable business models provides a direction to develop business models and steer policy, without needing to meet a precise sustainability target. As such, I suggest that, using empirical qualitative data, research may conceptually demarcate business model practices that are more likely to lead to improved sustainability performance. My research proposes four design principles (see **Section 4.1.3**) that seek to prioritise “...the reduction of net resource extraction, reduced greenhouse gas emissions, and enhanced social interaction as a result of sharing” (Curtis & Mont, 2020, p. 4). However, do these design principles actually lead to improved sustainability performance? In the absence of statistical certainty, I review existing literature to examine this further.

Much of the relevant scientific research assessing environmental and social sustainability focuses on business-to-consumer short-term rental companies, more akin to use-oriented PSS. Nonetheless, I suggest we can draw important insights from these findings. For example, Tukker (2004) suggests that PSS models that facilitate renting, sharing, or pooling resources may have major environmental benefits when the greatest environmental impact occurs during the production phase; however, if the use phase dominates, there is little positive outcome since these models increase intensity of use. Therefore, while increasing material efficiency and intensity of use may “reduced resource expenditure for a given level of consumption” (Hawlitschek et al., 2018, p. 1), it cannot be the only criterion for improved sustainability performance in the sharing economy.

For example, I look to mobility-as-a-service (MaaS) companies operating business-to-consumer short-term rental commonly associated with carsharing, bikesharing, and electric scooters. While short-term rental of electric scooters may reduce urban congestion and address the last-mile problem, life cycle assessment shows a net *increase* in global warming impact compared to other modes of transportation (Hollingsworth et al., 2019). Shared dockless bikes perform even worse, contributing an estimated 190 grams carbon dioxide per mile (g CO₂ / mi) (H. Luo et al., 2019) compared to 160 g CO₂ / mi for electric scooters (Hollingsworth et al., 2019). Electric scooters are only on par with personal (non-electric) bicycles or public transit if their lifetimes are

extended beyond two years. However, empirical evidence suggests scooters are not particularly durable, operating less than 30 days and 100 trips (Griswold, 2019).

While companies may choose to select more or less durable products, user behaviour is a contributing factor to the decreased lifetime of shared assets. Tunn & Ackermann (2020) found that, in the case of access-based product-service systems, consumers lack feelings of ownership or attachment, resulting in reduced product care. In addition, carsharing users have reported abusing vehicles, as they feel no responsibility for potential long-term damage (Bardhi & Eckhardt, 2012). These findings suggest business models that facilitate access may induce greater production and consumption, due to increased intensity of use, poor product care, and increased frequency of replacement. This led Zink & Geyer (2017) to propose the “circular economy rebound”, when a circular business model leads to increased production and use of products, outweighing any sustainability benefit.

A rebound effect refers to “... a behavioural or other systemic response to a measure taken to reduce environmental impacts that offsets the effect of the measure” (Hertwich, 2005, p. 86). These effects may *reduce* the anticipated sustainability impact or *backfire*, producing a net negative effect (Hertwich, 2005). In their review, Plepys & Singh (2019) identify several potential rebound effects in the sharing economy. For example, the sharing economy may induce consumption as a result of substitution or significant changes in disposable income (Plepys & Singh, 2019). The substitution effect sees increase in demand as products become cheaper to access, while the income effect sees users purchasing more products due to more disposable income (Hertwich, 2005). However, these are examples of direct effects, while indirect effects concern macro-level effects on the market, technology, and other institutions, which are harder to isolate (Hertwich, 2005).

As a result of this research, I suggest design principles to reduce rebound effects in the sharing economy. These design principles dictate sharing of an existing stock of goods between two actors without a profit motivation for ownership. SEBMs can increase intensity of use without inducing the consumption and production of new goods, while seeking to foster improved social cohesion. However, additional work to adapt the business model may be necessary based on the context in which they operate.

To help assess the sustainability potential of any business model, one question I always ask myself is *what practice does the sharing platform replace?* If users replace individual ownership with accessing a shared asset (from an existing stock), then the business model may be more likely to lead to net sustainability improvement. However, if users substitute an existing practice with a more polluting or harmful shared practice, well, this should be avoided. We often see harmful substitution effects with business-to-consumer and mobility-as-a-service companies. These companies purchase new goods, and compete with public transit, biking, and even walking, arguably more sustainable modes of transportation.

However, to support further evaluation of sustainability claims in the sharing economy and beyond, we must see continued development of quantitative modelling methods that capture the complexity of our globalised production and consumption systems now operating across sectors and geographies. Robust methodologies are sufficient for capturing first-order or direct impacts, but they cannot determine the net socio-economic impact, including potential rebound effects (M. Martin et al., 2019). As such, business and government need to collect data, which is made publicly available. With limited resources and few incentives, such a change would likely need policy intervention to mandate corporate sustainability reporting and additional resources to collect, store, and process data. However, continued evaluation of the sustainability claims made by platforms and academics is necessary, to shed light on greenwashing and other unfounded claims, while offering an opportunity to learn from best practices to inform future design and implementation.

5.3 Reflection

I want to pause here, and take a moment to reflect on both the content of the dissertation and the process I employed to study this phenomenon. Researchers from the natural sciences are clearly telling us there are serious problems, for example, human-caused “biological annihilation” resulting in a sixth mass extinction event (Ceballos et al., 2017) or air pollution from the burning of fossil fuels responsible for approximately 8.7 million deaths annually (Vohra et al., 2021). However, in academia, there seems to be a reluctance to engage with these dire realities to avoid appearing biased or challenging other engrained academic traditions. I have positioned my research within the discipline of sustainability science, an inherently normative and problem-driven field of research. I see the role of academia to be critical of existing societal institutions and, when appropriate, propose normative solutions to real-world problems for real-world actors.

Relying on other empirical studies, my research is highly conceptual in terms of design principles and definitions. As definitions became an important feature of the content in my dissertation, the reader will see that I quote major definitions of concepts (e.g. business model, sustainable business model, business model innovation) instead of paraphrasing in my own words. If a definition is well-justified and well-articulated, I chose to support strong existing definitions to avoid further muddying the water. However, where definitions or clarity were lacking in the source material, I often felt a need to provide further elaboration, for example, by defining a governance model or social cohesion. At times, when trying to contribute or advance definitional clarity, I had the strong feeling of *imposter syndrome*.

The reader will recognise that my research process included a thorough literature review, using NVivo in every article contained within this dissertation. I also employed

novel research methods (e.g. morphological analysis, business model patterns) to study sharing economy business models. I sought to be transparent in my motivation, research methods, and findings. For example, I provide the document list, full data, and underlying code as part of **Article III**. However, looking back on my research process, I see a greater opportunity to have involved more people in the production and evaluation of the artefacts contained within this dissertation. I hope to take what I have learned to engage more in transdisciplinary action research.

I deliberately chose to use the term business model, as opposed to platform model, to describe platforms within the sharing economy. Whereas 'business model' typically has an implicit meaning relating to profit-seeking firms or companies, my use of the term is intended to open up the definition of business model to be more inclusive of diverse organisational types, including non-traditional organisations and grassroots initiatives that seek to create value beyond solely economic value. By challenging the notion of what constitutes a business, I encourage relevant disciplines to take up this discussion, or to at least be critical of the existing paradigm, especially in the face of global and grand sustainability challenges. As a society, we may very well need to legitimise other forms of value creation, delivery, and capture beyond economic and shareholder value.

Finally, this dissertation reflects my research principles and the way that I see the world. I recognise that others may see the world differently and may disagree with the content of my research or my process in studying the sharing economy. Critique is an important aspect of the research process. Nonetheless, I hope to have demonstrated critical thinking as well as a critical review of sharing economy literature. Still, with more than 3,000 documents about the sharing economy catalogued in Scopus, my contribution feels modest and incremental. Companies like Airbnb and Uber, supported by institutional investors, dominate the sharing economy landscape, making it feel impossible to make any great impact on the development of the sharing economy for sustainability. Even so, I think this emphasises the need for greater communication and dissemination for research impact (see **Chapter 6**).

5.4 Future Research

If presented the opportunity to continue academic research, I suggest that there are three specific areas that warrant further research: 1) to study value co-creation processes in the sharing economy and/or triadic business models; 2) to investigate the process of business model innovation and implementation, using action research; 3) and, to explore sustainable business models further considering the product life cycle and consumption practice during the use phase.

Firstly, I suggest there is greater need to understand the processes of value co-creation in the sharing economy. Sharing platforms facilitate value co-creation by mediating

interactions between a resource owner and a resource user. Service-dominant logic, proposed by Vargo & Lusch (2004), stipulates that the customer is a co-creator of value. Value in sharing economy business models is created not only by the key activities of the sharing platform but also by multiple actors engaging in additional key activities (de Oliveira & Cortimiglia, 2017). Future research may explore specific actions of users that are necessary to co-create value, and what sharing platforms may do to direct or support these processes.

Secondly, research is needed to improve understanding of the process of business model innovation and implementation, which are currently taken for granted in research. Whether through continued development of these artefacts, or other knowledge and tools, future research may explore specifically how organisations incorporate and make use of these resources during the design and implementation of their business models. To do so, I propose a transdisciplinary approach in the form of action research, which sees deep collaboration and integration within an organisational context. Ideally, this experiential study may support learning among the respective organisation as well as among sustainable business models broadly.

Finally, Lüdeke-Fruend et al. (2018) suggest further research is needed to synthesise and consolidate knowledge about sustainable business models. One specific approach would be to integrate the disparate empirical studies across the sustainable business model domain, synthesising prescriptive learnings to realise improved sustainability performance. For example, one approach could be to conduct a systematic literature review to explore the product life cycle and consumption practice from the perspective of the business model. This contribution may help sustainable business model literature move beyond simply providing direction for improved sustainability performance.

6 Research Impact

Communication is a key activity in the process of design science research (Peppers et al., 2007), and I place extreme importance on science communication as a pathway to achieve research impact. Although unorthodox in a dissertation, I want to briefly discuss my efforts to communicate and disseminate my research findings to relevant actors, as part of the design science research process and contributing to research impact.

During my PhD, I attended a training by Mark S. Reed, international expert and scholar on research impact. This training and his related work have greatly influenced my understanding of and approach to research impact. He defines research impact as “the good researchers can do in the world”, though cautioning that this understanding has an implicit value judgement that research always provides benefits (Reed, 2018, p. 15). However, if one believes that research has power, as I do¹, I suggest we must think through the potential good AND bad that may come from our research. Reed (2018, p. 15) suggests it is the responsibility of researchers “... to anticipate and assess the potential consequences of research and work with stakeholders to design responsible, sustainable and inclusive research”. For example, I consider the potential negative impact on innovation by restricting the design of sharing economy business models for sustainability, or the possible negative impact on company performance or reputation by calling out ‘sharewashing’ and other dubious sustainability claims.

If research impact is the good that researchers want to contribute, *knowledge mobilisation* describes the process of how researchers transfer or exchange knowledge from researchers to research users (Bannister & Hardill, 2013). The modes of knowledge mobilisation are generally called impact pathways, which describe the “... explicit theory or model of how the project sees itself achieving impact” (Douthwaite et al., 2003, p. 243). However, there exists great diversity and scale of impact pathways

¹ Reading Michael Creighton’s *Jurassic Park*, I was struck by a particular quote: “Science has attained so much power that its practical limits begin to be apparent. Largely through science, billions of us live in one small world, densely packed and intercommunicating. But science cannot help us decide what to do with that world, or how to live. Science can make a nuclear reactor, but it cannot tell us not to build it. Science can make pesticide, but cannot tell us not to use it. And our world starts to seem polluted in fundamental ways---air, and water, and land---because of ungovernable science.” I read this quote and see that, just because science makes something possible, this does not mean that we as researchers or a society should partake in it. As a researcher, I am motivated by and feel a responsibility to understand my research impact.

available by which academic knowledge reaches relevant societal actors. For example, Grant (2015) identifies more than 3,700 unique impact pathways, depending on content, discipline, technology, and actors involved, among other factors.

There has been an increasing demand by governments and funding agencies for academic institutions to realise and evaluate research impact (Rau et al., 2018). The United Kingdom, largely seen as a forerunner in this area, was the first country to include research impact as part of its national assessment of research through what is called the Research Excellence Framework (REF). Swedish funding agencies (e.g. Formas, Vinnova) are also asking for greater elaboration on societal impact.

However, measurement and evaluation of research impact remains difficult (Morgan Jones et al., 2017). Two measures typically evaluated are reach and significance (Reed, 2018). Reach considers the engagement or audience of the research, but also the types of individuals, organisations, or communities engaged. Significance measures how research enriches, influences, or informs research users and subsequent stakeholders. Significance is much more difficult to assess beyond anecdotes without greater resources to interact, interview, or survey research users. However, it is often more illuminating compared with impressions or engagement statistics from social media where, for example, LinkedIn defines an impression as “the total number of times at least 50% of your update was visible for more than 300 milliseconds” (Sehl & Baird, 2020).

Reed (2018) proposes ten types of impact, although other scholars have different categorisations. Drawing on these ten, I suggest my individual research impact provides improved *understanding and awareness*, greater support for *decision-making*, changes in *attitudes*, improved outcomes for the *environment* and *social well-being*, and greater *capacity or preparedness*.

In the remainder of this chapter, I will briefly elaborate on the various impact pathways I have engaged in throughout my doctoral education.

6.1 Project Communication

As part of the *Urban Sharing* research programme, I led the effort to develop a communication plan for the project. The communication plan articulated our *purpose* for communicating, the *messages* of our communication, the available *communication channels* and corresponding *target audiences* as well as other relevant *stakeholders* to achieve our communication *goals*. For example, our overarching purpose of communication was to contribute specific knowledge to and within the research community about the operationalisation and institutionalisation of the sharing economy in cities. A secondary purpose was to advance knowledge relevant to the sustainability of the sharing economy for a broad set of societal actors including sharing platforms, city representatives, users of sharing platforms, and an interested general

audience. Messages, channels, target audiences, and communication goals can be seen to follow from a clearly articulated purpose.

One important communication channel was the project website (<https://www.urbansharing.org/>), which I developed early on in the project using Squarespace, and later supported our project administrator in content curation, upkeep, and revival. As of 18 March 2021, the project website has received 11,000 visitors and more than 26,000 page views. Among the more popular pages (+688 pageviews) was a blogpost I contributed to called *Rebuilding Urban Sharing in Light of the COVID-19 Pandemic*. Additionally, we experienced an increase in web traffic prior to and during our mobile research labs in the countries of our visits. For example, in the months leading up to and proceeding our visit to Toronto, Canada, web traffic from the Ontario province increased compared to background levels. This suggests the project website acted as an important source of information to our interviewees and other stakeholders, hopefully supporting the reputation of the research programme.

The plan also put forward suggested *routines* and *responsibilities*. However, I think we all soon realised that extra time and resources would be required to execute an ambitious communication plan. Nonetheless, several practices remain entrenched, such as posting news items and blogposts, creating and disseminating city snapshots, and creating a communication plan for each newly-published academic article. I have learned to plan and execute research communication, as well as some of the associated challenges.

6.2 Popular Science Publications

In an attempt to translate peer-reviewed journal articles into a medium more widely accessible to broader audiences beyond academia, I designed and authored a popular science publication called the *Sharing Platform Workbook*, largely reflecting content from **Article II**. The workbook is intended to support entrepreneurs, managers, and existing sharing platforms interested in creating or improving their value offering. It includes guiding questions and detailed descriptions of relevant business model attributes, available in both digital and print format. As of 18 March 2021, the workbook has been downloaded 293 times. I also printed 200 copies of the workbook for distribution to relevant actors. To produce the workbook, I collaborated with the design agency Kolossal, based in Lund. The publication is styled in line with the graphic profile of Lund University.

6.3 Presenting

I feel one important aspect of science communication is presenting research at academic conferences and other events, to an audience interested in your findings. Wanting to create significance for the audience, I spend considerable time reflecting on the main message the audience needs to hear. From this, I carefully structure the presentation and often use more visually-appealing formats, depending on the context. For example, I have created a PowerPoint template in line with the graphic profile of the University and the Institute with a dark background. A dark background is generally more inclusive for individuals with dyslexia. At times, I use Canva – an online design and publishing tool – to create visually-stunning presentations. My philosophy is that the visual should support the presenter, so I tend to have limited text aside from keywords and images to cement the main ideas. Most importantly, I practice each presentation at least three times, remembering transitions between ideas and important concepts, but never memorising content.

I have presented at approximately twelve academic or professional conferences, such as the Swedish National Laboratory on Sustainable Lifestyles. I have been asked to moderate sessions at Lund University's Sustainability Week, the International Workshop on the Sharing Economy, and the Sharing Cities Summit. In total, I estimate I have presented at or moderated events with a total audience of over 1,000 people.

I was awarded the Best Presentation at the New Business Models Conference in 2020, a virtual conference as a result of the COVID-19 pandemic. While it was not possible to interact with the audience, I asked rhetorical questions to prompt the listener to consider the content of the presentation and ensured a stable internet connection with a pleasant background. Another successful practice I have used at academic conferences was to pass around a half-sheet of paper to prompt the audience to respond to questions and provide feedback on the content of my presentation. I asked those interested to provide their email addresses in order to receive the slides and a summary of the responses from others. In total, nearly thirty people showed interest across two conferences, which I was able to follow-up afterwards and continue a dialogue.

6.4 Podcasting

I co-host the podcast *Advancing Sustainable Solutions*, a monthly podcast produced by the IIIIEE at Lund University. The mission is to make sustainability research more accessible and engaging for society by connecting the podcast to research, events, and people relevant to the activities of the IIIIEE. The podcast began in September 2018, making it among the early pioneers within academia to translate research for a wider audience using this medium. The podcast is an initiative of PhD students, including

Sofie Sandin, Katherine Shabb, Frans Libertson, Karolina Södergren, and myself. The episodes cover content related to the four research themes of the IIIIEE – sustainability in business, policy, consumption, and cities. The episodes are highly produced, with content scripted in addition to interviews with guests relevant to each episode.

As of 31 March 2021, the IIIIEE Podcast has been downloaded 26,000+ times across 23 episodes, averaging more than 1,130 listens per episode. With listeners from around the world, the podcast is in the top 10% of all podcasts globally. The podcast has attracted international staff and students, nurtured new and existing partnerships, been integrated into course curriculum, and institutionalised in funding applications within the department.

6.5 Social Media

I use both Twitter and LinkedIn as a means to communicate my research and podcasting activities professionally. While I am reluctant to devote too much time to social media, I also recognise the value in reaching a greater number of people, especially beyond academia. For example, my monthly Twitter impressions regularly top 10,000. Through posts on social media, I have interacted with municipalities, sharing platforms, and other researchers. I have created an online support community and curated relevant posts for my professional development. The use of social media can open opportunities for broader recognition. Recently, I was recognised on the University of Bath's #ThinklistNext, a list of doctoral researchers making an impact on Twitter in the field of responsible business. I also appeared in a [story](#) by the Network for Business Sustainability about translating research for practitioners.

One way to reduce time on social media is to use a social media scheduler such as CoSchedule. Doing so has saved me time and effort, by scheduling posts in one sitting to run throughout a week or in relation to a new publication. My guiding philosophy when generating research impact on social media is to focus on meaningful content and avoid contributing more noise.

6.6 Teaching

With the majority of my educational and professional experience in environmental science and sustainability, I recognise I am educating a generation faced with profound economic, ecological, and political uncertainty. I see teaching as an important pathway for creating impact within academia. I have embraced my role as educator and taken every opportunity to contribute to the design and execution of teaching at the IIIIEE. I have participated in teaching four courses, and served as course coordinator and lead

educator in two courses. Over four years, I have engaged in approx. 600 teaching hours. I have supervised two master's students writing their theses, and taken several pedagogical courses totalling 18.5 ECTS. I have conducted primary pedagogical research and contributed to two articles submitted to teaching conferences at Lund University.

To demonstrate my impact in teaching, I have selected a handful of feedback I received as course coordinator and educator in the course *Environmental Science and the Anthropocene*:

- “The teachers did an outstanding job at explaining what they expected from us and created a vibrant and supporting learning environment! I have not experienced such a well-structured seminar in any other learning environment.”
- “The teacher's passion really made a difference in the whole course approach. They really wanted us to learn in a meaningful way and it really worked. So many different things were learned without it being too much. The balance between different learning activities was great. I really appreciated this course and I hope it doesn't put the bar too high for other teachers and classes!”
- “It was abundantly clear that this course was created with great care. It's a model for how every class should be run. It made great use of a variety of mediums to best support students' learning (recorded lectures, zoom, podcasts, videos, etc.). ... The class provided the tools necessary to gain confidence in academic skills (referencing, presentation skills, etc.) and gave a safe space to practice them.”
- “Even though I didn't have a background in environmental sciences, I found the course and the teaching to be extremely understandable. I would especially like to thank the teachers for their ability to give constant feedback and to help us learn in different ways (presenting, writing, listening, conversations). All in all, the course was one of the best courses I have participated in and the teachers the most passionate I have seen. I really feel I learned more than any other previous courses.”

7 Conclusion

There is a design-implementation gap between the design of sharing economy business models and their successful implementation, especially realising any sustainability impact. This means there is a need for normative and critical research to advance knowledge about the sharing economy for sustainability. Inspired by design science research, I depart from sustainability science to study the design and implementation of sharing economy business models, contributing to sharing economy and business model literature. I sought to address the design-implementation gap by conducting prescriptive and design-oriented research. To conclude my dissertation, I summarise my main findings, provide recommendations to relevant stakeholders, reflect on my contribution to research and practice, highlight potential limitations, and conclude with some final remarks.

7.1 Summary of Main Findings

The dissertation provides an elaborate conceptualisation of sharing economy business models, prioritising improved environmental and social sustainability performance. The artefacts and justificatory knowledge presented within this dissertation amounts to a grand design theory. This research asked three research questions, with the main findings summarised below:

RQ1: What design principles can guide the design and implementation of sharing economy business models for sustainability?

- Four design principles delineate and guide the design and implementation of SEBMs: 1) operate as a platform; 2) leverage idling capacity of an existing stock of goods; 3) possess non-pecuniary motivation for ownership; and 4) facilitate temporary access over ownership.
- These design principles reflect the broader design theory, including an intentional definition with semantic properties and other concepts (e.g. resource owner, resource user, platform type, shared practice).

RQ2: How may sharing economy business models be designed for sustainability?

- This research proposes an artefact called the Sharing Economy Business Model Framework (**Figure 4**), which captures three value dimensions, sixteen business model attributes, and eighty-nine configuration options.
- The framework improves on existing conceptualisations by departing from a coherent and prescriptive definition of the sharing economy, providing greater elaboration of business model attributes (summarised in **Article II, III**, and the **Glossary**), and incorporating sustainability as a design condition.
- Other business model considerations may prove important during the design of SEBMs, for example, insurance, identity verification systems, dispute resolution, and ethical data management protocols help to foster trust and transparency among users and society.

RQ3: What constellation of business model attributes and organisational strategies support implementation?

- Using quantitative cluster analysis, I propose eight prototypical patterns and nineteen solution patterns to support the implementation of sharing economy business models.
- The prototypical patterns describe industry-specific business models, such as collaborative community platforms, P2P space sharing platforms, P2P mobility sharing platforms, and coworking space platforms. Each of the eight patterns includes a list of business model attributes and configuration options to support implementation of the corresponding sharing platform, described in **Table 4**.
- The solution patterns combine thirteen patterns already described in literature, but now elaborated specifically for the sharing economy, and six new patterns not yet described in literature. These new solution patterns for the sharing economy include community governance, price set by users, review system, existing community, nodes, and mixed revenue source, with all solution patterns described in **Table 5**.
- I conducted research to develop a systematic framework to assess the social impact of sharing platforms. The framework measures eighteen indicators across four social aspects – trust, empowerment, social justice, and inclusivity. In addition, the framework proposes measurable variables for each indicator targeting the platform, resource owner, resource user, and society.
- Finally, with the COVID-19 pandemic ongoing and continued economic and social uncertainty, I contributed to research on organisational response

strategies in the sharing economy. We inductively coded website and social media data of thirty sharing platforms to develop an empirical framework, including eight strategies and associated actions. The strategies target the organisation, its users, and the broader society. This research seeks to contribute to crisis management literature and support sharing platforms continued existence in challenging and uncertain times.

7.2 Recommendations

As my research is inherently normative and seeks to have utility, it feels natural to conclude with relevant recommendations for affected stakeholders, for example, sharing platforms, their users, and policymakers.

7.2.1 Sharing Platforms

I recommend the team behind every sharing platform *discusses their motivation and purpose for existing*. When made explicit, this helps teams develop strategy to design and implement aspects of their business model. Too often, I see sharing platforms communicating an environmental or social value orientation not reflected in their business model choices. Intentional or not, this may be a result of only partial knowledge of potential business model attributes or limited analysis of their impacts. I recommend that sharing platforms *gather information* and *form collaborations* to support the design and implementation of their business models (see **Section 5.1**). Additionally, sharing platforms may wish to *measure what is important* in line with their motivation. Finally, I understand there are always demands on time and resources, which produce feelings of urgency. In my own practice, as well as through observation, *determining what is important from what is urgent* helps to clarify necessary actions. And, I have often found that slow, deliberate, and limited interventions may lead to greater reward than ill-informed and reactionary innovations to the business model. I hope *the use of knowledge and artefacts* contained within this dissertation can support more methodological and strategic design and implementation of sharing economy business models for sustainability.

7.2.2 Users

In a two-sided market, users are extremely important, even necessary, to create and capture value. I suggest users *recognise their inherent value* in the sharing economy. This means using their voice to *influence platform governance* and *push back when their time or resources are being exploited*. Because users are integral to value co-creation, there is

opportunity to *engage the community* as much or as little as desired. Finally, I suggest users *read the user agreements and privacy statements* of each sharing platform.

7.2.3 Policymakers

I recognise that policymakers at all levels are motivated by different factors, for example, reduced greenhouse gas emissions, social integration, or employment. Again, by making these motivations explicit, policymakers can *target their response* to the sharing economy. I highlight the work by colleagues Yuliya Voytenko Palgan and Oksana Mont (2021) exploring the governance roles of municipalities, which may provide a hindering, enabling, or neutral effect on sharing platforms.

My most tangible recommendation is for municipal governments to *implement a tender process* for most business-to-consumer sharing companies allowed to operate in their city. This shifts competition from customer convenience to quality of service, reducing artificial idling capacity of scooter-, bike-, and carsharing companies that clutter sidewalks and street parking. For example, instead of having two hundred cars from four different companies, imagine six hundred cars from one company. This improves the service offering as more cars are available on one platform, improves resource efficiency by reducing transaction costs, and avoids unnecessary production of otherwise idling assets.

Policymakers can also support peer-to-peer sharing. Ultimately, sharing platforms with an environmental or social value orientation operating locally struggle to remain socially and financially viable. Policymakers could consider *offering tangible support* in the form of money, space, reputation, visibility, or other provisions.

7.3 Contribution to Research and Practice

I suggest my primary contribution is *conceptual*, with additional modest *methodological* and *empirical* contributions. Firstly, instead of developing descriptive knowledge, based solely on empirical observations, I advance knowledge by proposing prescriptive and design-oriented knowledge. This contributes rich and coherent *conceptualisations* that advance sharing economy research for sustainability. The Sharing Economy Business Model Framework and associated business model patterns guide research on the design of sharing economy business models, as well as support implementation among sharing platforms in practice.

Secondly, I employed methods such as morphological analysis and quantitative cluster analysis to study the sharing economy. The methods are well-described and documented to provide transparency and demonstrate reliability. Additionally, the use of these methods further establishes their relevance and rigour in studies of the design

of business models. Finally, I incorporated empirical data from *people* (e.g. interviews, stakeholder workshop), *documents* (e.g. webpages, social media), and *literature* (e.g. academic literature on the sharing economy or business models patterns), some of which is publicly available (**Articles III & IV**).

By embarking on design science research, the artefacts contained within this dissertation are intended to be useful for practitioners. I believe my research has clear value to practitioners, including sharing platforms, entrepreneurs, managers, policymakers, investors, and concerned citizens. Specifically, I point to **Chapter 6**, which provides an overview of the types of impact, for example, understanding and awareness, decision-making, changes in attitudes, and greater capacity or preparedness. I have made efforts to disseminate the research results via the *Sharing Platform Workbook* or the IIIIEE Podcast *Advancing Sustainable Solutions*. Ultimately, I hope my work supports critical reflection in research and practice about the design and implementation of sharing economy business models to realise improved sustainability performance.

7.4 Limitations

While this research provides an elaborate and coherent conceptualisation of sharing economy business models unseen previously in research, I have realised some limitations with conducting prescriptive and design-oriented research. Firstly, prescriptive research makes normative claims about how things should be done in order to solve a problem, in contrast to descriptive research. However, who am I to say how the sharing economy should be designed and implemented? I always feel like I will offend someone who sees the sharing economy differently, motivated not by sustainability, but by innovation, economic growth, employment, etc. To address this, I always triangulated literature and empirical data (e.g. interviews, observations, stakeholder workshops, as well as website and social media data) to capture as much knowledge and as many perspectives as possible, while remaining critical and thinking conceptually about sustainability claims. However, despite my best efforts, I know that the literature, interviewees, and business models analysed in this thesis only reflect those accessible to me, excluding legitimate knowledge in other languages or geographies to my own.

There are other challenges that impose limitations on the utility and longevity of this research. Firstly, the sharing economy – and sustainable business models in general – is a fast-paced and changing phenomena in research and practice. Many related phenomena remain contested in theory and practice. Since the beginning of this research, the platform economy has grown in popularity, with competing perspectives and similarly dubious sustainability claims. Additional concepts used in this research also are contested, including business models and sustainability. I have sought to be

clear and specific about how I define terms to avoid confusion and allow others to make choices about how to use this research.

The business model perspective offers a static view of the building blocks and key activities of a firm. Instead, business model design and implementation are iterative and infinite processes, influenced by changing technology and societal factors, which are difficult to capture in a static artefact. I have sought to address this by connecting design and implementation to the concept of business model innovation (**Section Fel! Hittar inte referenskölla.**). Other limitations present opportunities for future research, for example, continued testing of the design principles and artefacts developed as part of this dissertation.

Finally, conducting doctoral research and writing a dissertation during a global pandemic also presents some challenges, impacting this research. I experienced some setbacks in my research design and execution. Notably, in **Article IV**, a planned collaboration with a sharing platform to evaluate the usability of our social impact framework was no longer possible. I gave up the idea of evaluating some of the design artefacts produced throughout this research (e.g. business model patterns). I felt uncomfortable approaching sharing platforms to request their time, while many expressed the need to devote resources to more pressing matters stemming from the pandemic. With the support of my supervisors, we conceptualised **Article V** to examine the organisational response strategies of sharing platforms to the COVID-19 pandemic. I am proud to have contributed to this timely research, which I believe speaks to implementation strategies among sharing platforms faced with challenges beyond their doing as a result of the pandemic.

7.5 Concluding Remarks

In closing, I want to reiterate the argument made by Hammersley & Atkinson (2007): research has power. They argue that research should be emancipatory and always has political consequences, as “[t]o be of value, ... research should be concerned not simply with understanding the world but applying its findings to bring about change” (2007, p. 14). As someone researching sustainability, I must believe this, in order to cope with the dire predictions made by climate scientists, oceanographers, geographers, and anthropologists.

I believe that the sharing economy does have the *potential* to contribute to sustainable consumption. However, with strong economic logic and what I perceive to be relatively weak government and academic institutions, I fear the sharing economy will continue to be exploited by market forces to the detriment of the environment and societies.

Nonetheless, the drivers that led to the birth of the sharing economy persist, and I believe the sharing economy will continue in some form or another. Given the global

sustainability challenges that we face, I just hope that the sharing economy is part of the solution and not part of the problem. If anything, I hope that sharing challenges us to consider our own consumption, leading us towards a more sufficiency-based lifestyle. If we all think more critically, creatively, and collaboratively in how we consume, I am hopeful that the sharing economy can deliver on its purported sustainability potential.

References

- Abdelkafi, N., Makhotin, S., & Posselt, T. (2013). Business model innovations for electric mobility—What can be learned from existing business model patterns? *International Journal of Innovation Management*, 17(01), 1340003. <https://doi.org/10.1142/S1363919613400033>
- Abler, R., & Adams, J. S. (1977). *The industrial and occupational structure of the American labor force* (Vol. 15). Department of Geography, Pennsylvania State University.
- Acquier, A., Daudigeos, T., & Pinkse, J. (2017). Promises and paradoxes of the sharing economy: An organizing framework. *Technological Forecasting and Social Change*, 125, 1–10. <https://doi.org/10.1016/j.techfore.2017.07.006>
- Adams-Webber, J. (1989). Kelly's pragmatic constructivism. *Canadian Psychology/Psychologie Canadienne*, 30(2), 190–193. <https://doi.org/10.1037/h0079796>
- Ahuja, R., & Lyons, R. C. (2019). The silent treatment: Discrimination against same-sex relations in the sharing economy. *Oxford Economic Papers*, 71(3), 564–576. Scopus. <https://doi.org/10.1093/oep/gpz025>
- Akbar, P., & Hoffmann, S. (2020). Creating value in product service systems through sharing. *Journal of Business Research*, 121, 495–505. Scopus. <https://doi.org/10.1016/j.jbusres.2019.12.008>
- Akbar, Y. H., & Tracogna, A. (2018). The sharing economy and the future of the hotel industry: Transaction cost theory and platform economics. *International Journal of Hospitality Management*, 71, 91–101. Scopus. <https://doi.org/10.1016/j.ijhm.2017.12.004>
- Aloni, E. (2016). Pluralizing the “sharing” economy. *Washington Law Review*, 91(4), 1397–1459. Scopus.
- Alrawadieh, Z., & Alrawadieh, Z. (2018). Exploring entrepreneurship in the sharing accommodation sector: Empirical evidence from a developing country. *Tourism Management Perspectives*, 28, 179–188. Scopus. <https://doi.org/10.1016/j.tmp.2018.09.001>
- Amit, R., & Zott, C. (2012). Creating value through business model innovation. 2012.
- Amit, R., & Zott, C. (2015). Crafting business architecture: The antecedents of business model design. *Strategic Entrepreneurship Journal*, 9(4), 331–350.
- Amshoff, B., Dülme, C., Echterfeld, J., & Gausemeier, J. (2015). Business model patterns for disruptive technologies. *International Journal of Innovation Management*, 19(3). Scopus. <https://doi.org/10.1142/S1363919615400022>

- Andreassen, T. W., Lervik-Olsen, L., Snyder, H., Van Riel, A. C. R., Sweeney, J. C., & Van Vaerenbergh, Y. (2018). Business model innovation and value-creation: The triadic way. *Journal of Service Management*, 29(5), 883–906. <https://doi.org/10.1108/JOSM-05-2018-0125>
- Anells, M. (1996). Grounded Theory Method: Philosophical Perspectives, Paradigm of Inquiry, and Postmodernism. *Qualitative Health Research*, 6(3), 379–393. <https://doi.org/10.1177/104973239600600306>
- Apte, U. M., & Davis, M. M. (2019). Sharing economy services: Business model generation. *California Management Review*, 61(2), 104–131. Scopus. <https://doi.org/10.1177/0008125619826025>
- Au, Y. A. (2001). Design science I: The role of design science in electronic commerce research. *Communications of the Association for Information Systems*, 7(1), 1.
- Baden-Fuller, C., & Haefliger, S. (2013). Business models and technological innovation. *Long Range Planning*, 46(6), 419–426.
- Baines, T. S., Lightfoot, H. W., Evans, S., Neely, A., Greenough, R., Peppard, J., Roy, R., Shehab, E., Braganza, A., & Tiwari, A. (2007). State-of-the-art in product-service systems. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 221(10), 1543–1552.
- Baldassarre, B., Konietzko, J., Brown, P., Calabretta, G., Bocken, N., Karpen, I. O., & Hultink, E. J. (2020). Addressing the design-implementation gap of sustainable business models by prototyping: A tool for planning and executing small-scale pilots. *Journal of Cleaner Production*, 255, 120295. <https://doi.org/10.1016/j.jclepro.2020.120295>
- Bálint, D., & Trócsányi, A. (2016). New ways of mobility: The birth of ridesharing. A case study from Hungary. *Hungarian Geographical Bulletin*, 65(4), 391–405. Scopus. <https://doi.org/10.15201/hungeobull.65.4.7>
- Bannister, J., & Hardill, I. (2013). Knowledge mobilisation and the social sciences: Dancing with new partners in an age of austerity. *Contemporary Social Science*, 8(3), 167–175.
- Barbour, R. S. (2013). Analysing Focus Groups. In U. Flick (Ed.), *The SAGE Handbook of Qualitative Data Analysis* (pp. 313–326). SAGE Publications Ltd. <https://doi.org/10.4135/9781446282243>
- Bardhi, F., & Eckhardt, G. M. (2012). Access-Based Consumption: The Case of Car Sharing. *Journal of Consumer Research*, 39(4), 881–898. <https://doi.org/10.1086/666376>
- Barta, K., & Neff, G. (2016). Technologies for Sharing: Lessons from Quantified Self about the political economy of platforms. *Information, Communication & Society*, 19(4), 518–531. <https://doi.org/10.1080/1369118X.2015.1118520>
- Bazeley, P., & Jackson, K. (2013). *Qualitative Data Analysis with NVivo*. SAGE.
- Beck, R., Weber, S., & Gregory, R. W. (2013). Theory-generating design science research. *Information Systems Frontiers*, 15(4), 637–651. <https://doi.org/10.1007/s10796-012-9342-4>
- Begum, L., & Anjum, M. (2016). Beyond the creative class, mapping the collaborative economy of Bangladeshi creative industries: Case study of *Oitij - jo*. *South Asian Popular Culture*, 14(3), 137–153. <https://doi.org/10.1080/14746689.2017.1294802>

- Belk, R. (2010). Sharing. *Journal of Consumer Research*, 36(5), 715–734.
- Belk, R. (2014a). Sharing versus pseudo-sharing in Web 2.0. *The Anthropologist*, 18(1), 7–23.
- Belk, R. (2014b). You are what you can access: Sharing and collaborative consumption online. *Journal of Business Research*, 67(8), 1595–1600.
<https://doi.org/10.1016/j.jbusres.2013.10.001>
- Belk, R. (2016). Accept no substitutes: A reply to Arnould and Rose. *Marketing Theory*, 16(1), 143–149. <https://doi.org/10.1177/1470593115622720>
- Benoit, S., Baker, T. L., Bolton, R. N., Gruber, T., & Kandampully, J. (2017). A triadic framework for collaborative consumption (CC): Motives, activities and resources & capabilities of actors. *Journal of Business Research*, 79, 219–227.
<https://doi.org/10.1016/j.jbusres.2017.05.004>
- Bocken, N., Pauw, I. de, Bakker, C., & Grinten, B. van der. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320. <https://doi.org/10.1080/21681015.2016.1172124>
- Bocken, N., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production*, 65, 42–56.
<https://doi.org/10.1016/j.jclepro.2013.11.039>
- Bocken, N., Strupeit, L., Whalen, K., & Nußholz, J. (2019). A Review and Evaluation of Circular Business Model Innovation Tools. *Sustainability*, 11(8), 2210.
<https://doi.org/10.3390/su11082210>
- Boons, F., & Lüdeke-Freund, F. (2013). Business models for sustainable innovation: State-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*, 45, 9–19.
<https://doi.org/10.1016/j.jclepro.2012.07.007>
- Botsman, R., & Rogers, R. (2010). *What's Mine Is Yours: The Rise of Collaborative Consumption*. Harper Collins.
- Boutsoukis, G., Fasianos, A., & Petrohilos-Andrianos, Y. (2019). The spatial distribution of short-term rental listings in Greece: A regional graphic. *Regional Studies, Regional Science*, 6(1), 455–459.
- boyd, danah. (2015). Making Sense of Teen Life: Strategies for Capturing Ethnographic Data in a Networked Era. In E. Hargittai & C. Sandvig (Eds.), *Digital Research Confidential: The Secrets of Studying Behavior Online* (pp. 79–102). MIT Press.
- Breuer, H., Fichter, K., Freund, F. L., & Tiemann, I. (2018). Sustainability-oriented business model development: Principles, criteria and tools. *International Journal of Entrepreneurial Venturing*, 10(2), 256. <https://doi.org/10.1504/IJEV.2018.092715>
- Bridges, J., & Vásquez, C. (2018). If nearly all Airbnb reviews are positive, does that make them meaningless? *Current Issues in Tourism*, 21(18), 2065–2083. Scopus.
<https://doi.org/10.1080/13683500.2016.1267113>
- Bryant, A., & Charmaz, K. (2007). *The SAGE Handbook of Grounded Theory*. London: Sage.
- Bryman, A. (2012). *Social Research Methods, 4th Edition* (4th edition). Oxford University Press.
- Butenko, A. (2016). Sharing Energy. *European Journal of Risk Regulation*, 7(04), 701–716.
<https://doi.org/10.1017/S1867299X00010138>

- Butler, J. (2004). *Undoing Gender*. Psychology Press.
- Calabretta, G., Gemser, G., & Wijnberg, N. M. (2017). The Interplay between Intuition and Rationality in Strategic Decision Making: A Paradox Perspective. *Organization Studies*, 38(3–4), 365–401. <https://doi.org/10.1177/0170840616655483>
- Caldicott, R. W., von der Heide, T., Scherrer, P., Muschter, S., & Canosa, A. (2020). Airbnb—exploring triple bottom line impacts on community. *International Journal of Culture, Tourism and Hospitality Research*.
- Carrington, D. (2020, January 22). World's consumption of materials hits record 100bn tonnes a year. *The Guardian*. <https://www.theguardian.com/environment/2020/jan/22/worlds-consumption-of-materials-hits-record-100bn-tonnes-a-year>
- Cartwright, A. (2016). Dynamic property rights and the market process. *Journal of Entrepreneurship and Public Policy*, 5(3), 273–284. <https://doi.org/10.1108/JEPP-10-2015-0031>
- Ceballos, G., Ehrlich, P. R., & Dirzo, R. (2017). Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. *Proceedings of the National Academy of Sciences*, 114(30), E6089–E6096. <https://doi.org/10.1073/pnas.1704949114>
- Chadwick, L. (2020, May 8). *Hotels and Airbnb plan 'fundamental shift' after COVID-19 lockdowns*. Euronews. <https://www.euronews.com/2020/05/08/coronavirus-hotels-and-airbnb-plan-fundamental-shift-after-covid-19-lockdowns>
- Chalmers, A. (2013). *What Is This Thing Called Science?* University of Queensland Press.
- Charmaz, K. (2006). *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. London: Sage.
- Chasin, F., von Hoffen, M., Cramer, M., & Matzner, M. (2018). Peer-to-peer sharing and collaborative consumption platforms: A taxonomy and a reproducible analysis. *Information Systems and E-Business Management*, 16(2), 293–325. <https://doi.org/10.1007/s10257-017-0357-8>
- Chen, J. V., Biamukda, S., & Tran, S. T. T. (2020). Service providers' intention to continue sharing: The moderating role of two-way review system. *Industrial Management and Data Systems*, 120(8), 1543–1564. Scopus. <https://doi.org/10.1108/IMDS-08-2019-0436>
- Cheng, M. (2016a). Current sharing economy media discourse in tourism. *Annals of Tourism Research*, 60, 111–114. Scopus. <https://doi.org/10.1016/j.annals.2016.07.001>
- Cheng, M. (2016b). Sharing economy: A review and agenda for future research. *International Journal of Hospitality Management*, 57, 60–70. <https://doi.org/10.1016/j.ijhm.2016.06.003>
- Cherryholmes, C. H. (1992). Notes on pragmatism and scientific realism. *Educational Researcher*, 21(6), 13–17.

- Chesbrough, H., & Rosenbloom, R. (2002). The role of the business model in capturing value from innovation: Evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*, 11(3), 529–555. <https://doi.org/10.1093/icc/11.3.529>
- Chesbrough, H. (2010). Business Model Innovation: Opportunities and Barriers. *Long Range Planning*, 43(2–3), 354–363. <https://doi.org/10.1016/j.lrp.2009.07.010>
- Choudary, S. P., Parker, G. G., & Alystne, M. V. (2015). *Platform Scale: How an Emerging Business Model Helps Startups Build Large Empires with Minimum Investment*. Platform Thinking Labs.
- Circle Economy. (2021). *The Circularity Gap Report 2021*. Circle Economy. <https://www.circularity-gap.world/2021>
- Ciulli, F., & Kolk, A. (2019). Incumbents and business model innovation for the sharing economy: Implications for sustainability. *Journal of Cleaner Production*, 214, 995–1010. Scopus. <https://doi.org/10.1016/j.jclepro.2018.12.295>
- Clark, C. (1940). The Conditions of Economic Progress. *International Affairs Review Supplement*, 19(1), 36–37. <https://doi.org/10.2307/3026172>
- Cohen, B., & Kietzmann, J. (2014). Ride On! Mobility Business Models for the Sharing Economy. *Organization & Environment*, 27(3), 279–296. <https://doi.org/10.1177/1086026614546199>
- Coombs, W. T., & Holladay, S. J. (2002). Helping crisis managers protect reputational assets: Initial tests of the situational crisis communication theory. *Management Communication Quarterly*, 16(2), 165–186.
- Corbin, J., & Strauss, A. (2015). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. SAGE.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
- Curtis, S. K. (2021). Business model patterns in the sharing economy. *Sustainable Production and Consumption*, 27, 1650–1671. <https://doi.org/10.1016/j.spc.2021.04.009>
- Curtis, S. K., & Lehner, M. (2019). Defining the Sharing Economy for Sustainability. *Sustainability*, 11(3), 567. <https://doi.org/10.3390/su11030567>
- Curtis, S. K., & Mont, O. (2020). Sharing economy business models for sustainability. *Journal of Cleaner Production*, 266, 121519. <https://doi.org/10.1016/j.jclepro.2020.121519>
- Curtis, S. K., Singh, J., Mont, O., & Kessler, A. (2020). Systematic framework to assess social impacts of sharing platforms: Synthesising literature and stakeholder perspectives to arrive at a framework and practice-oriented tool. *PLOS ONE*, 15(10), e0240373. <https://doi.org/10.1371/journal.pone.0240373>
- Davies, A. R., Donald, B., Gray, M., & Knox-Hayes, J. (2017). Sharing economies: Moving beyond binaries in a digital age. *Cambridge Journal of Regions, Economy and Society*, 10(2), 209–230. <https://doi.org/10.1093/cjres/rsx005>

- de Oliveira, D. T., & Cortimiglia, M. N. (2017). Value co-creation in web-based multisided platforms: A conceptual framework and implications for business model design. *Business Horizons*, 60(6), 747–758. <https://doi.org/10.1016/j.bushor.2017.07.002>
- de Vries, B. J. M. (2012). *Sustainability Science*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511794469>
- Doganova, L., & Eyquem-Renault, M. (2009). What do business models do?: Innovation devices in technology entrepreneurship. *Research Policy*, 38(10), 1559–1570.
- Douthwaite, B., Kuby, T., van de Fliert, E., & Schulz, S. (2003). Impact pathway evaluation: An approach for achieving and attributing impact in complex systems. *Agricultural Systems*, 78(2), 243–265. [https://doi.org/10.1016/S0308-521X\(03\)00128-8](https://doi.org/10.1016/S0308-521X(03)00128-8)
- Dredge, D., & Gyimóthy, S. (2015). The collaborative economy and tourism: Critical perspectives, questionable claims and silenced voices. *Tourism Recreation Research*, 40(3), 286–302. <https://doi.org/10.1080/02508281.2015.1086076>
- Dresch, A., Lacerda, D. P., & Antunes, J. A. V. (2015). Design Science Research. In A. Dresch, D. P. Lacerda, & J. A. V. Antunes Jr (Eds.), *Design Science Research: A Method for Science and Technology Advancement* (pp. 67–102). Springer International Publishing. https://doi.org/10.1007/978-3-319-07374-3_4
- Dreyer, B., Lüdeke-Freund, F., Hamann, R., & Faccar, K. (2017). Upsides and downsides of the sharing economy: Collaborative consumption business models' stakeholder value impacts and their relationship to context. *Technological Forecasting and Social Change*, 125, 87–104. <https://doi.org/10.1016/j.techfore.2017.03.036>
- Echterfeld, J., Amshoff, B., & Gausemeier, J. (2015). How to use business model patterns for exploiting disruptive technologies. *IAMOT 2015 - 24th International Association for Management of Technology Conference: Technology, Innovation and Management for Sustainable Growth, Proceedings*, 2294–2313. Scopus. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84959289812&partnerID=40&md5=817f8045ff28f2ef443c8185421c632e>
- Edelman, B., & Luca, M. (2014). Digital Discrimination: The Case of Airbnb.com. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2377353>
- Edelman, B., Luca, M., & Svirsky, D. (2017). Racial discrimination in the sharing economy: Evidence from a field experiment. *American Economic Journal: Applied Economics*, 9(2), 1–22. Scopus. <https://doi.org/10.1257/app.20160213>
- Efron, S. E., & Ravid, R. (2019). *Writing a Literature Review: A practical guide*. The Guilford Press.
- Ellen MacArthur Foundation. (2013). Towards the circular economy: Opportunities for the consumer goods sector. *Ellen MacArthur Foundation*.
- Eriksson, T., & Ritchey, T. (2002). *Scenario Development using Computerised Morphological Analysis*. 8.
- Esin, C., Fathi, M., & Squire, C. (2013). Narrative Analysis: The Constructivist Approach. In U. Flick (Ed.), *The SAGE Handbook of Qualitative Data Analysis* (pp. 203–216). SAGE Publications Ltd. <https://doi.org/10.4135/9781446282243>
- European Commission. (2020). *A New Circular Economy Action Plan COM(2020) 98*. 20.

- Evans, D. S. (2009). *Two-Sided Market Definition* (SSRN Scholarly Paper ID 1396751). Social Science Research Network. <https://papers.ssrn.com/abstract=1396751>
- Fast Company. (n.d.). *About Us*. Fast Company. Retrieved 31 January 2018, from <https://www.fastcompany.com/about-us>
- Felson, M., & Spaeth, J. L. (1978). Community Structure and Collaborative Consumption: A Routine Activity Approach. *American Behavioral Scientist*, 21(4), 614–624. Scopus. <https://doi.org/10.1177/000276427802100411>
- Fine, G. A. (1993). Ten lies of ethnography: Moral dilemmas of field research. *Journal of Contemporary Ethnography*, 22(3), 267–294.
- Floercke, S., & Lehner, F. (2019). *Dominant Business Model Patterns of Regional IaaS Providers – An Exploratory Multiple-Case Study: Vol. 11819 LNCS* (p. 153). Scopus. https://doi.org/10.1007/978-3-030-36027-6_12
- Foote, N. N., & Hatt, P. K. (1953). Social mobility and economic advancement. *The American Economic Review*, 43(2), 364–378.
- Foss, N. J., & Saebi, T. (2017). Fifteen Years of Research on Business Model Innovation: How Far Have We Come, and Where Should We Go? *Journal of Management*, 43(1), 200–227. <https://doi.org/10.1177/0149206316675927>
- Fraga-Lamas, P., & Fernández-Caramés, T. M. (2019). A Review on Blockchain Technologies for an Advanced and Cyber-Resilient Automotive Industry. *IEEE Access*, 7, 17578–17598. Scopus. <https://doi.org/10.1109/ACCESS.2019.2895302>
- Frankenberger, K., Weiblen, T., & Gassmann, O. (2014). The antecedents of open business models: An exploratory study of incumbent firms. *R and D Management*, 44(2), 173–188. Scopus. <https://doi.org/10.1111/radm.12040>
- Fremstad, A. (2016). Sticky Norms, Endogenous Preferences, and Shareable Goods. *Review of Social Economy*, 74(2), 194–214. <https://doi.org/10.1080/00346764.2015.1089107>
- Frenken, K., & Schor, J. (2017). Putting the sharing economy into perspective. *Environmental Innovation and Societal Transitions*. edselp. <http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edselp&AN=S2210422417300114&site=eds-live&scope=site>
- Gamma, E., Helm, R., Johnson, R., Vlissides, J., & Booch, G. (1994). *Design Patterns: Elements of Reusable Object-Oriented Software* (1st edition). Addison-Wesley Professional.
- Gansky, L. (2010). *The Mesh: Why the Future of Business Is Sharing*. Penguin.
- Gassmann, O., Frankenberger, K., & Csik, M. (2014). *The business model navigator: 55 models that will revolutionise your business*. Pearson UK.
- Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation: A review. *Journal of Cleaner Production*, 198, 401–416. <https://doi.org/10.1016/j.jclepro.2018.06.240>
- Geissinger, A., Laurell, C., & Sandström, C. (2020). Digital Disruption beyond Uber and Airbnb—Tracking the long tail of the sharing economy. *Technological Forecasting and Social Change*, 155. Scopus. <https://doi.org/10.1016/j.techfore.2018.06.012>

- George, G., & Bock, A. J. (2011). The business model in practice and its implications for entrepreneurship research. *Entrepreneurship Theory and Practice*, 35(1), 83–111.
- Gergen, K. J. (1985). The social constructionist movement in modern psychology. *American Psychologist*, 40(3), 266.
- Geron, T. (2013). *Airbnb And The Unstoppable Rise Of The Share Economy*. Forbes. <https://www.forbes.com/sites/tomiogeron/2013/01/23/airbnb-and-the-unstoppable-rise-of-the-share-economy/#25cd97a6aae3>
- Gerwe, O., Silva, R., & Castro, J. D. (2020). Entry of Providers Onto a Sharing Economy Platform: Macro-Level Factors and Social Interaction. *Entrepreneurship: Theory and Practice*. Scopus. <https://doi.org/10.1177/1042258720903404>
- Glaser, B., & Strauss, A. (1967). *The Discovery of Grounded Theory*. Aldine Publishing Company: Chicago.
- Görög, G. (2018). The Definitions of Sharing Economy: A Systematic Literature Review. *Management*, 175–189. <https://doi.org/10.26493/1854-4231.13.175-189>
- Goyal, S., Kapoor, A., Esposito, M., & Sergi, B. S. (2017). Understanding business model-literature review of concept and trends. *International Journal of Competitiveness*, 1(2), 99–118.
- Grant, J. (2015). *The nature, scale and beneficiaries of research impact: An initial analysis of Research Excellence Framework (REF) 2014 impact case studies*. King's College London. <https://www.kcl.ac.uk/policy-institute/research-analysis/nature-scale-beneficiaries-research-impact>
- Gregor, S. (2006). The Nature of Theory in Information Systems. *MIS Quarterly*, 30(3), 611–642. <https://doi.org/10.2307/25148742>
- Gregor, S., & Hevner, A. R. (2013). Positioning and Presenting Design Science Research for Maximum Impact. *MIS Quarterly*, 37(2), 337–355. <https://doi.org/10.25300/MISQ/2013/37.2.01>
- Gregor, S., & Jones, D. (2007). *The anatomy of a design theory*.
- Griffith, E. (2014, September 25). *Why startups fail, according to their founders*. Fortune. <https://fortune.com/2014/09/25/why-startups-fail-according-to-their-founders/>
- Griswold, A. (2019). *Shared scooters don't last long*. Quartz. <https://qz.com/1561654/how-long-does-a-scooter-last-less-than-a-month-louisville-data-suggests/>
- Gronum, S., Steen, J., & Verreyne, M.-L. (2016). Business model design and innovation: Unlocking the performance benefits of innovation. *Australian Journal of Management*, 41(3), 585–605. <https://doi.org/10.1177/0312896215587315>
- Guba, E., & Lincoln, Y. (1994). Competing Paradigms in Qualitative Research. In *Handbook of Qualitative Research* (pp. 105–117). SAGE Publications.
- Gupta, Dr. P., & Chauhan, Prof. S. (2021). Mapping intellectual structure and sustainability claims of sharing economy research – A literature review. *Sustainable Production and Consumption*, 25, 347–362. <https://doi.org/10.1016/j.spc.2020.09.006>
- Guyader, H., & Piscicelli, L. (2019). Business model diversification in the sharing economy: The case of GoMore. *Journal of Cleaner Production*, 215, 1059–1069. Scopus. <https://doi.org/10.1016/j.jclepro.2019.01.114>

- Haas, P. M., & Haas, E. B. (2002). Pragmatic Constructivism and the Study of International Institutions. *Millennium*, 31(3), 573–601.
<https://doi.org/10.1177/03058298020310031001>
- Habibi, M. R., Davidson, A., & Laroche, M. (2017). What managers should know about the sharing economy. *Business Horizons*, 60(1), 113–121. Scopus.
<https://doi.org/10.1016/j.bushor.2016.09.007>
- Hamari, J., Sjöklint, M., & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science and Technology*, 67(9), 2047–2059. Scopus. <https://doi.org/10.1002/asi.23552>
- Hammersley, M., & Atkinson, P. (2007). *Ethnography: Principles in practice* (3rd ed). Routledge.
- Harmaala, M.-M. (2015). The sharing city as a platform for a more sustainable city environment? *International Journal of Environment and Health*, 7(4), 309–328. Scopus.
<https://doi.org/10.1504/IJENVH.2015.077116>
- Hawlitshchek, F., Stofberg, N., Teubner, T., Tu, P., & Weinhardt, C. (2018). How Corporate Sharewashing Practices Undermine Consumer Trust. *Sustainability*, 10(8), 2638.
<https://doi.org/10.3390/su10082638>
- Heinrichs, H. (2013). Sharing economy: A potential new pathway to sustainability. *GAI- Ecological Perspectives for Science and Society*, 22(4), 228–231.
- Henry, M., Schraven, D., Bocken, N., Frenken, K., Hekkert, M., & Kirchherr, J. (2021). The battle of the buzzwords: A comparative review of the circular economy and the sharing economy concepts. *Environmental Innovation and Societal Transitions*, 38, 1–21.
<https://doi.org/10.1016/j.eist.2020.10.008>
- Henten, A. H., & Windekilde, I. M. (2016). Transaction costs and the sharing economy. *Info*, 18(1), 1–15. Scopus. <https://doi.org/10.1108/info-09-2015-0044>
- Hertwich, E. G. (2005). Consumption and the rebound effect: An industrial ecology perspective. *Journal of Industrial Ecology*, 9(1–2), 85–98.
- Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design Science in Information Systems Research. *MIS Quarterly*, 28(1), 75–105. <https://doi.org/10.2307/25148625>
- Hine, C. (2015). *Ethnography for the Internet: Embedded, Embodied and Everyday*. Bloomsbury Publishing.
- Holbraad, M., Pedersen, M. A., & Castro, E. V. de. (2014). *The Politics of Ontology: Anthropological Positions — Cultural Anthropology*. <https://culanth.org/fieldsights/462-the-politics-of-ontology-anthropological-positions>
- Hollingsworth, J., Copeland, B., & Johnson, J. X. (2019). Are e-scooters polluters? The environmental impacts of shared dockless electric scooters. *Environmental Research Letters*, 14(8), 084031. <https://doi.org/10.1088/1748-9326/ab2da8>
- Holstein, J. A., & Gubrium, J. F. (1995). *The Active Interview*. SAGE.
- Hou, L. (2018). Destructive sharing economy: A passage from status to contract. *Computer Law and Security Review*, 34(4), 965–976. Scopus.
<https://doi.org/10.1016/j.clsr.2018.05.009>

- Hunke, F., Schüritz, R., & Kuehl, N. (2017). *Towards a unified approach to identify business model patterns: A case of e-mobility services* (Vol. 279, p. 196). Scopus.
https://doi.org/10.1007/978-3-319-56925-3_15
- Im, K., & Cho, H. (2013). A systematic approach for developing a new business model using morphological analysis and integrated fuzzy approach. *Expert Systems with Applications*, 40(11), 4463–4477. <https://doi.org/10.1016/j.eswa.2013.01.042>
- Intergovernmental Panel on Climate Change. (2018). *Global Warming of 1.5 °C: An IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. <http://ipcc.ch/report/sr15/>
- Ivanova, D., Stadler, K., Steen-Olsen, K., Wood, R., Vita, G., Tukker, A., & Hertwich, E. G. (2016). Environmental Impact Assessment of Household Consumption. *Journal of Industrial Ecology*, 20(3), 526–536. <https://doi.org/10.1111/jiec.12371>
- Jacobsson, K., & Åkerström, M. (2013). Interviewees with an agenda: Learning from a ‘failed’ interview. *Qualitative Research*, 13(6), 717–734.
<https://doi.org/10.1177/1468794112465631>
- John, N. A. (2013). The Social Logics of Sharing. *The Communication Review*, 16(3), 113–131. <https://doi.org/10.1080/10714421.2013.807119>
- Johnson, M. W., Christensen, C. M., & Kagermann, H. (2008). Reinventing your business model. *Harvard Business Review*, 86(12), 57–68.
- Johnson, M. W., & Lafley, A. G. (2010). *Seizing the white space: Business model innovation for growth and renewal*. Harvard Business Press.
- Jørgensen, K. M. (2016). The media go-along: Researching mobilities with media at hand. *MedieKultur: Journal of Media and Communication Research*, 32(60), 18.
<https://doi.org/10.7146/mediekultur.v32i60.22429>
- Justesen, L., & Mik-Meyer, N. (2013). *Qualitative Research Methods in Organisation Studies*. Gyldendal Akademisk.
- Kassambara, A. (2017). *Practical Guide to Cluster Analysis in R: Unsupervised Machine Learning*. STHDA.
- Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., McCarthy, J. J., Schellnhuber, H. J., Bolin, B., Dickson, N. M., Faucheux, S., Gallopin, G. C., Grubler, A., Huntley, B., Jäger, J., Jodha, N. S., Kasperson, R. E., Mabogunje, A., Matson, P., ... Svedin, U. (2001). Sustainability Science. *Science*, 292(5517), 641–642.
<https://doi.org/10.1126/science.1059386>
- Katz, J. (2018). On Becoming an Ethnographer. *Journal of Contemporary Ethnography*, 0891241618777801. <https://doi.org/10.1177/0891241618777801>
- Keathley-Herring, H., Van Aken, E., Gonzalez-Aleu, F., Deschamps, F., Letens, G., & Orlandini, P. C. (2016). Assessing the maturity of a research area: Bibliometric review and proposed framework. *Scientometrics*, 109(2), 927–951.
<https://doi.org/10.1007/s11192-016-2096-x>

- Kenessey, Z. (1987). The Primary, Secondary, Tertiary and Quaternary Sectors of the Economy. *Review of Income and Wealth*, 33(4), 359–385.
<https://doi.org/10.1111/j.1475-4991.1987.tb00680.x>
- Kenny, M., & Fourie, R. (2015). Contrasting classic, straussian, and constructivist grounded theory: Methodological and philosophical conflicts. *Qualitative Report*, 20(8), 1270–1289. Scopus.
- Kim, S., & Yoon, Y. I. (2016). Recommendation system for sharing economy based on multidimensional trust model. *Multimedia Tools and Applications*, 75(23), 15297–15310. Scopus. <https://doi.org/10.1007/s11042-014-2384-5>
- Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232.
- Knoblauch, H. (2005). Focused Ethnography. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 6(3). <https://doi.org/10.17169/fqs-6.3.20>
- Kumar, V., Lahiri, A., & Dogan, O. B. (2018). A strategic framework for a profitable business model in the sharing economy. *Industrial Marketing Management*, 69, 147–160. Scopus. <https://doi.org/10.1016/j.indmarman.2017.08.021>
- Kung, L.-C., & Zhong, G.-Y. (2017). The optimal pricing strategy for two-sided platform delivery in the sharing economy. *Transportation Research Part E: Logistics and Transportation Review*, 101, 1–12. Scopus. <https://doi.org/10.1016/j.tre.2017.02.003>
- Kwon, M., Lee, J., & Hong, Y. S. (2019). Product-Service System Business Modelling Methodology Using Morphological Analysis. *Sustainability*, 11(5), 1376.
<https://doi.org/10.3390/su11051376>
- Lamberton, C. P., & Rose, R. L. (2012). When Is Ours Better Than Mine? A Framework for Understanding and Altering Participation in Commercial Sharing Systems. *Journal of Marketing*, 76(4), 109–125. <https://doi.org/10.1509/jm.10.0368>
- Laukkanen, M., & Tura, N. (2020). The potential of sharing economy business models for sustainable value creation. *Journal of Cleaner Production*, 253, 120004.
<https://doi.org/10.1016/j.jclepro.2020.120004>
- Leih, S., Linden, G., & Teece, D. J. (2015). Business Model Innovation and Organizational Design. In N. J. Foss & T. Saebi (Eds.), *Business Model Innovation* (pp. 24–42). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780198701873.003.0002>
- Liang, S., Zhang, X., & Li, H. (2020). How to make guest reviews more informative? A case study of Airbnb. *E-Review of Tourism Research*, 17(4), 620–632. Scopus.
- Libert, B., Beck, M., & Wind, J. (2016). *The Network Imperative: How to Survive and Grow in the Age of Digital Business Models*. Harvard Business Review Press.
- Light, A., & Miskelly, C. (2015). Sharing Economy vs Sharing Cultures? Designing for social, economic and environmental good. *IxD&A*, 24, 49–62.
- Lincoln, Y. S., & Guba, E. G. (2000). The only generalization is: There is no generalization. *Case Study Method*, 27–44.
- Luckner, N., Fitzpatrick, G., Werner, K., & Subasi, Ö. (2015). *Setting up and Running a Sharing Service: An Organisational Perspective*.
<https://pdfs.semanticscholar.org/8ea4/e3f987371b615c911056515e4237cce256ab.pdf>

- Lüdeke-Freund, F., Carroux, S., Joyce, A., Massa, L., & Breuer, H. (2018). The sustainable business model pattern taxonomy—45 patterns to support sustainability-oriented business model innovation. *Sustainable Production and Consumption*, *15*, 145–162. <https://doi.org/10.1016/j.spc.2018.06.004>
- Lüdeke-Freund, F., Gold, S., & Bocken, N. (2019). A Review and Typology of Circular Economy Business Model Patterns. *Journal of Industrial Ecology*, *23*(1), 36–61. Scopus. <https://doi.org/10.1111/jiec.12763>
- Luo, H., Kou, Z., Zhao, F., & Cai, H. (2019). Comparative life cycle assessment of station-based and dock-less bike sharing systems. *Resources, Conservation and Recycling*, *146*, 180–189.
- Luo, X., Tong, S., Lin, Z., & Zhang, C. (2020). The Impact of Platform Protection Insurance on Buyers and Sellers in the Sharing Economy: A Natural Experiment. *Journal of Marketing*. Scopus. <https://doi.org/10.1177/0022242920962510>
- Lutz, C., Hoffmann, C. P., Bucher, E., & Fieseler, C. (2018). The role of privacy concerns in the sharing economy. *Information, Communication & Society*, *21*(10), 1472–1492.
- Ma, Y., Rong, K., Mangalagu, D., Thornton, T. F., & Zhu, D. (2018). Co-evolution between urban sustainability and business ecosystem innovation: Evidence from the sharing mobility sector in Shanghai. *Journal of Cleaner Production*, *188*, 942–953. Scopus. <https://doi.org/10.1016/j.jclepro.2018.03.323>
- March, S. T., & Smith, G. F. (1995). Design and natural science research on information technology. *Decision Support Systems*, *15*(4), 251–266. [https://doi.org/10.1016/0167-9236\(94\)00041-2](https://doi.org/10.1016/0167-9236(94)00041-2)
- Marcus, G. E. (1995). Ethnography in/of the World System: The Emergence of Multi-Sited Ethnography. *Annual Review of Anthropology*, *24*(1), 95–117. <https://doi.org/10.1146/annurev.an.24.100195.000523>
- Markham, A., & Buchanan, E. (2012). *Ethical Decision-Making and Internet Research: Recommendations from the AoIR Ethics Working Committee (Version 2.0)* (p. 19). <https://aoir.org/reports/ethics2.pdf>
- Martin, C. J. (2016). The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism? *Ecological Economics*, *121*, 149–159. <https://doi.org/10.1016/j.ecolecon.2015.11.027>
- Martin, M., Lazarevic, D., & Gullström, C. (2019). Assessing the environmental potential of collaborative consumption: Peer-to-peer product sharing in Hammarby Sjöstad, Sweden. *Sustainability (Switzerland)*, *11*(1). Scopus. <https://doi.org/10.3390/su11010190>
- Mason, K., & Spring, M. (2011). The sites and practices of business models. *Industrial Marketing Management*, *40*(6), 1032–1041. <https://doi.org/10.1016/j.indmarman.2011.06.032>
- Massa, L., Tucci, C. L., & Afuah, A. (2017). A Critical Assessment of Business Model Research. *Academy of Management Annals*, *11*(1), 73–104. <https://doi.org/10.5465/annals.2014.0072>

- May, S., Konigsson, M., & Holmstrom, J. (2017). Unlocking the sharing economy: Investigating the barriers for the sharing economy in a city context. *First Monday*, 22(2). Scopus. <https://doi.org/10.5210/fm.v21i12.7110>
- McGinnis, J. (2018). The Sharing Economy as an Equalizing Economy. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3225868>
- McLaren, D., & Agyeman, J. (2015). *Sharing Cities: A Case for Truly Smart and Sustainable Cities*. MIT Press.
- Milanova, V., & Maas, P. (2017). Sharing intangibles: Uncovering individual motives for engagement in a sharing service setting. *Journal of Business Research*, 75, 159–171. Scopus. <https://doi.org/10.1016/j.jbusres.2017.02.002>
- Miles, M. B., Huberman, A. M., & Saldana, J. (2013). *Qualitative Data Analysis*. SAGE.
- Miller, Daniel, & Slater, D. (2000). *The Internet: An Ethnographic Approach*. Bloomsbury Academic.
- Miller, David. (2001). Successful change leaders: What makes them? What do they do that is different? *Journal of Change Management*, 2(4), 359–368. <https://doi.org/10.1080/714042515>
- Mithani, M. A., & Kocoglu, I. (2020). Human and organizational responses to extreme threats: A comparative developmental approach. *Management Decision*, ahead-of-print(ahead-of-print). <https://doi.org/10.1108/MD-08-2020-1086>
- Mongeon, P., & Paul-Hus, A. (2015). The journal coverage of Web of Science and Scopus: A comparative analysis. *Scientometrics*, 106(1), 213–228. <https://doi.org/10.1007/s11192-015-1765-5>
- Mont, O. (2002). Clarifying the concept of product–service system. *Journal of Cleaner Production*, 10(3), 237–245. [https://doi.org/10.1016/S0959-6526\(01\)00039-7](https://doi.org/10.1016/S0959-6526(01)00039-7)
- Mont, O. (2018). *Mobile Research Lab: Methodological underpinnings*.
- Mont, O., Curtis, S. K., & Palgan, Y. V. (2021). Organisational Response Strategies to COVID-19 in the Sharing Economy. *Sustainable Production and Consumption*. <https://doi.org/10.1016/j.spc.2021.03.025>
- Morgan Jones, M., Manville, C., & Chataway, J. (2017). Learning from the UK’s research impact assessment exercise: A case study of a retrospective impact assessment exercise and questions for the future. *The Journal of Technology Transfer*, 1–25.
- Muñoz, P., & Cohen, B. (2018). A Compass for Navigating Sharing Economy Business Models. *California Management Review*, 35.
- Murillo, D., Buckland, H., & Val, E. (2017). When the sharing economy becomes neoliberalism on steroids: Unravelling the controversies. *Technological Forecasting and Social Change*, 125(C), 66–76.
- Nußholz, J. L. K. (2017). Circular Business Models: Defining a Concept and Framing an Emerging Research Field. *Sustainability*, 9(10), 1810. <https://doi.org/10.3390/su9101810>
- O’Reilly, K. (2012). *Ethnographic Methods*. Routledge.

- Osterwalder, A. (2004). *The business model ontology a proposition in a design science approach*. Université de Lausanne, Faculté des hautes études commerciales.
- Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. John Wiley & Sons.
- Osterwalder, A., Pigneur, Y., & Tucci, C. L. (2005). Clarifying Business Models: Origins, Present, and Future of the Concept. *Communications of the Association for Information Systems*, 16. <https://doi.org/10.17705/1CAIS.01601>
- Paris, M. E., & Epting, F. R. (2015). Dewey Between the Lines: George Kelly and the Pragmatist Tradition. *Journal of Constructivist Psychology*, 28(2), 181–189. <https://doi.org/10.1080/10720537.2014.943915>
- Patel, N. (2015, January 16). *90% Of Startups Fail: Here's What You Need To Know About The 10%*. Forbes. <https://www.forbes.com/sites/neilpatel/2015/01/16/90-of-startups-will-fail-heres-what-you-need-to-know-about-the-10/>
- Paton, G. (2020, April). *Legalising electric scooters could pose threat to pedestrian safety, government warned*. <https://www.thetimes.co.uk/article/legalising-electric-scooters-could-pose-threat-to-pedestrian-safety-government-warned-wnvjq3b8j>
- Patton, M. Q. (2014). *Qualitative Research & Evaluation Methods: Integrating Theory and Practice*. SAGE Publications.
- Peffer, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of Management Information Systems*, 24(3), 45–77.
- Peters, C., Blohm, I., & Leimeister, J. M. (2015). Anatomy of Successful Business Models for Complex Services: Insights from the Telemedicine Field. *Journal of Management Information Systems*, 32(3), 75–104. Scopus. <https://doi.org/10.1080/07421222.2015.1095034>
- Petticrew, M., & Roberts, H. (2008). *Systematic Reviews in the Social Sciences: A Practical Guide*. John Wiley & Sons.
- Philip, H. E., Ozanne, L. K., & Ballantine, P. W. (2015). Examining temporary disposition and acquisition in peer-to-peer renting. *Journal of Marketing Management*, 31(11–12), 1310–1332. Scopus. <https://doi.org/10.1080/0267257X.2015.1013490>
- Pies, I., Hielscher, S., & Everding, S. (2020). Do hybrids impede sustainability? How semantic reorientations and governance reforms can produce and preserve sustainability in sharing business models. *Journal of Business Research*, 115, 174–185. Scopus. <https://doi.org/10.1016/j.jbusres.2020.04.024>
- Piracha, A., Sharples, R., Forrest, J., & Dunn, K. (2019). Racism in the sharing economy: Regulatory challenges in a neo-liberal cyber world. *Geoforum*, 98, 144–152. <https://doi.org/10.1016/j.geoforum.2018.11.007>
- Pisano, P., Pironti, M., & Rieple, A. (2015). Identify Innovative Business Models: Can Innovative Business Models Enable Players to React to Ongoing or Unpredictable Trends? *Entrepreneurship Research Journal*, 5(3), 181–199. <https://doi.org/10.1515/erj-2014-0032>

- Piscicelli, L., Ludden, G. D. S., & Cooper, T. (2018). What makes a sustainable business model successful? An empirical comparison of two peer-to-peer goods-sharing platforms. *Journal of Cleaner Production*, *172*, 4580–4591. <https://doi.org/10.1016/j.jclepro.2017.08.170>
- Plante, S. G. (2019, August 6). *Uber and Lyft have admitted to making traffic worse in some US cities*. Vox. <https://www.vox.com/the-goods/2019/8/6/20757593/uber-lyft-traffic-congestion-pricing>
- Plepys, A., & Singh, J. (2019). Evaluating the sustainability impacts of the sharing economy using input-output analysis. In O. Mont, *A Research Agenda for Sustainable Consumption Governance* (pp. 66–84). Edward Elgar Publishing. <https://doi.org/10.4337/9781788117814.00013>
- Plewnia, F., & Guenther, E. (2018). Mapping the sharing economy for sustainability research. *Management Decision*, *56*(3), 570–583. <https://doi.org/10.1108/MD-11-2016-0766>
- Potter, J. (1996). *Representing Reality: Discourse, Rhetoric and Social Construction*. SAGE.
- Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, *18*(3), 5–14. <https://doi.org/10.1002/dir.20015>
- Purao, S. (2013). Truth or dare: The ontology question in design science research. *Journal of Database Management (JDM)*, *24*(3), 51–66.
- Randhawa, K., Wilden, R., & Hohberger, J. (2016). A Bibliometric Review of Open Innovation: Setting a Research Agenda. *Journal of Product Innovation Management*, n/a-n/a. <https://doi.org/10.1111/jpim.12312>
- Rau, H., Goggins, G., & Fahy, F. (2018). From invisibility to impact: Recognising the scientific and societal relevance of interdisciplinary sustainability research. *Research Policy*, *47*(1), 266–276.
- Ravenelle, A. J. (2017). Sharing economy workers: Selling, not sharing. *Cambridge Journal of Regions, Economy and Society*, *10*(2), 281–295. <https://doi.org/10.1093/cjres/rsw043>
- Reed, M. S. (2018). *The Research Impact Handbook* (2nd New edition). Fast Track Impact.
- Remane, G., Hanelt, A., Tesch, J. F., & Kolbe, L. M. (2017). The Business Model Pattern Database-A Tool For Systematic Business Model Innovation. *International Journal of Innovation Management*, *21*(1). Scopus. <https://doi.org/10.1142/S1363919617500049>
- Richardson, J. (2008). The business model: An integrative framework for strategy execution. *Strategic Change*, *17*(5–6), 133–144. <https://doi.org/10.1002/jsc.821>
- Richardson, L. (2015). Performing the sharing economy. *Geoforum*, *67*, 121–129. <https://doi.org/10.1016/j.geoforum.2015.11.004>
- Richter, M. (2013). Business model innovation for sustainable energy: German utilities and renewable energy. *Energy Policy*, *62*, 1226–1237.
- Ritala, P., Huotari, P., Bocken, N., Albareda, L., & Puumalainen, K. (2018). Sustainable business model adoption among S&P 500 firms: A longitudinal content analysis study. *Journal of Cleaner Production*, *170*, 216–226. <https://doi.org/10.1016/j.jclepro.2017.09.159>

- Ritter, M., & Schanz, H. (2019). The sharing economy: A comprehensive business model framework. *Journal of Cleaner Production*, 213, 320–331.
<https://doi.org/10.1016/j.jclepro.2018.12.154>
- Romme, A. G. L., & Reymen, I. M. (2018). Entrepreneurship at the interface of design and science: Toward an inclusive framework. *Journal of Business Venturing Insights*, 10, e00094.
- Rosenblat, A., Levy, K. E. C., Barocas, S., & Hwang, T. (2017). Discriminating Tastes: Uber's Customer Ratings as Vehicles for Workplace Discrimination: Customer Ratings and Workplace Discrimination. *Policy & Internet*, 9(3), 256–279.
<https://doi.org/10.1002/poi3.153>
- Roulston, K. (2013). Analysing Interviews. In U. Flick (Ed.), *The SAGE Handbook of Qualitative Data Analysis* (pp. 297–312). SAGE Publications Ltd.
<https://doi.org/10.4135/9781446282243>
- Sacks, D. (2011, April 18). *The Sharing Economy*. Fast Company.
<https://www.fastcompany.com/1747551/sharing-economy>
- Sanasi, S., Ghezzi, A., Cavallo, A., & Rangone, A. (2020). Making sense of the sharing economy: A business model innovation perspective. *Technology Analysis and Strategic Management*. Scopus. <https://doi.org/10.1080/09537325.2020.1719058>
- Schaltegger, S., Hansen, E. G., & Lüdeke-Freund, F. (2016). Business Models for Sustainability: Origins, Present Research, and Future Avenues. *Organization & Environment*, 29(1), 3–10. <https://doi.org/10.1177/1086026615599806>
- Schor, J. (2014). Debating the Sharing Economy. *Perspectives*, 2009(2013).
<http://www.greattransition.org/publication/debating-the-sharing-economy>
- Schor, J., Fitzmaurice, C., Carfagna, L. B., Attwood-Charles, W., & Poteat, E. D. (2016). Paradoxes of openness and distinction in the sharing economy. *Poetics*, 54, 66–81.
<https://doi.org/10.1016/j.poetic.2015.11.001>
- Schreier, M. (2012). *Qualitative Content Analysis in Practice*. SAGE.
- Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 118–137). Sage Publications, Inc.
- Schwartz, R. (2016). Pragmatic Constructivism: Values, Norms, and Obligations. In *Facts and Values: The ethics and metaphysics of normativity* (pp. 56–73). Routledge.
<https://doi.org/10.4324/9781315666297-10>
- Sehl, K., & Baird, F. (2020, August 26). LinkedIn Analytics: The Complete Guide for Marketers. *Social Media Marketing & Management Dashboard*.
<https://blog.hootsuite.com/linkedin-analytics/>
- Sharp, D. (2018). Sharing Cities for Urban Transformation: Narrative, Policy and Practice. *Urban Policy and Research*, 36(4), 513–526.
<https://doi.org/10.1080/0811146.2017.1421533>
- Siedhoff, S. (2019). *Siezing Business Model Patterns for Disruptive Innovations*. Springer Fachmedien. https://doi.org/10.1007/978-3-658-26336-2_2

- Simon, F. (2019, November 13). Circular economy erected as ‘number one priority’ of European Green Deal. *Www.Euractiv.Com*. <https://www.euractiv.com/section/circular-economy/news/circular-economy-is-number-one-priority-of-european-green-deal/>
- Simon, H. A. (1996). *The Sciences of the Artificial, 3rd Edition*. MIT Press.
- Sinclair, M. (2016). Fair and Efficient Regulation of the Sharing Economy. *Economic Affairs*, 36(2), 204–211. <https://doi.org/10.1111/ecaf.12179>
- Šiuškaitė, D., Pilinkienė, V., & Zvirdauskas, D. (2019). The conceptualization of the sharing economy as a business model. *Engineering Economics*, 30(3), 373–381. Scopus. <https://doi.org/10.5755/j01.ee.30.3.21253>
- Sovacool, B. K., Axsen, J., & Sorrell, S. (2018). Promoting novelty, rigor, and style in energy social science: Towards codes of practice for appropriate methods and research design. *Energy Research & Social Science*, 45, 12–42. <https://doi.org/10.1016/j.erss.2018.07.007>
- Sovacool, B. K., & Hess, D. J. (2017). Ordering theories: Typologies and conceptual frameworks for sociotechnical change. *Social Studies of Science*, 47(5), 703–750. <https://doi.org/10.1177/0306312717709363>
- Spieth, P., Schneckenberg, D., & Ricart, J. E. (2014). Business model innovation—state of the art and future challenges for the field. *R&D Management*, 44(3), 237–247.
- Srnicek, N. (2017). *Platform capitalism*. John Wiley & Sons.
- Stahel, W. (1994). The utilization-focused service economy: Resource efficiency and product-life extension. *The Greening of Industrial Ecosystems*, 178–190.
- Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., Vries, W. de, Wit, C. A. de, Folke, C., Gerten, D., Heinke, J., Mace, G. M., Persson, L. M., Ramanathan, V., Reyers, B., & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223), 1259855. <https://doi.org/10.1126/science.1259855>
- Stock, P., & Burton, R. J. F. (2011). Defining Terms for Integrated (Multi-Inter-Trans-Disciplinary) Sustainability Research. *Sustainability*, 3(8), 1090–1113. <https://doi.org/10.3390/su3081090>
- Sundararajan, A. (2017). *The sharing economy: The end of employment and the rise of crowd-based capitalism*. MIT Press.
- Talja, S. (1999). Analyzing qualitative interview data: The discourse analytic method. *Library & Information Science Research*, 21(4), 459–477.
- Tangour, C., Gebauer, M., Fischer, L., & Winkler, H. H. (2019). *Digital Business Model Patterns of Big Pharmaceutical Companies—A Cluster Analysis* (Vol. 358, p. 412). Scopus. https://doi.org/10.1007/978-3-030-30874-2_31
- Täuscher, K., & Laudien, S. M. (2018). Understanding platform business models: A mixed methods study of marketplaces. *European Management Journal*, 36(3), 319–329. <https://doi.org/10.1016/j.emj.2017.06.005>
- Teddle, C., & Tashakkori, A. (2003). Major issues and controversies in the use of mixed methods in the social and behavioral sciences. *Handbook of Mixed Methods in Social and Behavioral Research*, 1, 13–50.

- Teece, D. J. (2010). Business Models, Business Strategy and Innovation. *Long Range Planning*, 43(2–3), 172–194. <https://doi.org/10.1016/j.lrp.2009.07.003>
- Swedish Ethical Review Act, Pub. L. No. SFS 2003:460 (2003).
http://www.epn.se/media/2348/the_ethical_review_act.pdf
- Tietze, F., & Vimalnath, P. (2020). *Intellectual Property (IP) need-to-know for researching sustainability transitions* (Knowledge Brief, p. 3).
<https://ip4sustainability.org/knowledge-briefs/>
- Timmers, P. (1998). Business models for electronic markets. *Electronic Markets*, 8(2), 3–8.
- Tukker, A. (2004). Eight types of product–service system: Eight ways to sustainability? Experiences from SusProNet. *Business Strategy and the Environment*, 13(4), 246–260.
<https://doi.org/10.1002/bse.414>
- Tukker, A. (2015). Product services for a resource-efficient and circular economy – a review. *Journal of Cleaner Production*, 97, 76–91. <https://doi.org/10.1016/j.jclepro.2013.11.049>
- Tunn, V. S. C., & Ackermann, L. (2020). Comparing consumers’ product care in access and ownership models. *Proceedings of the Design Society: DESIGN Conference*, 1, 2167–2176.
<https://doi.org/10.1017/dsd.2020.80>
- Turber, S., Vom Brocke, J., Gassmann, O., & Fleisch, E. (2014). Designing business models in the era of internet of things. *International Conference on Design Science Research in Information Systems*, 17–31.
- Turo. (2020, April 3). The impact of COVID-19 on Turo in March. *Field Notes: The Turo Blog*. <https://turo.com/blog/insights/the-impact-of-covid-19-on-turo-in-march>
- UNFCCC. (2021a, February 26). *Greater Climate Ambition Urged as Initial NDC Synthesis Report Is Published*. <https://unfccc.int/news/greater-climate-ambition-urged-as-initial-ndc-synthesis-report-is-published>
- UNFCCC. (2021b). *Nationally determined contributions under the Paris Agreement. Synthesis report by the secretariat*. 32.
- Upward, A. (2013). *Towards an Ontology and Canvas for Strongly Sustainable Business Models: A Systemic Design Science Exploration*.
<https://yorkspace.library.yorku.ca/xmlui/handle/10315/20777>
- Upward, A., & Jones, P. (2015). An Ontology for Strongly Sustainable Business Models: Defining an Enterprise Framework Compatible With Natural and Social Science. *Organization & Environment*. <https://doi.org/10.1177/1086026615592933>
- Urry, J., & Larsen, J. (2011). *The Tourist Gaze 3.0*. SAGE.
- Ustyuzhanina, E. V., Komarova, I. P., Novikova, E. S., & Sigarev, A. V. (2018). The phenomenon of the sharing economy: Development problems and prospects in the context of the digital revolution. *Espacios*, 39(16). Scopus.
<https://www.scopus.com/inward/record.uri?eid=2-s2.0-85045770292&partnerID=40&md5=e62a79839a0da6f3187efdfaba07f22b>
- Vaishnavi, V., Kuechler, B., & Petter, S. (Eds.). (2004). *Design Science Research in Information Systems*. <http://www.desrist.org/design-research-in-information-systems/>
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a New Dominant Logic for Marketing. *The Journal of Marketing*, 68(1), 1–17.

- Vătămănescu, E.-M., & Pinzaru, F. M. (2017). *Knowledge Management in the Sharing Economy: Cross-Sectoral Insights into the Future of Competitive Advantage*. Springer.
- Verschuren, P., & Doorewaard, H. (2010). *Designing a Research Project*. Eleven International Publishing.
- Vinnova. (2019). *Sharing Cities Sweden*. <https://www.vinnova.se/en/p/sharing-cities-sweden/>
- Vohra, K., Vodonos, A., Schwartz, J., Marais, E. A., Sulprizio, M. P., & Mickley, L. J. (2021). Global mortality from outdoor fine particle pollution generated by fossil fuel combustion: Results from GEOS-Chem. *Environmental Research*, 195, 110754. <https://doi.org/10.1016/j.envres.2021.110754>
- Voytenko Palgan, Y., Mont, O., & Sulkakoski, S. (2021). Governing the sharing economy: Towards a comprehensive analytical framework of municipal governance. *Cities*, 108. Scopus. <https://doi.org/10.1016/j.cities.2020.102994>
- Voytenko Palgan, Y., Zvolska, L., & Mont, O. (2016). Sustainability framings of accommodation sharing. *Environmental Innovation and Societal Transitions*. <https://doi.org/10.1016/j.eist.2016.12.002>
- Weber, T. A. (2014). Intermediation in a Sharing Economy: Insurance, Moral Hazard, and Rent Extraction. *Journal of Management Information Systems*, 31(3), 35–71. Scopus. <https://doi.org/10.1080/07421222.2014.995520>
- Weinberger, M., Bilgeri, D., & Fleisch, E. (2016). IoT business models in an industrial context. *At-Automatisierungstechnik*, 64(9), 699–706. Scopus. <https://doi.org/10.1515/auto-2016-0054>
- Weitzman, M. L. (1984). *The Share Economy: Conquering Stagflation*. Harvard University Press.
- Weking, J., Hein, A., Böhm, M., & Krcmar, H. (2018). A hierarchical taxonomy of business model patterns [Article in Press]. In *Electronic Markets*. Scopus. <https://doi.org/10.1007/s12525-018-0322-5>
- Weking, J., Stöcker, M., Kowalkiewicz, M., Böhm, M., & Krcmar, H. (2019). Leveraging industry 4.0 – A business model pattern framework. *International Journal of Production Economics*. Scopus. <https://doi.org/10.1016/j.ijpe.2019.107588>
- Williams, J. (2005). *Understanding poststructuralism*. ACUMEN.
- Winter, R., & Aier, S. (2016). Design science research in business innovation. In *Business Innovation: Das St. Galler Modell* (pp. 475–498). Springer.
- Wirtz, B. W., Pistoia, A., Ullrich, S., & Göttel, V. (2016). Business Models: Origin, Development and Future Research Perspectives. *Long Range Planning*, 49(1), 36–54. <https://doi.org/10.1016/j.lrp.2015.04.001>
- Wolfe, M. (1955). The Concept of Economic Sectors. *The Quarterly Journal of Economics*, 69(3), 402–420. <https://doi.org/10.2307/1885848>
- Yablonsky, S. (2017). Smart Wearable Multi-sided Fashion Product Platforms. In R. Rinaldi & R. Bandinelli (Eds.), *Business Models and ICT Technologies for the Fashion Supply Chain* (Vol. 413, pp. 135–150). Springer International Publishing. https://doi.org/10.1007/978-3-319-48511-9_12
- Yin, R. K. (2014). *Case Study Research: Design and Methods*. SAGE Publications.

- Zhang, T., Bufquin, D., & Lu, C. (2019). A qualitative investigation of microentrepreneurship in the sharing economy. *International Journal of Hospitality Management*, 79, 148–157. <https://doi.org/10.1016/j.ijhm.2019.01.010>
- Zink, T., & Geyer, R. (2017). Circular Economy Rebound. *Journal of Industrial Ecology*, 21(3), 593–602. <https://doi.org/10.1111/jiec.12545>
- Zott, C., & Amit, R. (2010). Business Model Design: An Activity System Perspective. *Long Range Planning*, 43(2–3), 216–226. <https://doi.org/10.1016/j.lrp.2009.07.004>
- Zott, C., Amit, R., & Massa, L. (2011). The Business Model: Recent Developments and Future Research. *Journal of Management*, 37(4), 1019–1042. <https://doi.org/10.1177/0149206311406265>
- Zwicky, F. (1969). *Discovery, Invention, Research Through the Morphological Approach*. Macmillan.

Glossary

3rd-Party Revenue Source	The platform receives revenue from actors outside of the exchange, for example, advertisers, buyers of data, sponsors, or funding bodies.
Access-Based Discrimination	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.
Additional Services	A revenue stream that sees platforms offer 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.
Advertisements	A revenue stream with platforms hosting advertisements on their website or targeting users with paid advertisements (e.g. google ads).
Artefact	An artefact refers to the entity that has or can be transformed into a material object or process, for example, constructs, models, methods, frameworks, architectures, design principles, and instantiations.
Auction	Price discovery mechanisms that sees resource users bid to access a shared asset, with the highest bid winning.
Bartering	Price discovery mechanism that allow users to exchange non-monetary compensation for a product or service.
Business Model	While many definitions exist, a business model is generally understood as an abstract representation of the activities and function of a firm.
Business Model Attributes	The ‘building blocks’ of the business model, describing the material or immaterial functions, features, or actions of the firm.
Business Model Design	The process of an individual or team deciding on the choices reflecting the content, structure, and governance of their firm, often addressing the questions what, how, and who, reflecting all possible “building blocks” of the business model.

Business Model Implementation	Describes either the process or outcome of executing business model design choices to realise the stated goals or motivation of the firm.
Business Model Patterns	Patterns recognise trends among implemented solutions to solve a problem, which can be useful to apply in other contexts. Categories of patterns include framework patterns, prototypical patterns, and solution patterns.
Business-to-Business	Platform mediation taking place between business or organisational entities beyond individuals, often sharing idling resources particular to their business sector (e.g. construction or medical equipment)
Business-to-Consumer	Company offering access to goods, which they own. Does not operate as a two-sided market.
Business-to-Peer	Platform mediation between a business with idling resources that may be used by individuals
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)
Collaborative Governance Model	Increased involvement of users in the decision-making process. While commercial orientation is likely, other value orientations may prevail. This governance model may also impact other business model choices, for example, transparency of intellectual property and pricing mechanisms.
Commercial Value	Sees platforms prioritise economic value as the primary motivation for existence.
Commission	A percentage fee charged to either side of the market, similar to a service fee (e.g. 15% of the price).
Communal	Open intellectual property, but limited to those using the platform.
Configuration Options	The various known alternatives for each business model attribute.
Convenience Fee	A percentage fee to cover operating costs associated with managing the platform (e.g. 1.5% of the price).
Cooperative Governance Model	User involvement drives all governance, as they are involved in, or even leading, the decision-making process. This governance model describes what are often called platform cooperatives.

Corporate Governance Mode	Mirrors existing management practices primarily driven by profit-seeking behaviour. Decision-making rests with the platform, responding to market pressures, with limited input from users. This governance model is more likely to be associated with more formal technology, proprietary in nature, and more commercial value orientation.
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.
Crowd / Cooperative	Platform mediation from one to many, from many to one, or from many to many. This model is inclusive of cooperatives or crowdsourcing models (e.g. car cooperatives, renewable energy cooperatives, or crowdsourcing of classroom art supplies or borrowed costumes for a theatre production).
Data Mining	A revenue stream that uses or sells user data to target additional advertisements/sales.
Design Science Research	A rigorous approach that involves building artefacts and evaluating those artefacts in context and use, typically involving the following steps: 1) identify problem and motivation; 2) define objectives of the solution; 3) design and develop artefact(s); 4) demonstrate the use of artefact(s) in context; 5) evaluate the usefulness, effectiveness, and/or efficiency; and 6) communicate the artefacts as solutions to the identified problem.
Differential Pricing	Describes offering the same product to users at different prices, based on the market and user characteristics or behaviour.
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.).
Dynamic Pricing	Describes real-time data on supply and demand to adjust the price (e.g. surge pricing).
Empowerment	Describes the users' perceived power to influence the service offering and/or decision-making and governance of the platform.
Environmental Value	Sees platforms prioritise environmental sustainability and sustainable consumption practices.
Existing Community	Platform operates among a group of people possessing something in common (e.g. neighbourhood, school)

Feature-Based Discrimination	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).
Fines or Fees	For example, fines for damage or late fees.
Franchise	Allow franchisees to licence the business concept – including training, branding, technical infrastructure – for a recurring fee and/or revenue sharing.
Free	Price discovery mechanism that allow users free access to the platform and its primary offering, using additional sources to generate revenue (e.g. donation, crowdsourcing, advertising).
Geographical Scale	The proximity between the resource owner and resource user, and/or the reach of the sharing platform’s operations, depending on shared practice.
Governance Model	The approach of the platform in decision-making as well as risk and reward sharing, inclusive of three broad approaches in governing sharing platforms: corporate, collaborative and cooperative.
Hybrid	The users interact both online and offline, typically making connection via a digital platform and meeting in person during the exchange.
Inclusivity	The process that provides equal access to rights and resources as well as the elimination of barriers to participation.
Intellectual Property	The ideas and other creations of the mind, including innovations, literature, artwork, designs, symbols, photographs, as well as company names and logos. Protecting intellectual property is a business model choice, including proprietary, communal, and open source.
International	Platform operates internationally, in multiple locations.
Key Activity	Platform mediation allowing for access to under-utilised goods.
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
Local	Platform operates within a city or district.

Location-Based Discrimination	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.
Market Share-Based Discrimination	Describes variable pricing based on the number of customers the platform services.
Mediating Interface	The user-facing technological platform that users engage with to facilitate matchmaking, including smartphone app, website, or third-party applications.
Membership	Recurring cost to users for access to the platform.
Morphological Analysis	A customary qualitative modelling method to structure and analyse multidimensional objects, typically with three iterative steps: 1) identify and structure the business model attributes and dimensions; 2) conceptualise all possible configuration options for each attribute; and 3) consolidate these elements into a morphological box or schema.
National	Platform operates within a country.
Negotiation / Bargaining	Price discovery mechanism that sees the price negotiated and agreed upon between the resource owner and resource user, which may or may not involve the platform.
Nodes	Platform operates with fragmented diffusion geographically, driven by interested actors wanting to start operations in their own contexts
Offline	The users interact offline, having learned about the market via social media, website, etc.
Online	The users interact online, making connection via a digital platform and discussing the exchange online, without needing to meet in person (e.g. keypad, keyless entry, shipping).
Open Source	Open intellectual property, available without limitations.
Ownership Share	Users pay a fee, in return gaining access to a share of a collective good (e.g. renewable energy infrastructure).
Pay What You Can	Price discovery mechanism where the resource user offers to pay to access an asset provided by the resource owner.
Peer-to-Peer	Platform mediation between users having equal standing based on rank, class, age, etc.

Platform Reviews	The platform provides a mechanism to provide feedback on their activities, which is made publicly available.
Platform Type	Describes the users involved in sharing on the platform. These platform types engage users along these constellations: peer-to-peer (P2P), business-to-peer (B2P), business-to-business (B2B), and crowd cooperative models.
Price Discovery	The mechanism by which the prices for goods and services are determined in a market, for example, set by the platform, set by resource owner, set by resource user, negotiation, auction, pay what you can, or free.
Price Discrimination	The changes in the price based on characteristics of the product, user, or market.
Pricing Mechanism	The influence of the market, and elasticity of demand, on the price of shared assets, for example, static pricing, dynamic pricing, and differential pricing.
Private Project Funding	Venture capital, private investment, equity, etc.
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
Proprietary	Protected intellectual property, as stated in terms and conditions.
Public Project Funding	Grant money received as a result of a successful funding proposal.
Public-to-Citizen	Government- maintained or supported sharing platforms facilitating access.
Quantity-Based Discrimination	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.
Regional	Platform operates within a provincial or regional area within a nation.
Registration Fee	A fee charged to users only once, to register on the platform and gain access to its offerings.
Resource Owner	The user on the supply-side of the market granting temporary access to their resources.
Resource Owner Reviews	The platform allows for reviews of the resource owner, which are displayed to the resource user.
Resource User	The user on the demand-side of the market gaining temporary access to others' resources.

Resource User Reviews	The platform allows for reviews of the resource user, which are displayed to the resource owner.
Revenue Sharing	When operating as nodes or franchisees, revenue is shared with the central organisation and/or each other to support operating costs.
Revenue Source	The source (e.g. resource owner, resource user, volunteer) of the financial flow to the platform. Specifically, this places emphasis on the financial relationship between users and the platform, instead of the financial flow between users.
Revenue Streams	The financial flow that allows the platform to capture economic value as a result of delivering its value proposition.
Review System	A system to capture feedback about the service quality or social interaction, thereby increasing trust among resource owners and resource users by seeking to reduce information imbalances. A review system can be designed to facilitate reviews for the resource owner, the resource user and/or the platform.
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).
Set by Platform	Price discovery mechanism where the price is set by the platform.
Set by Resource Owner	Price discovery mechanism where, in a multi-sided market, the resource owner set the price of the exchange.
Set by Resource User	Price discovery mechanism where, in a multi-sided market, the resource user set the price of the exchange.
Shared Consumables	Providing access to goods characterised through one-time use, for example, food or personal care products (e.g. perfume, haircare products, fingernail polish) that cannot be shared again after use.
Shared Goods	Providing access to both durable goods and non- durable goods, for example, clothes, furniture, sporting goods, home improvement products, luggage, consumer electronics and other homeware.
Shared Mobility	Providing access to assets facilitating mobility, for example, carsharing, bikesharing, ridesharing, boatsharing, and e-scooters.
Shared Practice	Moving beyond a sectoral perspective, the shared practice describe the different consumption practices facilitated by sharing platforms, including shared space, shared mobility, shared goods, shared consumables, and shared resources.

Shared Resources	Providing access to cooperative energy, excess heat, and other municipal or industrial effluent.
Shared Space	Providing access to idling space, for example, rooms, apartments, attic storage space, and parking spots.
Sharing Economy	A socio-economic system that leverages technology to mediate two-sided markets, which facilitate temporary access to goods that are under-utilised, tangible, and rivalrous.
Sharing Economy Business Model	The term used to describe the business model of the sharing platform.
Sharing Platform	The term used to designate the entity facilitating the sharing practice, for example, any business, not-for-profit, non-traditional organisation, or grassroots initiative, so long as they operate as a two-sided market.
Smartphone App	Users access the platform via a smartphone app.
Social Value	Sees social enterprises largely motivated by the social cohesion and social bonding that may take place between those that share (more granular – on an individual level – compared to societal value).
Social Justice	Social justice seeks to ensure the morally proper distribution of social benefits and burdens among society’s members, representative of distributive, cultural, and associational justice.
Societal / Public Value	Sees platforms motivated by more normative beliefs of how things should be, potentially returning to simpler and more meaningful exchanges.
Sponsorship	External individuals or businesses providing financial resources in exchange for advertisements or naming rights.
Static Pricing	The process of a platform setting a fixed price based on market conditions, which change infrequently and in a stepwise manner.
Subscription Fee	Recurring cost to users for access to goods or services.
Third-Party App or Integration	Users access the marketplace via a third-party application (e.g. Facebook) or integration into the platform website.
Transaction Fee	One-time charge to users each time the good or service is accessed.
Trust	The belief in something or someone based on its characteristics (e.g. personability, ability, performance, integrity, transparency, achievements, or history).

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).
User-Based Discrimination	Describes price differences based on characteristics of the user using the product that influences its cost (e.g. age).
Value Capture	Describes the mechanisms for capturing value for a business and its stakeholders, including economic, environmental, social, and societal value.
Value Delivery	Describes the way in which the platform delivers value or acts out its contribution of the value proposition for the resource owner and resource user.
Value Facilitation	Describes the practices by which the sharing platform mediates the exchange in a two-sided market, including the extent of customer input in shaping the product or service offering. For example, this may be done by providing resources, information, or assistance.
Value Orientation	The underlying motivation of the platform to create and capture various types of value for itself, its stakeholders, and society, for example, economic, social, environmental, or societal/public value.
Value Proposition	Reduction of transaction costs in sharing.
Venue for Interaction	Describes how users communicate and where they meet, if at all, including online, offline, or a hybrid of the two.
Verification	Charge a fee to verify a user's identity, thus increasing trust on the platform.
Volunteer	The platform relies on the time of volunteers to support their operations.
Website	Users access the platform via a website.

Article I



Review

Defining the Sharing Economy for Sustainability

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Received: 10 December 2018; Accepted: 18 January 2019; Published: 22 January 2019

Abstract: (1) Background: The sharing economy has emerged as a phenomenon widely described by academic literature to promote more sustainable consumption practices such as access over ownership. However, there exists great semantic confusion within academic literature surrounding the term “sharing economy,” which threatens the realisation of its purported sustainability potential. (2) Objective: The aim of this paper is to synthesise the existing academic definitions and propose a definition of the sharing economy from the perspective of sustainability science in order to indicate sharing practices that are consistent with the sustainability claims attributed to the sharing economy. (3) Methods: We conduct a database search to collect relevant academic articles. Then, we leverage qualitative content analysis in order to analyse the authors’ definitions and to synthesise the broad dimensions of the sharing economy in the discourse. (4) Results: We propose the following characteristics, or semantic properties, of the sharing economy for sustainability: ICT-mediated, non-pecuniary motivation for ownership, temporary access, rivalrous and tangible goods. (5) Conclusion: The semantic properties that inform our definition of the sharing economy for sustainability indicate those sharing practices that promote sustainable consumption compared to purely market-based exchanges. This definition is relevant for academics studying the sustainability impacts of the sharing economy in order to promote comparability and compatibility in research. Furthermore, the definition is useful for policy-makers, entrepreneurs, managers and consumers that have the sharing economy on the agenda in order to promote social enterprise and support sustainable consumption.

Keywords: sharing economy; sustainability; literature review; interdisciplinarity

1. Introduction

In the Special Report of the IPCC released in October 2018, scientists warn that our window for preventing catastrophic climate change is closing [1,2]. This report is just the latest of a growing chorus of warnings. According to scientists, the over-exploitation of natural resources as a result of our unsustainable consumption, especially in more-developed countries, is the cause of this catastrophic collapse of animal species [3] and contributes to continued greenhouse gas emissions [2]. Our unsustainable consumption results in habitat loss, biodiversity loss, pollution and climate change, among other impacts [2,3].

As such, solutions to address our unsustainable consumption patterns are needed. Strategies to dematerialise our economies permeate academic discourses including product-service systems [4], access-based consumption [5], collaborative consumption [6,7], the sharing economy [8], among others. However, the practical applications and subsequent sustainability implications of sustainable consumption approaches seem incremental in the face of our growing sustainability challenges [9].

Therefore, in order to meaningfully address these sustainability challenges, more needs to be done in order to realise the purported sustainability potential of alternative modes of consumption, such as the sharing economy. The sharing economy is largely promoted in academic literature as

offering access over ownership [10,11], by leveraging the idling capacity of goods and services [12,13], in order to reduce our overall consumption and subsequent resource use [14,15].

Widely, the sharing economy is promoted by practitioners, industry associations, policy-makers and academics because its purported sustainability potential. However, the sustainability impact of the sharing economy remains understudied [16], especially considering rebound effects [17–19].

Furthermore, the academic discourse surrounding the sharing economy offers inconsistent conceptualisations of the phenomenon depending on the discipline and focus of research. Some suggest that this leads to semantic confusion surrounding the sharing economy, which permeates academic and popular discourses [20,21]. For actors interested in the sharing economy because of its purported sustainability potential, the lack of a consistent definition as to which types of practices and organisations belong under the umbrella of the sharing economy may lead to undesirable outcomes (e.g. for managers and practitioners) [22]. Furthermore, the phenomenon may be co-opted or exploited in ways that the purported sustainability potential is not realised [23], with some authors claiming the “[sharing economy] is simply a faster and up-to-date form of market economy” [24] (p. 4269). Already, the term ‘share-washing’ is used to describe exploitative economic ventures that operate under the “warm glow” of the sharing economy umbrella [25,26].

We suggest that this semantic confusion has a negative impact on current and future perception of the sharing economy, threatening the potential for the sharing economy to mainstream. As such, researchers, policy-makers and entrepreneurs interested in institutionalising sharing as a consumption practice may wish to be concerned with the increasing negative sentiment among consumers, described in popular science publications. For example, in a 2017 US national survey conducted by the National League of Cities, 51% of those surveyed had mixed feelings about the sharing economy [27]. Moreover, the sharing economy is described as leading to reduced equity and justice as a result of casualised labour markets and financialising of housing [28]. Finally, using Uber as an example, a recent *Guardian* article called for “tougher rules” governing the sharing economy [29].

We fear the semantic confusion within academia—which also permeates among policy-makers, entrepreneurs, managers and consumers—hinders the institutionalisation of sharing as a consumption practice and threatens the realisation of the purported sustainability potential of the sharing economy at scale needed to address our grand sustainability challenges. As such, our aim is to synthesise the existing academic definitions and propose a definition of the sharing economy from the perspective of sustainability science in order to indicate the types of practices that may lead to more sustainable outcomes. Our definition is intended to support academics, policy-makers, entrepreneurs, managers and consumers that promote the sharing economy for its purported sustainability potential.

We approach our analysis from the critical realist ontology and the discipline of sustainability science, an interdisciplinary research field, which seems appropriate in order to integrate conceptualisations among social and natural science disciplines. Of course, we appreciate that other disciplines study the sharing economy from different perspectives, including from management and economics. However, these conceptualisations must be logically consistent and at least have the potential to deliver on its purported sustainability potential if authors continue to promote the sharing economy in this way.

In the following sections, we will provide an overview of the sharing economy as a phenomenon. Then, we will describe our methods, which resulted in the dimensions of the sharing economy that capture the breadth of the discourse in academic literature. Then, we analyse these dimensions, seeking to align logically the discourse to arrive at semantic properties to propose a definition of the sharing economy for sustainability. Finally, we discuss the implications of our proposed definition in how the sharing economy has been conceptualised thus far.

2. Sharing and the Sharing Economy

The meaning of sharing has been previously discussed by past academics including Price [30], Belk [31] and John [32]. Depending on the context, sharing could mean to share: as an act of division

into equal parts; as an act of distribution; as a form of common ownership; as an act of communication; or as a form of individual expression online [32]. Throughout the English language, the word ‘sharing’ has shifted in meaning and continues to do so, especially with its prolific use on social media.

Considering ‘sharing’ and ‘economy,’ the words do not obviously relate to each other. Nonetheless, the term ‘sharing economy’ has emerged. The sharing economy is described as “a rising pattern in consumption behaviour,” experiencing “immense growth” [33] that “is surpassing any other markets in outlook and market growth” [12]. The practice of sharing promises many societal benefits: to provide an opportunity to save and/or make money [34,35]; to change consumer behaviour [12,36]; to reduce resource use and usher in more sustainable consumption [13,37]; to facilitate sustainable economic growth [38]; and to enhance social cohesion in cities [39–41].

Quite broadly, the sharing economy as described by literature includes a variety of consumption practices and organisational models. Among authors and across disciplines, there is great disparity in the types of activities that are described within the sharing economy (Table 1). In sampling a diversity of definitions, we see tensions emerge: the extent of online mediation (e.g. online vs. offline); whether the exchanges allow transfer of ownership (e.g. renting vs. donating); the role and place of money (e.g. pecuniary vs. non-pecuniary motivation); and, the actors involved in the exchange (e.g. peer-to-peer vs. business-to-consumer).

Table 1. Diverse definitions of the sharing economy from literature.

Source	Definition
Aloni, E. (2016)	“...an economic activity in which web platforms facilitate peer-to-peer exchanges of diverse types of goods and services” [25] (p. 1398)
Barnes, S. & Mattsson, J. (2016)	“...involves access-based consumption of products or services that can be online or offline” [42] (p. 200)
Cheng, M. (2016)	“...describes the phenomenon as peer to peer sharing of access to under-utilised goods and services, which prioritizes utilization and accessibility over ownership, either for free or for a fee” [43](p. 111)
Habibi, M.R., Davidson, A., & Laroche, M. (2017)	“...non-ownership forms of consumption activities such as swapping, bartering, trading, renting, sharing and exchanging” [22] (p. 113)
Hamari (2016)	“...the peer-to-peer-based activity of obtaining, giving or sharing the access to goods and services, coordinated through community-based online services” [44] (p. 2047)
Heinrichs, H. (2013)	“...individuals exchanging, redistributing, renting, sharing and donating information, goods and talent...” [13] (p. 229)
Shaheen, S., Chan, N.D., Gaynor, T. (2016)	“...a popularized term for consumption focused on access to goods and services through borrowing and renting rather than owning them” [45] (p. 165)

As a result, scholars describe the sharing economy as an umbrella term [13,22,46], covering a variety of behaviours and business models that cannot be narrowed down to one specific definition [47–49]. Moreover, scholars often treat the term ‘sharing economy’ as synonymous to related terms such as ‘collaborative consumption’ [50]. These competing conceptualisations leads to semantic confusion in the research field and beyond [20,22,47].

The sharing economy is described as a neologism [32,51], which may account for this purported semantic confusion. Neologisms are defined as “form-meaning pairings ... that have been manifested in use... but have not yet occurred frequently and are not widespread enough in a given period to have become part and parcel of the lexicon of the speech community and the majority of its members” [52] (p. 31–32). Neologisms are described to undergo the process of institutionalisation through three stages: creation, consolidation and establishment [52,53]. When a new word or phrase is created, the meaning is often highly ambiguous and reliant on context for correct interpretation [52]. The transition from creation to consolidation is difficult to demonstrate empirically but is often characterised by decreased semantic ambiguity as the term increases in usage [52]. The term is described as established or institutionalised with the addition of semantic properties generally known and understood by a speech community, independent of context [52].

Ambiguity persists as the characteristics, that is, semantic properties, overlap with other upcoming modes of consumption such as collaborative consumption, access-based consumption, gig economy, platform economy, among others. This suggests that the sharing economy is likely in the process of consolidation as its use permeates and efforts are made to reduce the surrounding ambiguity.

Herbert & Collin-Lachaud [47] suggest three reasons for the difficulty in arriving at a definition of the sharing economy: 1) the practices described within the sharing economy “are extremely varied, flourishing, constantly changing and subject to the fad effect”; 2) consumers and/or organisations that engage in these varied practices do not see themselves as part of the sharing economy; and, 3) out of pragmatism, stakeholders choose not to impose criteria on what constitutes the sharing economy. To be clear, scholars have embarked on conceptualising the sharing economy [10,48,54–56]; however, these conceptualisations are not developed to support the realisation of the purported sustainability potential attributed by academics and businesses to the sharing economy.

The sustainability challenges that we face as a society are urgent and mounting. Practices that promote sustainable consumption and production are required. The semantic confusion surrounding the sharing economy allows for purely market-based exchange, without improved sustainability outcomes. Therefore, this paper conducts qualitative content analysis to synthesise the existing literature in order to develop characteristics, or semantic properties, that prioritise the sustainability potential often attributed to the sharing economy.

3. Materials and Methods

In order to synthesise the academic discourse pertaining to the definition of the sharing economy, we conducted a literature review followed by qualitative content analysis using a grounded theory approach. Methods presented by Keathley-Herring et al. [57], Randhawa et al. [58], Corbin & Strauss [59] and Bazeley & Jackson [60] primarily supported us in developing our approaches to both.

3.1. Method for Data Collection—Database Search

The literature review collected academic, peer-reviewed journal articles, in particular, as this type of literature is described to facilitate broad understanding and to illuminate nuances among authors within a research field [61]. In addition, the coverage of Web of Science and Scopus databases favours academic journals over books, conference proceedings and reports within the social sciences and humanities [62].

Similar to Keathley-Herring et al. [57], we conducted a scoping study to support the identification of keywords to be used in our subsequent database search of Scopus and Web of Science. We chose the search query “‘sharing economy’ OR ‘collaborative consumption’” to account for the fact that some authors used the terms interchangeably. Then, we included in our scoping study the ten most cited articles in Scopus and Web of Science, which yielded 18 articles after accounting for duplicates. These articles were thoroughly read by two researchers to distil other related terms to the sharing economy. The scoping study arrived at thirty-eight related terms (Appendix A), which were used to execute the subsequent database search relating to the sharing

economy. The database search was conducted on 10 May 2017 and included articles starting 1 January 1978; results were limited to academic, peer-reviewed journal articles written in English. The search results returned 2270 articles, including duplicates between databases, 869 from Scopus, 1401 from Web of Science (Appendix A). The titles, keywords and abstracts were reviewed to confirm relevance for this study based on exclusion criteria determined by our scoping study (consult Appendix B). The review yielded 272 articles from Scopus and 213 articles from Web of Science (485 including duplicates). Of these, we initiated a second round of review by removing: articles that were duplicates between the databases; articles in which we could not obtain full access as PDF; or, articles incorrectly catalogued based on type of literature, language or contradicting metadata between the databases. Furthermore, we chose to remove articles that mentioned the ‘share economy’ exclusively, as this concept is intellectually unrelated to the sharing economy discourse. The ‘share economy,’ originally conceptualised as a profit-sharing scheme to tackle stagflation, was first written about by Weitzman [63] and later rebutted by many scholars throughout the 1980s and early 1990s. Presumably, its inclusion in the literature stream stems from its similar root word and several authors conflating the term with sharing economy [13,64]. Our final sample included 255 academic, peer reviewed journal articles that make up the basis for next stage of analysis.

3.2. Method for Data Analysis—Qualitative Content Analysis

Qualitative content analysis (QCA) is a method to systematically study the meaning of qualitative data (i.e. language). A core feature of QCA is the development of a coding framework, either theory-driven or data-driven [65]. In line with a grounded theory approach, we use data-driven strategies to develop our coding framework inductively [59,65]. Our data-driven coding framework was developed through processes of open, axial and selective coding.

Open coding, sometimes referred to as *in vivo* coding, uses words or short phrases directly from the text to assign as codes [65–67]. As the codes become increasingly dense, the codes are grouped into relevant categories and sub-categories [66]. Axial coding begins to understand links between these categories, yet still flexible to new codes and categories as one continues textual analysis [65,66]. Finally, selective coding arrives at core categories that are further refined and integrated into the emerging theory [65].

We used NVivo 11 for Mac, developed by QSR International, to aid in analysis of our sample articles. Computer-assisted qualitative data analysis software (CAQDAS), such as NVivo, is particularly useful when working with large amounts of textual data to engage in the above coding processes in a systematic way [65]. Furthermore, NVivo is a useful tool to conduct literature reviews [60,68–71], especially when engaging in an analytical task [60], such as synthesising the definitions of the sharing economy across academic literature. Furthermore, NVivo seeks to reduce human error during the coding process as well as analyse the data across multiple categories [71].

We proceeded with two phases: 1) we identified the definitions provided of the sharing economy in all articles within the final sample; 2) we coded all definitions of the sharing economy to arrive at the dimensions of the sharing economy, which describe the broad categories discussed in literature. Continuously, throughout both phases, we utilised features in NVivo, such as memos and annotations, to begin to interrogate and analyse the data.

3.2.1. Phase One

The unit of analysis, that is the object of investigation, was the definition of the sharing economy in each academic article. As such, our first phase was concerned with coding for the relevant definition in each academic article. In NVivo, one codes the unit of analysis as cases [60]. For example, Cheng [43] (p. 111) states that the “[s]haring economy describes ... peer to peer sharing of access to under-utilised goods and services, which prioritizes utilization and accessibility over ownership, either for free or for a fee.” This text would be coded as a case labelled ‘sharing economy.’

However, some authors conflated terms, in part, due to the continued semantic confusion. For example, Barnes & Mattsson [42] (p. 200) state: “Collaborative consumption is embedded within the “sharing economy,” which involves access-based consumption of products or services that can be

online or offline.” In these instances, the text would be coded to multiple cases including ‘sharing economy,’ ‘collaborative consumption’ and ‘access-based consumption.’

We used a predatory reading approach, focusing more attention on the relevant parts of the text that may contain the authors’ stated or theorised definition such as abstract, introduction, literature review (where relevant) or conclusion. We developed and discussed iteratively a Phase One Coding Protocol based on our purpose for content analysis (see Appendix C). To begin, we each coded the same fifteen articles to ensure inter-coder reliability. Using NVivo, we calculated our strength of agreement measured by the kappa statistic. The calculated kappa statistic was 0.66, which suggests substantial agreement among coders [72]. After discussions and refinement of our coding protocol, we proceeded coding the articles individually. After coding for cases in all 255 articles, relevant definitions were coded to the case ‘sharing economy’ in 151 of the articles (Figure 1).

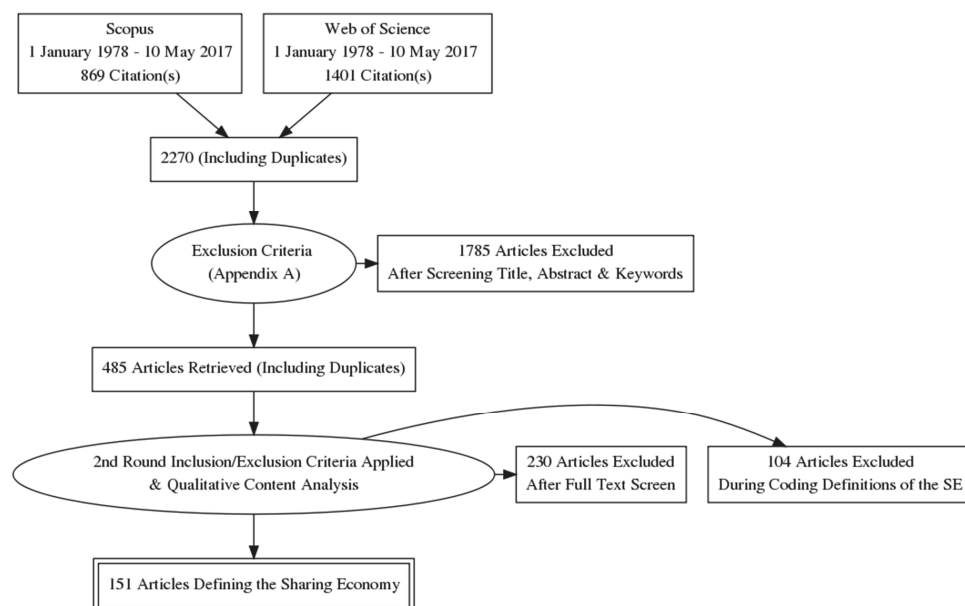


Figure 1. Flow Diagram: Screening of Articles Defining the Sharing Economy.

3.2.2. Phase Two

Once we completed coding for cases, we proceeded with analysing the definitions of the sharing economy. Once again, we developed and discussed iteratively a Phase Two Coding Protocol (see Appendix D). We applied a grounded theory approach using the processes of open, axial and selective coding.

Open Coding

To begin, we conducted line-by-line coding, using words or short phrases in each line to form new codes. We open coded the definitions in 34 of the 151 articles; we began to reach saturation of some codes. At that point, we had developed 821 codes. In several sessions, we grouped all codes that appeared connected and established higher order categories and related subcategories. We used the ‘Mind Map’ function in NVivo to visualise our emerging coding framework and generate parent and child nodes in NVivo for continued coding.

Axial Coding

Using the emerging coding framework, we continued coding line by line, assigning codes to either an existing category or creating a new code. In doing so, we proceeded to forge links between and within categories, as new codes continued to better describe the emerging categories. Once again, after coding 64 of the 151 articles’ definitions, we became satisfied with the density of many of these

core categories and subcategories. At this point, we confirmed our coding framework and proceeded with selective coding.

Selective Coding

We proceeded coding the remaining 87 of 151 articles' definitions using the coding framework established through the processes of open and axial coding. This included refining categories; we revisited categories by condensing or expanding their focus. We sought to define each core category and sub-category through relevant empirical data to provide weight and context to the emerged codes.

Once all of the definitions were coded, we congregated once more to discuss and explain the core categories. The core categories are said to be "broad and abstract enough to integrate the other categories and to cement the components of the phenomenon" [66] (p. 1276). We describe these core categories as dimensions of the sharing economy, which we report in Section 4. From these dimensions, in Section 5, we propose characteristics that support our definition of the sharing economy for sustainability.

4. Findings

The identified dimensions of the sharing economy represent the wide breadth of characteristics coded within the 151 articles in which definitions of the sharing economy were coded. They are not normative; the dimensions do not constitute a definition of the sharing economy. Instead, they are descriptive of the discourse and demonstrate the semantic confusion within literature. Relevant to the development of characteristics that inform a definition, we report on the following dimensions: motivation, ICT-enabled, idling capacity, platform or organisational models, shared goods and services as well as ownership.

For each dimension, we report the categories that emerged from our data (e.g. ICT-enabled → online) and, where possible, provide the number of articles in which we found the category to occur. Furthermore, we also include the total number of times—i.e. the frequency—the category occurred, representing the intensity of discussion.

4.1. Motivation

Literature suggests the proliferation of the sharing economy is driven by the great recession of 2007–2008 [16,73–77], growing social inequality [73,78], increased environmental awareness [14,16,74,79,80], proliferation of ICT [44,74,81] and convenience [45,79,82–85], among others. As such, authors expressed differing motivations among actors involved in the sharing economy. Based on our data, we found these motivations to include economic, environmental and social motivation.

Economic motivation is amorphously discussed across the literature. Our analysis seeks to structure the purported economic motivations; we coded economic motivation from the perspective of users, providers, businesses and the community. Users within the sharing economy are said to be motivated by access to a greater number of goods and services [49,86,87], which are less expensive than ownership [34,45,79,80,88–90]. By increasing users' access to goods and services at a reduced price, users have the ability to access things they otherwise could not afford, leading to increased purchasing power elsewhere in the economy [14,77]. Likewise, providers see the sharing economy as a means to generate extra income [35,82,91,92].

Businesses see the economic potential in the sharing economy; in an often-cited report by PwC, the sharing economy is said to have generated USD \$15 billion in revenue globally in 2015, increasing to USD \$335 billion in revenue by 2025 [12,82,93–96]. More recently, in China, according to official figures, it is reported that the sharing economy generated \$500 billion USD in transactions among more than 600 million users in 2017 [97]. By 2020, officials predict that the sharing economy may account for more than 10% of China's gross domestic product (GDP), increasing to upwards of 20% by 2025 [97]. While the true scale of the economic potential is difficult to measure (especially without a widely-accepted definition to understand and compare the types of consumption practices included in the revenue estimates), literature describes the sharing economy as reducing barriers to entry [86] and introducing new business models for generating profit [98]. It is purported that this business

potential will lead to increased employment [43,93,99] and more resilient communities [93,100]. Based on this, some authors propose that the sharing economy is guided by economic maximisation over altruism [5,45,101,102]. However, a study conducted by Bucher, Fieseler, & Lutz [89] showed that economic motivations ranked third behind social-hedonic and moral motivations.

Beyond the prevailing economic motivation, consumers are said to be socially driven to participate in the sharing economy [103]. They are said to be seeking more meaningful social experiences beyond the traditional business-consumer paradigm [81,104,105]. Harmaala [12] suggests the sharing economy is an antidote to the isolating nature of social media and digitisation. Furthermore, the sharing economy is said to reduce social inequality by allowing for a more equitable distribution of goods and services [50,89].

However, widely, the literature in our sample promotes the sharing economy on the basis of its purported sustainability potential. Literature frames users in the sharing economy being driven by increased environmental awareness and the purported sustainability potential of the sharing economy [14,16,44,74,79,81,106]. The purported sustainability potential lies in leveraging the idling capacity of goods and services to reduce net consumption, which leads to reduced resource use [14,15]. It is also claimed that sharing leads to a reduction of water and energy use [38,93] and a reduction in consumer waste [15,73,84]. Ultimately, it is claimed that the sharing economy leads to reduced greenhouse gas emissions [15,17,93,106], positioning sharing as an alternative consumption practice to address climate change [12,44,76,107].

While environment and sustainability are discussed broadly, some authors suggest that sustainability aspects are merely co-benefits associated with sharing, although, there are more important utilitarian motivations among users underlying the consumption practice [18,108]. For example, convenience is a significant motivating factor not to be overlooked [18,45,79,80,83–85], achieved through the mediation of providers and users leveraging ICT.

4.2. ICT-enabled

Although not universal, the sharing economy is largely described as being ‘ICT-enabled.’ While authors indicate that sharing is not a new phenomenon [6,91,99,106], the ‘newness’ of the sharing economy seems to stem from the use of technology to facilitate the efficient mediation or exchange between users and providers [10,44,48,73,84,100], creating a two- or multi-sided market [109–113]. In turn, this reduces the transaction costs associated with sharing among strangers [109,114]. Technology helps to reduce these transaction costs by:

- Improving access to information [113,115–117]
- Facilitating intermediation between providers and users [46,48,87]
- Facilitating payments [90,93]
- Facilitating a reputation or review system [116–118]
- Increasing convenience [79,119]

The underlying explanatory factor for this increased economic efficiency in our dataset is primarily linked to technological innovation. While offline sharing exists, many sharing organisations utilise some form of technology. The internet, smartphones, social media and algorithms are discussed with respect to platform intermediation, bringing about the efficiency gains ascribed to the sharing economy.

Our analysis demonstrated that numerous terms are used in literature to describe the extent to which the sharing economy is ICT-enabled (Table 2). In total, these terms are used in 108 of the 151 article definitions coded in our sample literature.

The diversity of terms used to describe the means and extent of ICT-enabled intermediation of the sharing economy adds to the semantic confusion. For example, authors use the terms ‘internet’ and ‘web’ interchangeably; however, there is an important distinction: the internet describes networking infrastructure whereas the web describes the information-sharing model that is built on top of the internet. Furthermore, contrasting digital and smart technologies, both ‘digital’ and ‘smart’ focus on ICT integration whereas ‘smart’ also acknowledges the connection to systems, infrastructure and prescribes an underlying environmental motivation [120]. The breadth of discussion in literature

pertaining to these dimensions leads to questions regarding the type, form or extent of ICT-enabled mediation taking place in the sharing economy and the subsequent impact on realising purported sustainability outcomes.

Table 2. ICT-Enabled—Number of Articles and Frequency of Appearance in Dataset.

Term	Articles	Frequency
Online	58	138
Internet	48	74
Technology	45	82
Smartphone	16	20
Smart Phone App	14	24
Social Media	12	26
Website	11	13
Social Networks	7	9
ICT	7	9
Internet-based	6	6
Mobile Technology	6	6
Web 2.0	6	7
Online Community	5	5
Online Platform	5	5
Virtual	5	9
Internet-mediated	4	4
Technology-driven	4	4
3rd Industrial		
Revolution	3	3
Big Data	3	3
Digital Platform	3	3
Mobile Device	3	3
Online Marketplace	2	2
Web Platform	2	2

4.3. Idling Capacity

The sharing economy is said to leverage the excess, surplus or underutilised nature of idling goods and services [12,13]. In defining the sharing economy, authors distinguish it from other forms of consumption based on leveraging the idling capacity of goods or services to facilitate *access*. Goods and services in the sharing economy are said to have high idling capacity [108], which describes the percentage of time the goods or services are being utilised. Our analysis identified several terms that describe this idling capacity: excess, excess capacity, idle, intense use, latent, spare, spare capacity, surplus, unproductive, underused and unused (Table 3).

Idling capacity, using some formulation of the above words, appears in 60 of the 151 definitions contained within our dataset. As many of the definitions are limited or incomplete, we find this is a dominant dimension of the sharing economy. However, the exact formulation and scope of idling capacity is varied across our sample. For example, considering the category ‘idle,’ which appeared most frequently in our sample, authors discussed ‘idle’ in relation to resources [12,34,98,111,121], assets [122], cars [123,124], accommodation [125] and time [92]. Similar diversity in formulation permeates the dimension.

Furthermore, we see this dimension most closely associated with the sustainability potential of the sharing economy described by many authors. Leveraging the idling capacity of goods, in particular, increases the intensity of use leading to a reduction in the need to produce new goods, which reduces the overall environmental impact associated with production and consumption.

Table 3. Idling Capacity—Number of Articles and Frequency of Appearance in Dataset.

Term	Articles	References
Idle	18	25
Spare	13	19
Unused	12	15
Underused	10	11
Excess	9	11
Surplus	9	11
Underutilised / Under-utilised	9	15
Excess Capacity	8	8
Latent	2	8
Space Capacity	2	3
Unproductive	2	3
Intense Use	1	1

4.4. Platform or Organisational Models

Within literature, the language used to describe the entity that facilitates sharing is contested. Described as a platform or an organisation, the choice by authors has implications in how the sharing economy is understood, implemented and regulated. While our analysis did not find any discussion on this, we suggest differences exist in how organisations and platforms operate pertaining to their goals, approaches and practices.

We choose to adopt the terminology ‘platform’ to describe the entity that facilitates sharing, in part, due to the ICT-mediated nature of the sharing economy in connecting providers and users. As such, we suggest a platform describes the entity responsible for mediating interactions between providers and users; the platform model describes the constellation of these actors involved in the interaction forming the two- or multi-sided market. Central to the platform models, *access* to goods and services, in contrast to ownership (see Section 4.6), seems a central feature. Table 4 illustrates the platform models generated as a result of coding our sample.

The platform models most prominently discussed in literature include business-to-consumer and peer-to-peer models. Discussed less frequently, business-to-business models are also found within the literature. Furthermore, our coding generated three other platform models: business-to-peer, crowd and public-to-citizen. In a business-to-peer model, the platform mediates a two-sided market connecting businesses with idling assets to users in order to gain access to goods and services. The ‘crowd’ model describes mediation from one to many, from many to one or from many to many. In our analysis, we conceptualised ‘crowd’ platforms to include crowdsourcing, crowdfunding, cooperatives and shared-ownership models. Finally, public-to-citizen model describes government-maintained or supported sharing platforms.

Table 4. Platform Models—Number of Articles and Frequency of Appearance in Dataset.

Term	Articles	Frequency
Peer-to-Peer	64	211
Business-to-Consumer	10	15
Crowd	6	7
Consumer-to-Consumer	5	11
Business-to-Business	4	9
Business-to-Peer	1	1
Public-to-Citizen	0	0

Based on the coding of the literature within our study, the ‘business’ in the business-to-consumer model is the provider/merchant, providing and facilitating access among consumers to a stock of

goods [98]. In this model, the business retains ownership of the goods offered in the interaction. The models are often described in relation to product-service systems [126–128] and carsharing [16]. In these examples, the business-to-consumer model does not lead to a two- or multi-sided market. Furthermore, literature describes the business-to-consumer model as the standard or traditional commercial dyad [122], which is being challenged by other models emerging that promote more prosocial exchanges.

In contrast, the peer-to-peer platform model, appearing most frequently in our study, leverages ICT to mediate a two- or multi-sided market between peer providers and peer users. Literature also discussed consumer-to-consumer models [84,98,129], which was not fundamentally different from the peer-to-peer model. Similar in nature, business-to-business platforms also create two- or multi-sided markets, although between businesses in need of idling resources niche to their business sector. A feature of these models is that sharing takes place among equals.

The business-to-peer model occurs so infrequently in our sample, we suggest this model is not part of the dominant discourse. Furthermore, in our sample, business-to-peer is used to describe similar platforms as the business-to-consumer model; for example, literature used the example of Zipcar [25,91], which is a commercial carsharing company, to exemplify the business-to-peer model. Instead, we propose the business-to-peer model describes a platform mediating exchanges between businesses with idling resources and peers desiring access to such resources. There were no examples or discussions in our sample literature as of yet matching this model; however, we see this as a potential platform model that is within the spirit of the sharing economy.

We conceptualise and define the platform model ‘crowd’ drawing on literature describing crowdsourcing, crowdfunding, filesharing, cooperatives and shared-ownership models. Crowd platforms see multi-sided markets created and mediated using ICT. In contrast to peer-to-peer or business-to-business platform models, which mediate exchange typically between one provider and one user, crowd platform models mediate interactions between multiple actors. Crowd platform models connect many to one (e.g. crowdfunding), one to many (e.g. filesharing) and many to many (e.g. shared-ownership models).

Finally, some literature discussed public transportation, parks and roads as part of the sharing economy [8,12] as well as municipal-supported or operated bike sharing schemes and tool libraries [11,121]. We conceptualised this model as public-to-citizen as the provider is often a municipal government providing access to goods and services to all citizens within their jurisdiction.

4.5. Shared Goods & Services

The literature largely distinguished shared objects on the basis of tangible and intangible objects [11,17,46,98,105,109,130]. Based on our analysis, we categorised tangible objects to include space, durable goods and non-durable goods; in contrast, intangible objects include services, time, knowledge, money, thoughts and online content (i.e. filesharing, streaming services, photos).

In considering intangible objects, we observed services discussed in literature relating to the gig economy [10,41,131] and product-service systems [13,128]. Furthermore, intangible objects discussed in literature include time banks [48,132], crowdfunding [38,41,131] and knowledge-sharing [41,131,133]. Furthermore, authors have described streaming services such as Netflix and Spotify to belong to the sharing economy [82,84]. It is unclear if these manifestations constitute sharing, especially in contrast to the sustainability motivations prevalent in literature.

In contrast, tangible objects are described broadly as goods [18,46,101,109], assets [11,17,80] or resources [77,130]. In our analysis, we categorised these as physical goods, which encompass space, durable goods and non-durable goods. Firstly, sharing of space is described widely in literature as a room [11,87,88], apartment [73,88], home [106,114,134], accommodation [24,135], office [74,103] or parking spot [136]. Furthermore, durable goods include those goods that do not quickly deteriorate through use. We suggest that these goods also often possess high idling capacity. Examples in literature include cars, bikes, luggage, sporting goods, consumer electronics, home improvement products, furniture and homeware, among others. Finally, non-durable goods include those goods

that typically have a lifetime less than two to three years, for example, clothes, personal care products and food.

4.6. Ownership

Authors claim there is less need and desire for ownership, especially among millennials [5,24,77,80,137]. However, there is a lack of consistency in how researchers discuss ownership of goods and services, depending on the type of goods or services being included in the authors' conceptualisation of the sharing economy.

Many authors see the sharing economy as promoting exchanges that do not lead to the transfer of ownership [18,94,95,138]; in this spirit, the sharing economy is said to facilitate "access over ownership" [10–12,101]. In contrast, other authors describe the sharing economy as facilitating redistribution and second-hand exchanges [13,18,121,139], which would constitute transfer of ownership.

As such, our analysis looked at the verbs used by authors to describe the exchanges taking place within the sharing economy to explore the notion of transfer of ownership. When describing transfer of ownership, authors include consumption practices such as bartering, buying second hand, donating, exchanging, gifting, redistributing, swapping or trading. In contrast, when describing no transfer of ownership, authors include consumption practices such as accessing, borrowing, collaborating, hiring, lending, renting, sharing, using or utilising (Table 5).

Table 5. Ownership—Number of Articles and Frequency of Appearance in Dataset.

Term	Articles	Frequency	Transfer of Ownership
Access	79	206	No
Exchange	61	190	Either
Rent	39	74	No
Collaborate	37	72	No
Trade	24	47	Yes
Lend	23	27	No
Swap	19	24	Either
Barter	15	15	Yes
Borrow	14	29	No
Gift	14	22	Yes
Redistribute	11	18	Yes
Lease	8	10	No
Shared Use	7	7	No
2nd-Hand	4	8	Yes
Share	-	-	No
Use	-	-	No

In our analysis, access emerges as the dominant mechanism in the sharing economy; however, 'share' and 'use' were excluded from this discussion as they occur in too many contexts not relevant to our analysis. Furthermore, practices that promote no transfer of ownership also dominate in our analysis.

5. Defining the Sharing Economy for Sustainability

The above dimensions represent the breadth of the academic discourse. The initial tensions elaborated in Section 2—the extent of online mediation; transfer of ownership; the role and place of money; and, the actors involved in the exchange—are embodied again within these dimensions. However, further logical inconsistencies emerged. Firstly, the sharing economy is widely described as potentially leading to more sustainable consumption, by leveraging idling capacity and/or facilitating access over ownership. However, the conceptualisations, as well as the examples used to

illustrate the sharing economy, fail to achieve one or both of these promises. Redistribution and second-hand markets clearly exhibit transfer of ownership, although these practices leverage idling capacity. Commercial carsharing platforms provide access to vehicles in contrast to ownership; however, they do not leverage idling capacity of existing vehicles.

Furthermore, some authors position the actor facilitating sharing as an organisation, others as a platform. This distinction has implications on the role of ICT and the extent it is leveraged to create two- or multi-sided markets. It is these inconsistencies, we sought to harmonise the disparities within each dimension in order to reduce the semantic confusion and promote a definition of the sharing economy, motivated by literature, that may offer more sustainable outcomes. We purpose the following semantic properties, the elements of a term that contribute meaning, that inform our definition of the sharing economy for sustainability: ICT-mediated, non-pecuniary motivation for ownership, temporary access, rivalrous and tangible goods.

ICT-Mediated: The sharing economy is mediated by ICT, creating two- or multi-sided markets. The fundamental ‘newness’ of the sharing economy, as compared to traditional forms of sharing, is the mediated exchange enabled by ICT. This leads to reduced transaction costs through the provision of information, access to new markets and facilitating payment. While we view that the exchange may take place either online or offline, it must also be mediated by technology, either formally (e.g. app or website) or informally (e.g. Facebook group).

Non-Pecuniary Motivation for Ownership: The sharing economy leverages the idling capacity of goods. If the sharing economy is to leverage idling capacity, as widely discussed in literature, it follows that the goods shall not be purchased or owned only for the purpose of making money through sharing. We do not see it as inconsistent for the sharing economy to involve monetary or other forms of compensation. However, while providers (and platforms) may make money from sharing, the owner presumably owns the good for their own use, leveraging its idling capacity when not in use through the sharing economy.

Temporary Access: The sharing economy is characterised by consumption practices that do not lead to transfer of ownership. Although not unanimous, throughout our sample, the sharing economy is said to facilitate “access over ownership.” It is distinguished from other forms of consumption such as buying second-hand, swapping, donating, trading or gifting because sharing does not lead to the transfer of ownership (although sometimes it does may lead to shared-ownership). Furthermore, as the sharing economy is said to leverage idling capacity, it follows that access, not transfer of ownership, increases the intensity of use of the goods shared. We clarify “access over ownership” further to describe temporary access, which is differentiated from renting over longer periods of use such as rental cars or apartments.

Rivalrous: When sharing, the use of shared goods prevents the simultaneous use by another. Some literature discusses public transit, parks and roads as examples of the sharing economy. However, we see goods that are accessible simultaneously by all as poor examples of the sharing economy, in part, because they possess low idling capacity and unlimited access. Therefore, we suggest shared objects shall be rivalrous. This criterion subsequently eliminates filesharing and video streaming, among others, as examples of the sharing economy because they are non-rivalrous exchanges.

Tangible Goods: The sharing economy sees sharing of space, durable goods and nondurable goods. Following the logic of the above semantic properties, the sharing economy shall facilitate exchange of tangible goods, in contrast to intangible goods. First, tangible goods possess clear idling capacity. Second, tangible goods possess clear mechanisms for access and ownership. Finally, tangible goods are rivalrous.

6. Discussion

The above semantic properties inform our definition of the sharing economy for sustainability. However, they have some implications on how the sharing economy has been previously conceptualised. Figure 2 illustrates the semantic properties and the subsequent activities excluded from our definition, which are sometimes attributed to the sharing economy.

Below, we discuss the following implications on the conceptualisation of the sharing economy: 1) excludes business-to-consumer models; 2) excludes second-hand and other redistribution markets as well as other exchanges that allow for the transfer of ownership; 3) excludes intangible objects such as services, time, money, knowledge, streaming content, among others; and 4) we propose consumables (e.g. food, personal care products) may be included in the sharing economy, despite transfer of ownership.

Firstly, we suggest that business-to-consumer models be excluded from the sharing economy. Our semantic properties position the sharing economy as ICT-mediated. The distinction between the sharing economy and other forms of consumption that also leverage ICT is the creation of two- or multi-sided markets connecting providers and users to facilitate access of idling tangible goods. Therefore, in our definition, we argue business-to-consumer models are excluded from the sharing economy as ownership of the goods is retained with the business that facilitates the exchange. This fails to constitute the creation of a two- or multi-sided market. As such, many carsharing (e.g. Zipcar, DriveNow, Car2Go) and bike sharing (e.g. Donkey Republic, Ofo) schemes fall outside of our proposed definition, provided the assets are not peer-owned.

Furthermore, we also suggest that business-to-consumer models are excluded as pecuniary motivation drives ownership among the suppliers in the model; therefore, suppliers do not leverage the idling capacity of goods. Instead of sharing, we suggest this type of exchange is more closely aligned with existing literature on product-service systems [4] or access-based consumption [5]. In instances where businesses do provide access of idling goods to users, unless mediated by a platform, we suggest this exchange is more closely aligned with existing literature on collaborative consumption [6].

However, we do not go as far as some [43,56] to say that sharing only takes place between peers. While it is likely that the semantic properties proposed manifest in peer-to-peer exchanges, they may also include business-to-business, business-to-peer and crowd platform models. These models may leverage ICT to create multi-sided markets and may provide temporary access of idling tangible goods.

Secondly, our definition excludes exchanges that allow for the transfer of ownership including second-hand or other redistribution markets. While these models likely lead to more sustainable consumption, we suggest these models extend product lifetimes, slowing resource loops but lead to a transfer of ownership. As such, we suggest second-hand markets and other redistribution markets, which are included in several conceptualisations of the sharing economy, more closely align with existing literature on the circular economy.

Next, we argue that the sharing economy facilitates the sharing of tangible objects in contrast to intangible objects, which are excluded from our definition. While an individual may provide a service as a result of idling time and acquired (owned) knowledge, we argue that these types of exchanges are better described by the literature pertaining to the gig economy [140] and do not embody the purported sustainability motivations described in our sample. Other types of intangible objects may possess idle capacity such as knowledge, thoughts, files or streaming content; however, while ownership of intangible objects is often possible, these do not have a clear mechanism for maintaining or transferring ownership. Furthermore, intangible objects are often not rivalrous, in that multiple people can access these objects at the same time (e.g. Wikipedia, Netflix, Spotify, Twitter).

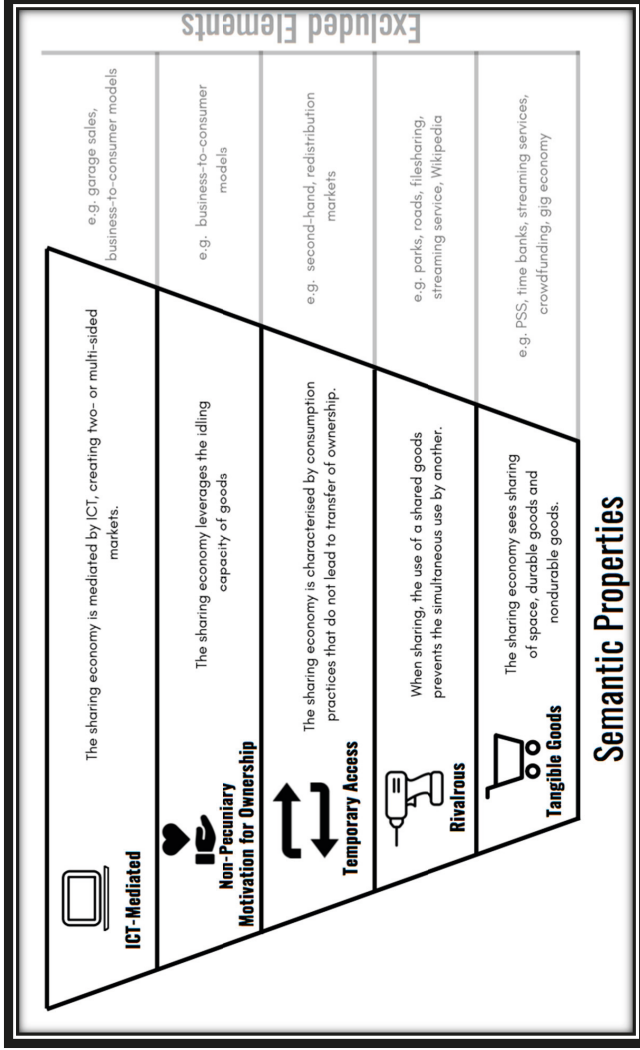


Figure 2. Semantic Properties of the Sharing Economy and Excluded Elements.

Finally, we propose that consumables, such as food and personal care products, are included in the sharing economy, despite requisite transfer of ownership. This is as long as the other semantic properties, namely, ICT-mediation and idling capacity, are fulfilled. This is because consumables are characterised through one-time use and, as such, transfer of ownership is inherent in the use of these products. It is simply impossible to return food once eaten or put a spritz of perfume back in the bottle. However, we distinguish consumables from non-durable goods (e.g. clothes), which are described to have a lifespan less than two to three years. As such, in keeping with the above semantic properties, access over ownership to clothes and other non-durable goods is expected. While this excludes second-hand shops or Really Really Free Markets [141], it captures clothes libraries, tuxedo or dress rentals as well as recreational equipment and other rental services mediated online in a two- or multi-sided market.

7. Conclusion

The sharing economy has the potential to realise more sustainable consumption practices; however, at present, the semantic confusion surrounding the sharing economy detracts from realising this potential. We seek to better define the sharing economy, especially with regard to sustainability, in order: 1) to indicate those practices that may lead to more sustainable outcomes, in comparison, to those that are associated with purely market-based exchange, deemed “share-washing”; 2) to promote the institutionalisation of sharing as a sustainable consumption practice; and, 3) to support the comparability of research examining the economic, social and environmental impact by academics, especially when used as decision-support among policy-makers and businesses.

The aim of this article was to synthesise the existing academic definitions of sharing economy and propose a definition of the sharing economy from the perspective of sustainability science. Guided by literature, we propose a logically coherent definition consisting of relevant semantic properties: ICT-mediated, non-pecuniary motivation for ownership, temporary access, rivalrous and tangible goods. These characteristics seek to harmonise the purported potential of the sharing economy among diverse conceptualisations born from different disciplines. Our definition can help indicate those sharing practices within the sharing economy that prioritise sustainable consumption. This is particularly relevant for academics studying the sharing economy from the perspective of sustainability as well as policy-makers, entrepreneurs and consumers interested in the sharing economy for its sustainability potential.

We acknowledge that our derived definition is not the only possible way to conceptualise the sharing economy. Researchers in diverse disciplines are motivated to study the sharing economy broadly from their own interests and perspectives. We acknowledge this right. However, should authors continue to suggest that the sharing economy may lead to sustainable outcomes, their conceptualisations must at least have the potential to deliver on its purported sustainability potential. If we, as academics, fail to be critical of the sharing economy and its current implementation due to continued semantic confusion, we suggest the sustainability potential of the sharing economy may never be realised.

Limitations: Our study was conducted from the critical realist ontology and the discipline of sustainability science. As such, readers should interpret our analysis and the suggested definition with this in mind. Furthermore, as with any literature review, articles that are chosen for inclusion or exclusion influence the findings. We have chosen to only include academic peer-reviewed journal articles written in English and justified this approach. Furthermore, the articles in our study are static and do not take into account advancements in knowledge since our initial database search in May 2017. However, since then, we have monitored publications and believe our article contributes to the research community.

Future Research: Through our analysis of literature, we recorded over forty different terms used to describe similar consumption practices (e.g. sharing economy, collaborative consumption, platform

economy, access-based consumption). We propose these terms used to describe a variety of consumption practices (e.g. sharing, renting, buying) belong to a semantic domain. A semantic domain describes a set of words or concepts that possess common semantic properties [142]. One approach used in semantics when words and concepts have shared semantic properties is called distinctive feature analysis [142]. Future research may wish to explore the semantic properties possessed by each term and distinguish these competing terms through distinctive feature analysis. For example, access-based consumption may be similar to the sharing economy except it does not harness idling capacity. This approach may further support the reduced semantic confusion within the semantic domain and support the institutionalisation of alternative sustainable consumption modes.

Furthermore, discourse analysis may be another useful method for those interested in studying the construction of meaning among different stakeholder groups, for example, users or the political or power relations among actors involved in the sharing economy. The choice to use discourse analysis should consider how researchers "...conceptualise subjectivity, the structure of meaning and the processes that produce that meaning" [143](p. 6); however, different approaches can be considered along three dimensions; ontology; focus; and purpose [143]. In particular, this method might be relevant when examining the definitions of the sharing economy based on the position in society from which the actor comes from or the purpose and motivation for the actor to define the sharing economy in that way. Of course, this can illuminate who is setting the agenda, for what purpose and how this might impact the institutionalisation of the sharing economy.

Author Contributions: Conceptualisation, S.C., M.L.; methodology, S.C.; software, S.C., M.L.; formal analysis, S.C., M.L.; resources, S.C., M.L.; data curation, S.C.; writing—original draft preparation, S.C.; writing—review and editing, S.C., M.L., O.M.; visualization, S.C.; supervision, O.M.; funding acquisition, O.M.

Funding: This research has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 771872) and Riksbankens Jubileumsfond (The Swedish Foundation for Humanities and Social Sciences) (Grant Agreement No. RIK16-1055:1).

Acknowledgements: We would like to thank Professor Oksana Mont (O.M.), Associate Professor Yuliya Voytenko Palgan and Associate Professor Andrius Plepys for their comments and support in the writing process.

Conflicts of Interest: Authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses or interpretation of data; in the writing of the manuscript or in the decision to publish the results.

Appendix A. Database Search Results

Table A1. Search Terms and Returned Results

Search Term	Scopus	Web of Science
"business model" AND sharing	291	268
entrepreneurship AND sharing	153	554
"sharing economy"	147	105
"sharing economies"	147	3
PSS AND sharing	64	108
"collaborative consumption"	55	47
"the mesh" AND sharing	51	159
"peer-to-peer exchange" OR "P2P exchange"	28	18
"product-service system" AND sharing	28	24
"product service system" AND sharing	28	24
"share economy"	26	23
"resource pooling" AND sharing	19	25
"sustainable consumption" AND sharing	19	58
"social innovation" AND sharing	18	29
prosumer AND sharing	18	15
"social lending"	18	9
"collaborative economy"	16	10
"access-based consumption"	15	12
"sharing model" AND commercial	6	1
"prosocial sharing"	5	4
"alternative consumption" AND sharing	4	4
"extended self" AND sharing	4	19
"commercial sharing systems"	3	2
"collaborative lifestyle"	3	1
"market-mediated access"	2	2
"fractional ownership" AND sharing	2	3
"alternative marketplaces" AND sharing	1	1
"peer-to-peer trading services" OR "P2P trading services"	1	0
"result-oriented services" AND sharing	1	1
"non-exchange-based sharing"	0	0
"sharing model" AND non-commercial	0	0
"non-ownership-based sharing"	0	0
"redistribution markets" AND sharing	0	0
"non-reciprocal ownership" AND sharing	0	0
"direct-contact collaboration"	0	0
"system-hookup collaboration"	0	0
"segregated collaboration"	0	0
"use-oriented services" AND sharing	0	0
Sum	1173	1529
Duplicates between searches	304	128
Total	869	1401

Appendix B. Motivation and Exclusion Criteria

Produced and agreed upon as of May 11, 2017 during joint discussions among two researchers on the basis of reading the 18 articles that made up the scoping study.

The motivation of the study is to examine the ways in which sharing has been described as new as a part of the sharing economy. This is done by using qualitative content analysis to construct the dimensions of the sharing economy or at least differentiate the sharing economy from other similar models (access-based consumption, redistribution markets, commodity exchanges, gift-giving, product service systems, bartering, lending, renting, leasing, etc.). As such, the following exclusion criteria guide our selection of articles that form our final sample for analysis. Only the article title, keywords and abstract are reviewed.

We exclude articles on the basis of the following:

1. Results that are not academic articles
2. Articles not indexed as written in English
3. Articles that do not include any of the search terms in the Title, Abstract or Keywords
4. Articles that do not appear to be relevant, at least in part, to discussing the concept of sharing
5. Articles that describe sharing as an act of communication (ex. knowledge sharing, information sharing, information as pricing) or as an act of individual expression online (social media)
6. Articles that discuss the sharing of data/files, unless it is rivalrous and peer-to-peer (i.e. distributed shared memory)
7. Articles that describe risk sharing or profit and loss sharing, unless it is discussed as part of the Share Economy (concept by Weitzman)
8. Articles that discuss peer-to-peer lending, unless it specifically mentions it as a part of the sharing economy or collaborative consumption

We chose to include electricity sharing/pooling from renewable energy, as electricity is rivalrous and has inherently environmental benefits.

Appendix C: Phase One Coding Protocol

July 21, 2017

Phase One: Coding for Cases

1. Select the next unassigned article from shared Google Sheets: Final Document List
2. From the drop-down menu, select yourself as the person 'Coded by'
3. Within the selected article, code for cases, the unit of analysis, which includes the definition for the sharing economy and/or any other related model to the sharing economy (i.e. collaborative consumption, access-based consumption). These terms should come from the text, seeking to see how the authors use other terms to describe other but related, terms.
 - a. Coding for existing and new cases:
 - i. New cases include terms/words that the authors use that act as synonyms or variations (i.e. related models) that replace or contrast the sharing economy in the text.
 - ii. When a new term relating to the sharing economy is introduced in relation to another, they should both be coded as cases (ex. The article describes the sharing economy as part of collaborative consumption. In this instance, the same text should be coded for both sharing economy and collaborative consumption).
 - b. The content that makes up the case should include and be limited to any text within the article that describes the sharing economy (or related models) and any of its features/factors/dimensions/drivers/motivations/outputs/impacts or any content that provides additional understanding or meaning of the sharing economy or related models.
 - i. It is appropriate to exclude content that the coder determines unnecessary in creating a better picture of the sharing economy or related models, in particular, detailed results and discussion from each article.
 - c. One should also code for all examples that are expressed in the article in relation to the sharing economy (or related models).
4. Annotations can/should be written in NVivo to document preliminary analysis of the article and its content. In particular, this may be a thought to consider moving forward based on the text or a future research question with the dataset.
5. Memos are not necessary but can be linked to a specific article to provide greater context / description of thinking in relation to the linked article.

Appendix D. Phase Two Coding Protocol

September 26, 2017

Phase Two: Coding of Cases

The goal of this phase is to code the case ‘sharing economy’ to begin to develop concepts for each of the terms used to describe the sharing economy and related activities. The process seeks to employ a grounded theory approach—namely open, axial and selective coding practices—to arrive at concepts for each of the cases. The coders will begin with processes of open coding. Once saturation is agreed upon by both coders, the coders will begin to work with the codes to arrive at a preliminary coding framework. At this point, the coders move onto processes of axial coding, seeking to code based on the preliminary coding framework but being open to codes that continue to emerge from the data.

The below process details the coding protocols:

1. Code for one case at a time in alphabetical and subsequent order of articles within each case based on the Google Sheet.
2. Select the next unassigned article from Google Sheets: Coding of Cases
3. From the drop-down menu, select yourself as the person ‘Coded by’
4. Within the selected case and article, employ open coding processes:
 - a. Code as nodes
 - b. Code entire sentences
 - c. Code for context, when appropriate
 - d. Code for all terms used to describe the particular case
5. It is at the coders’ discretion for which to code for and not to code for, based on discussions among the coders and in line with the above proposed research objectives, as agreed upon by the coders.
6. Due to working collaboratively in two different NVivo files, the coders shall utilise ANNOTATIONS (instead of MEMOS as they are not include when merging files) to:
 - a. Preserve thinking with regard to the rational for choosing a particular code (if necessary)
 - b. Preserve and suggest future thinking for analysis
 - c. Put forward emerging concepts
7. One should also code for all examples that are expressed in the article in relation to the sharing economy (or related models).

References

1. Watts, J. We have 12 years to limit climate change catastrophe, warns UN. *The Guardian*, 8 October 2018.
2. Intergovernmental Panel on Climate Change. *Global Warming of 1.5 °C: An IPCC Special Report on the Impacts of Global Warming of 1.5 °C above Pre-Industrial Levels And Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty*; Intergovernmental Panel on Climate Change: Geneva, Switzerland, 2018.
3. WWF. *Living Planet Report—2018: Aiming Higher*; WWF: Gland, Switzerland, 2018.
4. Mont, O. Clarifying the concept of product–service system. *J. Clean. Prod.* **2002**, *10*, 237–245.
5. Bardhi, F.; Eckhardt, G.M. Access-Based Consumption: The Case of Car Sharing: Table 1. *J. Consum. Res.* **2012**, *39*, 881–898.
6. Belk, R. You are what you can access: Sharing and collaborative consumption online. *J. Bus. Res.* **2014**, *67*, 1595–1600.
7. Botsman, R.; Rogers, R. *What's Mine Is Yours: The Rise of Collaborative Consumption*; Harper Collins: New York City, USA, 2010; ISBN 978-0-06-201405-4.
8. Lambertson, C.P.; Rose, R.L. When Is Ours Better Than Mine? A Framework for Understanding and Altering Participation in Commercial Sharing Systems. *J. Mark.* **2012**, *76*, 109–125.
9. Mont, O.; Plepys, A. Sustainable consumption progress: Should we be proud or alarmed? *J. Clean. Prod.* **2008**, *16*, 531–537.
10. Martin, C.J. The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism? *Ecol. Econ.* **2016**, *121*, 149–159.
11. Light, A.; Miskelly, C. Sharing economy vs sharing cultures? Designing for social, economic and environmental good. *Interact. Des. Archit.* **2015**, *24*, 49–62.
12. Harmaala, M.-M. The sharing city as a platform for a more sustainable city environment? *Int. J. Environ. Health* **2015**, *7*, 309–328.
13. Heinrichs, H. Sharing economy: A potential new pathway to sustainability. *GAIA-Ecol. Perspect. Sci. Soc.* **2013**, *22*, 228–231.
14. Ala-Mantila, S.; Ottelin, J.; Heinonen, J.; Junnila, S. To each their own? The greenhouse gas impacts of intra-household sharing in different urban zones. *J. Clean. Prod.* **2016**, *135*, 356–367.
15. de Leeuw, T.; Gössling, T. Theorizing change revisited: An amended process model of institutional innovations and changes in institutional fields. *J. Clean. Prod.* **2016**, *135*, 435–448.
16. Cohen, B.; Kietzmann, J. Ride On! Mobility Business Models for the Sharing Economy. *Organ. Environ.* **2014**, *27*, 279–296.
17. Hobson, K.; Lynch, N. Diversifying and de-growing the circular economy: Radical social transformation in a resource-scarce world. *Futures* **2016**, *82*, 15–25.
18. Kathan, W.; Matzler, K.; Veider, V. The sharing economy: Your business model's friend or foe? *Bus. Horiz.* **2016**, *59*, 663–672.
19. Seegebarth, B.; Peyer, M.; Balderjahn, I.; Wiedmann, K.-P. The Sustainability Roots of Anticonsumption Lifestyles and Initial Insights Regarding Their Effects on Consumers' Well-Being. *J. Consum. Aff.* **2016**, *50*, 68–99.
20. Belk, R. Sharing versus pseudo-sharing in Web 2.0. *Anthropologist* **2014**, *18*, 7–23.
21. Richardson, L. Performing the sharing economy. *Geoforum* **2015**, *67*, 121–129.
22. Habibi, M.R.; Davidson, A.; Laroche, M. What managers should know about the sharing economy. *Bus. Horiz.* **2017**, *60*, 113–121.
23. Barta, K.; Neff, G. Technologies for Sharing: Lessons from Quantified Self about the political economy of platforms. *Inf. Commun. Soc.* **2016**, *19*, 518–531.
24. Ukolov, V.F.; Solomatin, A.V.; Solomatin, Y.V. Food-Sharing Economy Pattern Comparison in UK and Russian Markets. *Int. Bus. Manag.* **2016**, *10*, 4268–4282.
25. Aloni, E. Pluralizing the “sharing” economy. *Wash. Law Rev.* **2016**, *91*, 1397–1459.
26. Belk, R. Accept no substitutes: A reply to Arnould and Rose. *Mark. Theory* **2016**, *16*, 143–149.
27. Musulin, K. Report: 51% of City Residents have Mixed Feelings about the Sharing Economy. Available online: <https://www.smartcitiesdive.com/news/report-51-of-city-residents-have-mixed-feelings-about-the-sharing-economy/509932/> (accessed on 12 September 2018).

28. Horne, R. Sharing Economy Sounds Caring, but Let's Put it to the Ethical City Test. Available online: <http://theconversation.com/sharing-economy-sounds-caring-but-lets-put-it-to-the-ethical-city-test-87165> (accessed on 12 September 2018).
29. Jericho, G. The Dark Side of Uber: Why the Sharing Economy Needs Tougher Rules | Greg Jericho. *The Guardian*, 18 April 2016.
30. Price, J.A. Sharing: The Integration of Intimate Economies. *Anthropologica* **1975**, *17*, 3–27.
31. Belk, R. Sharing. *J. Consum. Res.* **2010**, *36*, 715–734.
32. John, N.A. The Social Logics of Sharing. *Commun. Rev.* **2013**, *16*, 113–131.
33. Fagerström, A.; Pawar, S.; Sigurdsson, V.; Foxall, G.R.; Yani-de-Soriano, M. That personal profile image might jeopardize your rental opportunity! On the relative impact of the seller's facial expressions upon buying behavior on Airbnb™. *Comput. Hum. Behav.* **2017**, *72*, 123–131.
34. Fang, B.; Qiang, Y.; Law, R. Effect of sharing economy on tourism industry employment. *Ann. Tour. Res.* **2016**, *57*, 234–278.
35. Heo, C.Y. Sharing economy and prospects in tourism research. *Ann. Tour. Res.* **2016**, *58*, 166–170.
36. Nerinckx, S. The 'Uberization' of the labour market: Some thoughts from an employment law perspective on the collaborative economy. *ERA Forum* **2016**, *17*, 245–265.
37. Phipps, M.; Ozanne, L.K.; Luchs, M.G.; Subrahmanyam, S.; Kapitan, S.; Catlin, J.R.; Gau, R.; Naylor, R.W.; Rose, R.L.; Simpson, B.; et al. Understanding the inherent complexity of sustainable consumption: A social cognitive framework. *J. Bus. Res.* **2013**, *66*, 1227–1234.
38. Bonciu, F.; Balgar, A.-C. Sharing Economy as a Contributor to Sustainable Growth, an EU Perspective. *Rom. J. Eur. Aff.* **2016**, *16*, 36.
39. Kopnina, H. Sustainability: New strategic thinking for business. *Environ. Dev. Sustain.* **2017**, *19*, 27–43.
40. Laamanen, M.; Wahlen, S.; Campana, M. Mobilising collaborative consumption lifestyles: A comparative frame analysis of time banking: Mobilising collaborative consumption lifestyles. *Int. J. Consum. Stud.* **2015**, *39*, 459–467.
41. Munkøe, M.M. Regulating the European Sharing Economy: State of Play and Challenges. *Intereconomics* **2017**, *52*, 38–44.
42. Barnes, S.J.; Mattsson, J. Understanding current and future issues in collaborative consumption: A four-stage Delphi study. *Technol. Forecast. Soc. Chang.* **2016**, *104*, 200–211.
43. Cheng, M. Current sharing economy media discourse in tourism. *Ann. Tour. Res.* **2016**, *60*, 111–114.
44. Hamari, J.; Sjöklint, M.; Ukkonen, A. The sharing economy: Why people participate in collaborative consumption. *J. Assoc. Inf. Sci. Technol.* **2016**, *67*, 2047–2059.
45. Shaheen, S.; Chan, N.D.; Gaynor, T. Casual carpooling in the San Francisco Bay Area: Understanding user characteristics, behaviors, and motivations. *Transp. Policy* **2016**, *51*, 165–173.
46. Bálint, D.; Trócsányi, A. New ways of mobility: The birth of ridesharing. A case study from Hungary. *Hung. Geogr. Bull.* **2016**, *65*, 391–405.
47. Herbert, M.; Collin-Lachaud, I. Collaborative practices and consumerist habitus: An analysis of the transformative mechanisms of collaborative consumption. *Rech. Appl. En Mark. Engl. Ed.* **2017**, *32*, 40–60.
48. Schor, J.B.; Fitzmaurice, C.; Carfagna, L.B.; Attwood-Charles, W.; Poteat, E.D. Paradoxes of openness and distinction in the sharing economy. *Poetics* **2016**, *54*, 66–81.
49. Rahman, K.S. The Shape of Things to Come: The On-Demand Economy and the Normative Stakes of Regulating 21st-century Capitalism. *Eur. J. Risk Regul.* **2016**, *7*, 652–663.
50. Martin, C.J.; Upham, P.; Budd, L. Commercial orientation in grassroots social innovation: Insights from the sharing economy. *Ecol. Econ.* **2015**, *118*, 240–251.
51. Banning, M.E. Shared entanglements—Web 2.0, info-liberalism & digital sharing. *Inf. Commun. Soc.* **2016**, *19*, 489–503.
52. Kerremans, D. *A Web of New Words. A Corpus-Based Study of the Conventionalization Process of English Neologisms*; Peter Lang: Frankfurt, Germany, 2016; Volume 15; ISBN 978-3-631-65578-8.
53. Schmid, H.-J. New Words in the Mind: Concept-formation and Entrenchment of Neologisms. *Angl. Z. Engl. Philol.* **2008**, *126*, 1–36.
54. Acquier, A.; Daudigeos, T.; Pinkse, J. Promises and paradoxes of the sharing economy: An organizing framework. *Technol. Forecast. Soc. Chang.* **2017**, *125*, 1–10.
55. Murillo, D.; Buckland, H.; Val, E. When the sharing economy becomes neoliberalism on steroids: Unravelling the controversies. *Technol. Forecast. Soc. Chang.* **2017**, *125*, 66–76.

56. Frenken, K.; Schor, J. Putting the sharing economy into perspective. *Environ. Innov. Soc. Transit.* **2017**, *23*, 3–10.
57. Keathley-Herring, H.; Van Aken, E.; Gonzalez-Aleu, F.; Deschamps, F.; Letens, G.; Orlandini, P.C. Assessing the maturity of a research area: Bibliometric review and proposed framework. *Scientometrics* **2016**, *109*, 927–951.
58. Randhawa, K.; Wilden, R.; Hohberger, J. A Bibliometric Review of Open Innovation: Setting a Research Agenda. *J. Prod. Innov. Manag.* **2016**, *33*, 750–772.
59. Corbin, J.; Strauss, A. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*; SAGE: Newcastle upon Tyne, UK, 2015; ISBN 978-1-4129-9746-1.
60. Bazeley, P.; Jackson, K. *Qualitative Data Analysis with NVivo*; SAGE: Newcastle upon Tyne, UK, 2013; ISBN 978-1-4462-8247-2.
61. Nie, K.; Ma, T.; Nakamori, Y. An approach to aid understanding emerging research fields—the case of knowledge management. *Syst. Res. Behav. Sci.* **2009**, *26*, 629–643.
62. Mongeon, P.; Paul-Hus, A. The journal coverage of Web of Science and Scopus: A comparative analysis. *Scientometrics* **2015**, *106*, 213–228.
63. Weitzman, M.L. *The Share Economy: Conquering Stagflation*; Harvard University Press: Cambridge, MA, USA, 1984; ISBN 978-0-674-80583-5.
64. Richter, C.; Kraus, S.; Syrjä, P. The shareeconomy as a precursor for digital entrepreneurship business models. *Int. J. Entrep. Small Bus.* **2015**, *25*, 18–35.
65. Schreier, M. *Qualitative Content Analysis in Practice*; SAGE: Newcastle upon Tyne, UK, 2012; ISBN 978-1-4462-8992-1.
66. Kenny, M.; Fourie, R. Contrasting classic, straussian, and constructivist grounded theory: Methodological and philosophical conflicts. *Qual. Rep.* **2015**, *20*, 1270–1289.
67. Miles, M.B.; Huberman, A.M.; Saldana, J. *Qualitative Data Analysis*; SAGE: Newcastle upon Tyne, UK, 2013; ISBN 978-1-4522-5787-7.
68. Boldermo, S.; Ødegaard, E.E. What about the Migrant Children? The State-Of-The-Art in Research Claiming Social Sustainability. *Sustainability* **2019**, *11*, 459.
69. Pearce, T.D.; Rodríguez, E.H.; Fawcett, D.; Ford, J.D. How Is Australia Adapting to Climate Change Based on a Systematic Review? *Sustainability* **2018**, *10*, 3280.
70. Camacho-Otero, J.; Boks, C.; Pettersen, I.N. Consumption in the Circular Economy: A Literature Review. *Sustainability* **2018**, *10*, 2758.
71. Escarcha, J.F.; Lassa, J.A.; Zander, K.K. Livestock under Climate Change: A Systematic Review of Impacts and Adaptation. *Climate* **2018**, *6*, 54.
72. Landis, J.R.; Koch, G.G. The Measurement of Observer Agreement for Categorical Data. *Biometrics* **1977**, *33*, 159–174.
73. Apteekar, S. Gifts Among Strangers: The Social Organization of Freecycle Giving. *Soc. Probl.* **2016**, *63*, 266–283.
74. Cohen, B.; Muñoz, P. Sharing cities and sustainable consumption and production: Towards an integrated framework. *J. Clean. Prod.* **2016**, *134*, 87–97.
75. Leighton, P. Professional self-employment, new power and the sharing economy: Some cautionary tales from Uber. *J. Manag. Organ.* **2016**, *22*, 859–874.
76. Morgan, B.; Kuch, D. Radical Transactionalism: Legal Consciousness, Diverse Economies, and the Sharing Economy. *J. Law Soc.* **2015**, *42*, 556–587.
77. Posen, H.A. Ridesharing in the Sharing Economy: Should Regulators Impose Uber Regulations on Uber Notes. *Iowa Law Rev.* **2015**, *101*, 405–434.
78. Heylighen, F. Towards an intelligent network for matching offer and demand: From the sharing economy to the global brain. *Technol. Forecast. Soc. Chang.* **2017**, *114*, 74–85.
79. Butenko, A. Sharing Energy. *Eur. J. Risk Regul.* **2016**, *7*, 701–716.
80. Matzler, K.; Veider, V.; Kathan, W. Adapting to the Sharing Economy. *MIT Sloan Manag. Rev.* **2015**, *2015*, 70–77.
81. Tussyadiah, I.P. Factors of satisfaction and intention to use peer-to-peer accommodation. *Int. J. Hosp. Manag.* **2016**, *55*, 70–80.
82. May, S.; Königsson, M.; Holmstrom, J. Unlocking the sharing economy: Investigating the barriers for the sharing economy in a city context. *First Monday* **2017**, *22*, doi:10.5210/fm.v22i2.7110.

83. Miller, S.R. First Principles for Regulating the Sharing Economy. *Harv. J. Legis.* **2016**, *53*, 147.
84. Puschmann, T.; Alt, R. Sharing Economy. *Bus. Inf. Syst. Eng.* **2016**, *58*, 93–99.
85. Santana, J.; Parigi, P. Risk Aversion and Engagement in the Sharing Economy. *Games* **2015**, *6*, 560–573.
86. Aznar, J.; Sayeras, J.M.; Rocafort, A.; Galiana, J. The irruption of AirBNB and its effects on hotels' profitability: An analysis of Barcelona's hotel sector. *Intang. Cap.* **2017**, *13*, 147.
87. Brescia, R.H. Uber for Lawyers: The Transformative Potential of a Sharing Economy Approach to the Delivery of Legal Services. *Buff. Rev.* **2016**, *64*, 745.
88. Aznar, J.; Sayeras, J.; Galiana, J.; Rocafort, A. Sustainability Commitment, New Competitors' Presence, and Hotel Performance: The Hotel Industry in Barcelona. *Sustainability* **2016**, *8*, 755.
89. Bucher, E.; Fieseler, C.; Lutz, C. What's mine is yours (for a nominal fee)—Exploring the spectrum of utilitarian to altruistic motives for Internet-mediated sharing. *Comput. Hum. Behav.* **2016**, *62*, 316–326.
90. Cartwright, A. Dynamic property rights and the market process. *J. Entrep. Public Policy* **2016**, *5*, 273–284.
91. Hatzopoulos, V.; Roma, S. Caring for sharing? The collaborative economy under EU law. *Common Mark. Law Rev.* **2017**, *54*, 81–127.
92. Huefner, R.J. The sharing economy: Implications for revenue management. *J. Revenue Pricing Manag.* **2015**, *14*, 296–298.
93. Cheng, M. Sharing economy: A review and agenda for future research. *Int. J. Hosp. Manag.* **2016**, *57*, 60–70.
94. Pera, R.; Viglia, G.; Furlan, R. Who Am I? How Compelling Self-storytelling Builds Digital Personal Reputation. *J. Interact. Mark.* **2016**, *35*, 44–55.
95. Szetela, B.; Mentel, G. May the sharing economy create a new wave of globalization? *World Econ. Int. Econ. Relat.* **2016**, *161*, 31–34.
96. Shaheen, S.; Chan, N. Mobility and the Sharing Economy: Potential to Facilitate the First- and Last-Mile Public Transit Connections. *Built Environ.* **2016**, *42*, 573–588.
97. Campbell, C. China's Bike-Sharing Fever Has Reached Saturation Point. Available online: <http://time.com/5218323/china-bicycles-sharing-economy/> (accessed on Sep 7, 2018).
98. Choi, H.R.; Cho, M.J.; Kangbae, L.; Soon, G.H.; Chae, R.W. The Business Model for the Sharing Economy between SMEs. *WSEAS Trans. Bus. Econ.* **2014**, *11*, 625–634.
99. Sinclair, M. Fair and Efficient Regulation of the Sharing Economy. *Econ. Aff.* **2016**, *36*, 204–211.
100. Dredge, D.; Gyimóthy, S. The collaborative economy and tourism: Critical perspectives, questionable claims and silenced voices. *Tour. Recreat. Res.* **2015**, *40*, 286–302.
101. Milanova, V.; Maas, P. Sharing intangibles: Uncovering individual motives for engagement in a sharing service setting. *J. Bus. Res.* **2017**, *75*, 159–171.
102. Möhlmann, M. Collaborative consumption: Determinants of satisfaction and the likelihood of using a sharing economy option again: Collaborative consumption-determinants of satisfaction and the likelihood of using a sharing economy option again. *J. Consum. Behav.* **2015**, *14*, 193–207.
103. Lee, J.Y. Trust and Social Commerce. *Univ. Pittsburgh Law Rev.* **2016**, *77*, 137–181.
104. Ert, E.; Fleischer, A.; Magen, N. Trust and reputation in the sharing economy: The role of personal photos in Airbnb. *Tour. Manag.* **2016**, *55*, 62–73.
105. Yang, S.; Song, Y.; Chen, S.; Xia, X. Why are customers loyal in sharing-economy services? A relational benefits perspective. *J. Serv. Mark.* **2017**, *31*, 48–62.
106. Ballús-Armet, I.; Shaheen, S.; Clonts, K.; Weinzimmer, D. Peer-to-Peer Carsharing: Exploring Public Perception and Market Characteristics in the San Francisco Bay Area, California. *Transp. Res. Rec. J. Transp. Res. Board* **2014**, *2416*, 27–36.
107. Polackova, L.; Poto, M. Responses to Food Waste in a Sharing Economy—We have fully transitioned to a participatory culture, and digital technology is key driver of that transition. *Rev. Direito Cid.* **2017**, *9*, 182–197.
108. Philip, H.E.; Ozanne, L.K.; Ballantine, P.W. Examining temporary disposition and acquisition in peer-to-peer renting. *J. Mark. Manag.* **2015**, *31*, 1310–1332.
109. Henten, A.H.; Windekilde, I.M. Transaction costs and the sharing economy. *info* **2016**, *18*, 1–15.
110. King, S.P. Sharing Economy: What Challenges for Competition Law? *J. Eur. Compet. Law Pract.* **2015**, *6*, 729–734.
111. Kung, L.-C.; Zhong, G.-Y. The optimal pricing strategy for two-sided platform delivery in the sharing economy. *Transp. Res. Part E Logist. Transp. Rev.* **2017**, *101*, 1–12.

112. Lougher, G.; Kalmanowicz, S. EU Competition Law in the Sharing Economy. *J. Eur. Compet. Law Pract.* **2016**, *7*, 87–102.
113. Pisano, P.; Pironti, M.; Rieple, A. Identify Innovative Business Models: Can Innovative Business Models Enable Players to React to Ongoing or Unpredictable Trends? *Entrep. Res. J.* **2015**, *5*.
114. Weber, T.A. Intermediation in a Sharing Economy: Insurance, Moral Hazard, and Rent Extraction. *J. Manag. Inf. Syst.* **2014**, *31*, 35–71.
115. Fuentes-Bracamontes, R. Is unbundling electricity services the way forward for the power sector? *Electr. J.* **2016**, *29*, 16–20.
116. Kim, S.; Yoon, Y. Recommendation system for sharing economy based on multidimensional trust model. *Multimed. Tools Appl.* **2016**, *75*, 15297–15310.
117. Liang, S.; Schuckert, M.; Law, R.; Chen, C.-C. Be a “Superhost”: The importance of badge systems for peer-to-peer rental accommodations. *Tour. Manag.* **2017**, *60*, 454–465.
118. Doménech-Pascual, G. Sharing Economy and Regulatory Strategies towards Legal Change. *Eur. J. Risk Regul.* **2016**, *7*, 717–727.
119. Begum, L.; Anjum, M. Beyond the creative class, mapping the collaborative economy of Bangladeshi creative industries: Case study of Oitij-jo. *South Asian Pop. Cult.* **2016**, *14*, 137–153.
120. Cocchia, A. Smart and Digital City: A Systematic Literature Review. In *Smart City*; Dameri, R.P., Rosenthal-Sabroux, C., Eds.; Springer International Publishing: Cham, Germany, 2014; pp. 13–43, ISBN 978-3-319-06159-7.
121. Gregory, A.; Half, G. Understanding public relations in the ‘sharing economy.’ *Public Relat. Rev.* **2017**, *43*, 4–13.
122. McArthur, E. Many-to-many exchange without money: Why people share their resources. *Consum. Mark. Cult.* **2015**, *18*, 239–256.
123. Bauer, R.M.; Gegenhuber, T. Crowdsourcing: Global search and the twisted roles of consumers and producers. *Organization* **2015**, *22*, 661–681.
124. Teubner, T.; Flath, C.M. The Economics of Multi-Hop Ride Sharing: Creating New Mobility Networks Through IS. *Bus. Inf. Syst. Eng.* **2015**, *57*, 311–324.
125. Wang, D.; Nicolau, J.L. Price determinants of sharing economy based accommodation rental: A study of listings from 33 cities on Airbnb.com. *Int. J. Hosp. Manag.* **2017**, *62*, 120–131.
126. Catulli, M. What uncertainty? Further insight into why consumers might be distrustful of product service systems. *J. Manuf. Technol. Manag.* **2012**, *23*, 780–793.
127. Ceschin, F. Critical factors for implementing and diffusing sustainable product-Service systems: Insights from innovation studies and companies’ experiences. *J. Clean. Prod.* **2013**, *45*, 74–88.
128. Retamal, M. Product-service systems in Southeast Asia: Business practices and factors influencing environmental sustainability. *J. Clean. Prod.* **2017**, *143*, 894–903.
129. Tham, A. When Harry met Sally: Different approaches towards Uber and AirBnB—An Australian and Singapore perspective. *Inf. Technol. Tour.* **2016**, *16*, 393–412.
130. Zurek, K. Food Sharing in Europe: Between Regulating Risks and the Risks of Regulating. *Eur. J. Risk Regul.* **2016**, *7*, 675–687.
131. Cockayne, D.G. Sharing and neoliberal discourse: The economic function of sharing in the digital on-demand economy. *Geoforum* **2016**, *77*, 73–82.
132. Whitham, M.M.; Clarke, H. Getting is Giving: Time Banking as Formalized Generalized Exchange: Time Banking as Generalized Exchange. *Sociol. Compass* **2016**, *10*, 87–97.
133. Gargiulo, E.; Giannantonio, R.; Guercio, E.; Borean, C.; Zenezini, G. Dynamic Ride Sharing Service: Are Users Ready to Adopt it? *Procedia Manuf.* **2015**, *3*, 777–784.
134. Esposito, M.; Tse, T.; Soufani, K. Is the Circular Economy a New Fast-Expanding Market? Identifying Fast Expanding Markets. *Thunderbird Int. Bus. Rev.* **2017**, *59*, 9–14.
135. McNeill, D. Governing a city of unicorns: Technology capital and the urban politics of San Francisco. *Urban Geogr.* **2016**, *37*, 494–513.
136. Forgacs, G.; Dimanche, F. Revenue challenges for hotels in the sharing economy: Facing the Airbnb menace. *J. Revenue Pricing Manag.* **2016**, *15*, 509–515.
137. Hwang, J.; Hwang, J.; Griffiths, M.A.; Griffiths, M.A. Share more, drive less: Millennials value perception and behavioral intent in using collaborative consumption services. *J. Consum. Mark.* **2017**, *34*, 132–146.

138. Ndubisi, N.O.; Ehret, M.; Wirtz, J. Relational Governance Mechanisms and Uncertainties in Nonownership Services: Relational governance mechanisms. *Psychol. Mark.* **2016**, *33*, 250–266.
139. Kennedy, J. Conceptual boundaries of sharing. *Inf. Commun. Soc.* **2016**, *19*, 461–474.
140. De Stefano, V. The Rise of the Just-in-Time Workforce: On-Demand Work, Crowdwork, and Labor Protection in the Gig-Economy. *Comp. Labor Law Policy J.* **2015**, *37*, 471–504.
141. Albinsson, P.A.; Yasanthi Perera, B. Alternative marketplaces in the 21st century: Building community through sharing events: Alternative marketplaces in the 21st century. *J. Consum. Behav.* **2012**, *11*, 303–315.
142. Rowe, B.M.; Levine, D.P. *A Concise Introduction to Linguistics*; 4th ed.; Pearson: Boston, 2014; ISBN 978-0-13-381121-6.
143. Glynos, J.; Howarth, D.; Norval, A.; Speed, E. *ESRC National Centre for Research Methods Review Paper*; National Centre for Research Methods: Essex, United Kingdom, 2009; p. 41.



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Article II





Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Sharing economy business models for sustainability

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ARTICLE INFO

Article history:

Received 7 August 2019

Received in revised form

27 March 2020

Accepted 3 April 2020

Available online 25 April 2020

Handling Editor: Yutao Wang

Keywords:

Sharing economy

Sustainable business models

Sustainable consumption

Morphological analysis

ABSTRACT

Background: The predominant focus of academic research on the sharing economy has been on Airbnb and Uber; to this extent, the diversity of business models ascribed to the sharing economy has not yet been sufficiently explored. Greater conceptual and empirical research is needed to increase understanding of business models in the sharing economy, particularly attributes that deliver on its purported sustainability potential.

Objective: We aimed to elaborate an improved sharing economy business modelling tool intended to support the design and implementation of sharing economy business models (SEBMs) with improved sustainability performance.

Methods: We used a structured approach to business modelling, morphological analysis, to articulate relevant business model attributes. Our analysis was informed by a narrative literature review of business and platform models in the sharing economy. We also iteratively tested, refined, and evaluated our analysis through three structured opportunities for feedback.

Results: The output of the morphological analysis was a sharing economy business modelling tool for sustainability, with stipulated preconditions and descriptions of all business model attributes.

Conclusion: The sharing economy is not sustainable by default, so we must be strategic and deliberate in how we design and implement SEBMs. The sharing economy business modelling tool should be of interest not only to researchers and practitioners, but also to advocacy organisations and policymakers who are concerned about the sustainability performance of sharing platforms.

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1. Introduction

The sharing economy is a phenomenon where new business models are emerging, framed as technology-mediated (Hamari et al., 2016), facilitating access to under-utilised goods or services (Habibi et al., 2017; Harmaala, 2015), and potentially reducing net consumption (Frenken and Schor, 2017). While sharing has been a longstanding practice in society, the sharing economy is used as an umbrella term for a broad range of disparate consumption practices and organisational models (Dreyer et al., 2017; Guyader and Piscicelli, 2019; Habibi et al., 2017) that include sharing, renting, borrowing, lending, bartering, swapping, trading, exchanging, gifting, buying second-hand, and even buying new goods. Such a sweeping understanding of the term "...can result in detrimental outcomes for managers and practitioners..." (Habibi et al., 2017, p. 115). This semantic confusion (Belk, 2014b; Habibi et al., 2017; L.

Richardson, 2015) makes it difficult to design or implement sharing economy business models (SEBMs). In addition, it is difficult to claim that the sharing economy – with all its divergent practices – reduces net consumption.

Despite this, academics, media, practitioners, and policymakers often promote the sharing economy as contributing to more sustainable consumption (Hassanli et al., 2019; Heinrichs, 2013; Martin, 2016). By facilitating access to goods instead of ownership, it is argued that net consumption is reduced (Belk, 2014a; Seegebarth et al., 2016), reducing net production and improving material efficiency, as well as providing other economic and social benefits (Acquier et al., 2017; Hamari et al., 2016; Laukkanen and Tura, 2020). This may reduce resource use and greenhouse gas emissions (Cherry and Pidgeon, 2018; Schor, 2016). Conversely, the sharing economy may contribute negatively to sustainability outcomes due to negative rebound effects (Kathan et al., 2016; Schor, 2016) – net consumption may increase (Denegri-Knott, 2011; Parguel et al., 2017; Piepys and Singh, 2019) and current sharing practices may lead to adverse social and environmental impacts (Ma et al., 2018; Retamal, 2017). For example, Airbnb is blamed for increased housing prices, depleting

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local housing stock, and gentrification, as well as displacement of local communities (Muñoz and Cohen, 2018). Uber and Lyft are said to increase congestion (Plante, 2019) and contribute to greater air pollution (Keating, 2019). The sharing economy is not sustainable by default, so we must be deliberate and strategic in how we design and implement SEBMs for sustainability.

Tools and methods for business modelling are scarce and rarely elevate sustainability as a driver (Geissdoerfer et al., 2018). In response, recent academic work has focused on tool development to support business model innovation at the organisational level (Bocken et al., 2013; Breuer et al., 2018; Geissdoerfer et al., 2016; Joyce and Paquin, 2016; Yang et al., 2017). While research has focused on design of sustainable business models to some extent (Breuer et al., 2018), there are few examples of successful implementation of sustainable business models (Ritala et al., 2018). Literature identifies a design-implementation gap (Baldassarre et al., 2020; Geissdoerfer et al., 2018), which must be bridged in order to realise any sustainability impact.

No tool currently exists to support sustainable business model innovation at the organisational level within the sharing economy. Therefore, our aim is to elaborate an improved sharing economy business modelling tool intended to support the design and implementation of SEBMs for improved sustainability performance. In doing so, we hope to make two contributions: 1) to advance research in sustainable business model innovation and sustainable consumption in the context of the sharing economy, and 2) to support practitioners, advocacy organisations, and policymakers motivated by sustainability to design, implement, communicate, support, or regulate the sharing economy. Our approach is prescriptive and conceptual from the field of interdisciplinary sustainability science. We define a sharing economy for sustainability as a socio-economic system that leverages technology to mediate two-sided markets, which facilitate temporary access to goods that are under-utilised, tangible, and rivalrous (Curtis and Lehner, 2019). We develop a sharing economy business modelling tool using morphological analysis (Kwon et al., 2019). The resulting analysis produces a morphological box, presented as a “customary tool to describe business model possibilities holistically” (Müller and Welpe, 2018, p. 499).

In the remainder of this article, we review existing literature on business models (Section 2.1) and benchmark other SEBM conceptualisations, particularly their treatment of sustainability (Section 2.2). We share our conceptualisation of SEBMs for sustainability (Section 2.3). We describe our methodology (Section 3) and present preconditions that scope those business and consumption practices (Section 4.1) relevant for our sharing economy business modelling tool for sustainability (Section 4.2). Finally, we review our process for testing and evaluating the tool (Section 5) and discuss its implications for sustainable business model and sustainable consumption literature (Section 6).

2. Background literature

2.1. Business models

In its simplest understanding, a business model is an abstract representation of the activities and function of a business (Osterwalder et al., 2005; Teece, 2010; Wirtz et al., 2016), but definitions of the business model concept vary across literature (Geissdoerfer et al., 2018; Massa et al., 2017; Zott et al., 2011). We see the business model as a depiction – or representation – of specific business model attributes and the choices made by organisations in how they do business (Massa et al., 2017).

Those authors that describe business models in this way often propose dimensions of a business model as value proposition, value

creation and delivery, and value capture (Bocken et al., 2014; Osterwalder et al., 2005; J. Richardson, 2008; Short et al., 2014). Broadly speaking, value proposition describes the product/service offering, the customer segments, and their relationship with the business (Osterwalder et al., 2005; Osterwalder and Pigneur, 2010). Value creation and delivery describe the channels for how value is provided to customers, including the structure and activities in the value chain (Osterwalder and Pigneur, 2010). Value capture describes the various revenue streams available to capture economic value through the provision of goods, services, or information (Teece, 2010). Thus, value plays a central role in business modelling, which in turn depicts the structure and activities in the value chain (Chesbrough and Rosenbloom, 2002).

A growing body of literature on sustainable business models also emphasises the need to explore value capture of other forms of value, e.g. social and environmental (Bocken et al., 2013; Boons and Lüdeke-Freund, 2013; Schaltegger et al., 2016). A sustainable business model is a “holistic value logic” (Evans et al., 2014), which aligns the interest of all stakeholders – including the environment and society (Bocken et al., 2014) – to create, deliver, and capture economic, environmental, and social value (Geissdoerfer et al., 2016). In this way, we suggest sustainable business models describe how businesses, non-traditional organisations and grassroots initiatives function in order to reduce negative environmental and social impacts, while maintaining economic viability. Bocken et al. (2014) suggests sustainable business models may facilitate access to under-utilised assets or deliver function rather than ownership – both exemplified by SEBMs. However, since SEBMs do not reduce negative environmental and social impacts by default, it is important to devise business modelling tools that can assist in the task of designing and implementing SEBMs for improved sustainability performance.

2.2. Benchmarking SEBM conceptualisations

There are few comprehensive SEBM conceptualisations that can be operationalised to support the design and implementation of sharing platforms, particularly considering sustainability. Early efforts to conceptualise business models in the sharing economy have resulted in diverse and often conflicting typologies, classifications, taxonomies, frameworks and tools (Chasin et al., 2018; Lobbers et al., 2017; Muñoz and Cohen, 2018; Plewnia and Guenther, 2018; Ritter and Schanz, 2019; Täuscher and Laudien, 2018). This is likely the result of continued semantic confusion and data sources indiscriminate of “all activities currently uncomfortably corralled under the term ‘sharing economy’” (Davies et al., 2017, p. 210). Our review of several of the most cited articles that conceptualise SEBMs (Table 1) enabled us to identify several areas for improvement to support the design and implementation of SEBMs.

2.2.1. The need for a prescriptive and coherent definition of the sharing economy

The lack of definitional clarity of the sharing economy leads to conflicting research contributions and disparate conceptualisations of SEBMs. Some authors choose not to define the sharing economy at all (Plewnia and Guenther, 2018), while others depart from a definition but fail to apply it consistently throughout their work. For example, Muñoz and Cohen (2018, p. 115) state that the sharing economy must aim to optimise under-utilised resources, but their proposed tool includes optimising the use of new resources – using Etsy and InstaCart as examples to exemplify their tool – which contradicts their stated definition. Etsy is an e-commerce website that facilitates distribution of artisanal products for sale, and InstaCart is an online grocery delivery platform facilitating home deliveries between local grocery stores and shoppers. These

Table 1
Overview of conceptualisations of sharing economy business models.

Article	Aim/Purpose	Data	Sustainability Incorporated into Conceptualisation	Contribution
Ritter and Schanz (2019)	"This study aims to review and categorize the field of sharing economy business model research..."	131 academic articles	No	Conceptual <i>framework</i> of the sharing economy, which classifies four ideal-type market segments of the sharing economy: singular transaction models, subscription-based models, commission-based platforms and unlimited platforms.
Chasin et al. (2018)	"[O]ur research aims to develop and evaluate a taxonomy for [peer-to-peer] [sharing and collaborative consumption] platforms."	Extracted 22,770 examples over a 35-month period from relevant databases. Of these, 522 were classified as pertinent to the study.	Yes	Develops a <i>taxonomy</i> of peer-to-peer sharing and collaborative consumption platforms with ten core dimensions and subsequent characteristics for each dimension. Intended to be used by practitioners and researchers to study the peer-to-peer sharing and collaborative consumption market and its participants.
Muñoz and Cohen (2018)	Aims "to develop a sharing business model artefact" intended to "provid[e] orientation and support the profiling of sharing businesses".	Used over 350 data sources and 36 case studies	Yes	Develops a business modelling <i>tool</i> for the sharing economy constituted as a sharing business model compass. The compass proposes six dimensions, each with three additional aspects. The dimensions include <i>technology, transaction, business approach, shared resources, governance model, and platform type</i> .
Plewnia and Guenther (2018)	"[T]o develop a comprehensive framework that captures the wide range of activities and business models that are considered to be part of the sharing economy."	Reviewed 101 sources, which yielded 43 descriptive schematics. Of those, 24 academic articles and 15 documents from grey literature were used in the analysis.	Yes	Proposes a <i>typology</i> of sharing economy activities, which includes four dimensions and subsequent categories: 1) <i>shared good or service</i> ; 2) <i>market structure</i> ; 3) <i>market orientation</i> ; 4) <i>industry sector</i>
Tauscher and Laudien (2018)	"[A]im at exploring the distinctive types of marketplace business models through a systematic study of their elements"	Evaluate 100 randomly selected marketplaces.	No	Use morphological analysis to develop a <i>framework</i> > that describes key business model attributes of marketplaces, which they include the sharing economy, among others.
Löbbers et al. (2017)	Conduct analysis in the business model domain to allow exploratory research "...that derives a consolidated and synthesized framework for business model generation purposes in the Sharing Economy".	Examined "extant literature"	No	The subsequent analysis arrives at what the researchers call the <i>Sharing Economy Business Development Framework</i> , which takes a canvas approach to explore value creation, delivery, and capture. Furthermore, the framework seeks to consider the embedded business environment, to consider the purpose for sharing and the relevant components for the peer provider, peer consumer and the platform.

examples do not facilitate access to under-utilised resources, instead facilitating transfer of ownership. Therefore, there is a need to use a coherent definition throughout SEBM conceptualisations as well as to greater demarcate those practices included or excluded in the authors' definition of the sharing economy.

2.2.2. The need for greater elaboration of the business model attributes of SEBMs

We have identified several discrepancies across the reviewed conceptualisations. For example, half of the reviewed conceptualisations include business-to-consumer models operating as a one-sided market (Plewania and Guenther, 2018; Ritter and Schanz, 2019; Täuscher and Laudien, 2018) while the others focus on two-sided markets only. The types of shared resources range from physical goods (Chasin et al., 2018; Muñoz and Cohen, 2018) to a broad range of services, such as Uber, Netflix, Wikipedia, food subscription boxes, and the cinema (Ritter and Schanz, 2019). Some conceptualisations include business models that facilitate access to goods, while others include transfer of ownership (e.g. second-hand shops, eBay, Etsy). At times, it is difficult to see the similarities between these disparate business models. Without presenting a coherent definition of the sharing economy, reconciling these discrepancies is further complicated because articles do not adequately describe business model attributes to support the design or implementation by sharing platforms, leaving room for interpretation.

2.2.3. The need to operationalise SEBMs to support sharing platforms, particularly considering sustainability

Finally, only one of the conceptualisations reviewed is intended as a tool, which seeks to incorporate sustainability to an extent (Muñoz and Cohen, 2018). However, this tool does not depart from a coherent definition of the sharing economy, and lacks adequate elaboration to support implementation by sharing platforms (e.g. governance model). While the tool does seek to incorporate sustainability as part of the category to describe *business approach*, this attribute describes the profit and impact objectives of the sharing platform and not the sustainability performance as such (Muñoz and Cohen, 2018). None of the studies we reviewed offer support to design SEBMs for improved sustainability performance.

2.3. Conceptualising sharing economy business models for sustainability

We depart from a normative and consistent definition of a sharing economy for sustainability to address the first area of improvement mentioned above. In previous research, we proposed defining properties of a sharing economy that are most likely to lead to improved sustainability performance (Curtis and Lehner, 2019). We define a sharing economy for sustainability as a socio-economic system that leverages technology to mediate two-sided markets, which facilitate temporary access to goods that are under-utilised, tangible, and rivalrous (Curtis and Lehner, 2019). We use the term 'socio-economic system' to describe the sharing economy phenomenon and broader ecosystem of actors, which include the platform, the users, governments, and other relevant actors. In this way, we align with other authors who also use such terminology to describe the sharing economy (Kennedy, 2016; Lee, 2015; Muñoz and Cohen, 2018; Tussyadiah and Zach, 2017; Wang and Nicolau, 2017). Our definition prioritises the reduction of net resource extraction, reduced greenhouse gas emissions, and enhanced social interaction as a result of sharing.

In line with our stated definition (Curtis and Lehner, 2019), we join others that use the terminology 'sharing platform' to describe the entity facilitating the sharing practice (Akbar and Tracogna,

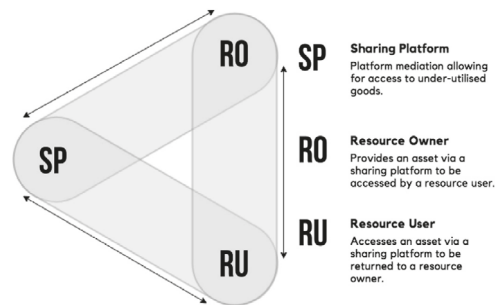


Fig. 1. Actors and their key activities in the sharing economy.

2018; Ciulli and Kolk, 2019; Hou, 2018; Kumar et al., 2018; Piscicelli et al., 2018). This may be any platform (e.g. a business, non-traditional organisation or grassroots initiative) that operates a two-sided business model – also called a triadic business model – that facilitates rather than creates value, as a result of interaction between the supply- and demand-side of the platform (Andreassen et al., 2018; Choudary et al., 2015; Massa et al., 2017). The key activity of a platform is mediating or matchmaking social interactions and economic transactions between two actors (Massa et al., 2017). Platforms do not usually own physical assets involved in the exchange (Fraga-Lamas and Fernández-Caramés, 2019; Vătămănescu and Pinzaru, 2017); instead, they enable or facilitate access to goods and services between actors in the market (Cennamo and Santalo, 2013; Massa et al., 2017; Vătămănescu and Pinzaru, 2017). In general, platforms have limited costs for tangible assets and relatively high investment costs in platform IT infrastructure (Libert et al., 2016). Platforms rely on trust between actors in the two-sided market and, therefore, often implement reputation and review systems to enhance the perception of value delivered by the platform (Andreassen et al., 2018).

Following this reasoning, we define SEBMs as the business model of a sharing platform, which mediates an exchange between a resource owner and a resource user¹ to facilitate temporary access to under-utilised goods (key activity), resulting in a reduction of transaction costs associated with sharing (value proposition). While platform or triadic business models may facilitate access and transfer of ownership, we suggest that SEBMs only facilitate access and not transfer of ownership. SEBMs facilitate value creation by mediating an exchange between a resource owner and resource user, each of which interact with one another and carry out key activities to co-create value on the platform (Fig. 1).

While sustainable business models and SEBMs – the focus of our research – consider the organisational perspective, it is the practice of 'sharing' between the resource owner and resource user that affects the sustainability performance. Hence, the mediated

¹ We use the terms 'resource owner' – the person who grants temporary access to their resources – and 'resource user' – the person who gains temporary access to others' resources – to describe the actors involved in the two-sided market facilitated by the sharing platform. When referring to both actors, we use the term 'user'. Some literature would call the resource owner a 'service provider' and the resource user a 'consumer' (Andreassen et al., 2018; Benoit et al., 2017). From the perspective of the platform, service provider and consumer are clear as to what roles are being fulfilled. However, from the perspective of the resource user, the provider of the shared resource to the user may be the platform or the resource owner, depending on the particular business model.

sharing practice must be considered when assessing the sustainability performance of SEBMs. Any tool must also consider the practice facilitated by the sharing platform, not only the offer of the platform. For example, the practice ‘access over ownership’ is provided as the key condition to realise improved sustainability performance (Light and Miskelly, 2015; Martin, 2016; Muñoz and Cohen, 2018; Ritter and Schanz, 2019). However, access alone is not sufficient to ensure more sustainable consumption practices, especially in a market economy with hyper-competition. Consider the bikesharing boom and bust in China. Beginning in 2016, bike-sharing platforms saturated the market, competing on convenience and availability in accessing shared bikes. This hyper-competition created an artificial overcapacity of under-utilised assets. Consequently, many platforms liquidated and their bikes were discarded in bike graveyards (Taylor, 2018). E-scooter companies are currently exhibiting a similar trajectory of development, which may have grave consequences for the environment. Scooters are not particularly durable; initial reporting suggests the average lifespan of e-scooters to be less than 30 days and 100 trips (Griswold, 2019). While accessing shared resources like bikes and scooters may seem more sustainable, business models that facilitate access may induce unnecessary production and create inefficient overcapacity of shared goods that offset their sustainability potential. Thus, conditions need to be established that focus on the business and consumption practices facilitated by SEBMs to enhance their sustainability performance.

3. Methods

Our work departs from a normative definition of the sharing economy (Curtis and Lehner, 2019). Like the previous conceptualisations, we depart from business model literature describing value creation, value delivery, and value capture (Osterwalder and Pigneur, 2010). We are inspired by the previous work of Plewnia and Guenther (2018), Täuscher and Laudien (2018), and Lüdeke-Freund et al. (2019), using morphological analysis to model sharing economy business models, platform business models, and circular economy business models, respectively. Morphological analysis is a qualitative modelling method to structure and analyse multidimensional objects such as business models (Eriksson and Ritchey, 2002; Lüdeke-Freund et al., 2019; Plewnia and Guenther, 2018). As a method, it is a structured and comprehensive procedure to develop and describe all relevant business model attributes in a given context (Kwon et al., 2019). The analysis results in an artefact, or tool, that is directly useful for practitioners in reflecting on their sharing economy business model choices for sustainability.

Morphological analysis usually undertakes several iterative steps: 1) the identification of dimensions and/or attributes; 2) the identification of alternate conditions to describe all possibilities relevant for each attribute; and 3) the consolidation of these elements into a morphological box or schema, a visual representation and classification system relevant to the analysis (Im and Cho, 2013).

In the first step, we structured our analysis around the dimensions value creation, value delivery, and value capture (Täuscher and Laudien, 2018). We sought to identify relevant business model attributes in relation to these dimensions, so we reviewed academic articles that present a framework or conceptualisation for business models in the sharing economy, platform economy, or circular economy. The output of this step was a list of business model attributes and an initial morphological box to aid in our conceptualisation of each attribute (Appendix A).

In the second step, we expanded our literature sample to better identify and describe the full set of alternate conditions for each

dimension previously identified. We conducted a narrative literature review, which is exploratory and allows more in-depth qualitative insights (Sovacool et al., 2018). We chose this approach to retain flexibility and researcher discretion, as the disparate business models attributed to the sharing economy were in conflict with our conceptualisation of a sharing economy for sustainability.

The literature review was executed on 25 April 2019 using the search query “*sharing economy*” AND [“*business model*” OR “*platform model*”]. The results included 104 academic articles in English. We reviewed the titles, keywords, and abstracts to assess the relevance of each article. From this, we selected 71 articles that promised to discuss business or platform models in the sharing economy, and we obtained full access to 68 of these articles. We used NVivo to abductively code our sample based on the attributes identified in Step One, but we were open to new attributes and alternate conditions as they emerged in our analysis. The output from this step was a further elaborated and advanced morphological box (Appendix B).

In the third step, we sought to test, revise and evaluate the attributes and alternate conditions to arrive at a final morphological box (Section 4). We received feedback on the morphological box from 35 people in three feedback sessions. In addition to the tool, we also presented and shared text describing each business model choice. The feedback sessions took place more or less concurrently, with limited time to revise the schema in between sessions. The first session involved feedback from seven academics researching the sharing economy and/or business models. The feedback from researchers was based on their empirical observations of sharing platforms in Berlin, London, San Francisco, Amsterdam, and Toronto. While their research interests in the sharing economy are diverse (e.g. design of business models, sustainability impacts, and institutionalisation pathways), their feedback drew from experience of interviewing more than 100 sharing platforms in these cities over the last three years.

The second session involved feedback from ten PhD students from our interdisciplinary sustainability department at Lund University. These PhD students were from the research themes *business management and practice*, *sustainable consumption governance*, *urban transformations*, and *policy interventions*. While diverse in their research areas, the different perspectives helped elaborate some choices while reducing conflicting terminology with other areas of research. In the third session, the morphological analysis was presented and received both oral and written feedback from participants of the 4th International Conference on New Business Models in Berlin, Germany in July 2019. Participants responded to prompts and were asked to write down their ideas and feedback. Written feedback was collected from 18 individuals, which was summarised at the end of the interactive presentation and incorporated into the final morphological box.

4. Sharing economy business modelling tool

To address the areas for improvement in existing SEBM conceptualisations, we propose a tool that builds upon previous literature by adding granularity and nuance to advance our understanding of sustainable business models and sustainable consumption in the sharing economy. We developed our tool using morphological analysis to ascertain and describe relevant sharing economy business model attributes that are consistent with our stated definition of a sharing economy for sustainability. The result is the development of a morphological box, which is a visual representation and classification schema, or tool. Our sharing economy business modelling tool describes analysis across three dimensions: value facilitation, value delivery, and value capture. Relevant business model attributes are illustrated for each

Attributes		Alternate Conditions										
Value Facilitation	Key Activity	Platform mediation allowing access to under-utilised goods										
	Platform Type	Peer-to-Peer			Business-to-Business			Business-to-Peer		Crowd/Cooperative		
	Practice	Shared Space		Shared Mobility		Shared Goods		Shared Consumables		Shared Resources		
	Intellectual Property	Open Source				Communal			Proprietary			
	Governance Model	Cooperative				Collaborative			Corporate			
	Price Discovery	Free	Pay What you Can		Negotiation / Bargaining	Auction	Set by Resource User		Set by Resource Owner	Set by Platform		
Value Delivery	Key Value Proposition	Reduction of transaction costs in sharing										
	Mediating Interface	Smartphone App				Website			Third-Party App (e.g. Facebook Group)			
	Venue for Interaction	Offline			Hybrid			Online				
	Review System	Resource Owner Reviews			Resource User Reviews			Platform Reviews		None		
	Geographical Scale	Existing Community		Local		Regional		National		International		
Value Capture	Value Orientation	Societal / Public			Social			Environmental		Commercial		
	Revenue Streams	None	Transaction Fee	Commission	Subscription Fee	Membership	Advertisements	Data Mining	Sponsorship	Donations	Public or Private Project Funding	
	Pricing Mechanisms	None			Static Pricing			Dynamic Pricing		Differential Pricing		
	Price Discrimination	None			Feature-based			Location-based		Quantity-based		
	Revenue Source	None	Volunteer		Other		Resource Owner	Resource User		3rd-Party		

Fig. 2. Sharing economy business modelling tool for sustainability.

dimension, where all alternate conditions are described for each attribute (Fig. 2). For example, we suggest the attribute 'review system' belongs to the dimension value delivery, which can be implemented by facilitating resource owner reviews, resource user reviews, platform reviews, or no review system at all.

In our tool, we retained the value proposition and value creation elements expressed in business model literature, but updated these for SEBMs. In contrast to value creation, we propose the dimension *value facilitation*, which is more instructive for platform business models and describes the practices by which the platform mediates the exchange in a two-sided market. Furthermore, we conceptualise the value proposition embedded in value delivery, following the approach of Täuscher and Laudien (2018) in their work on platform business models. We suggest that the value proposition is a platform-level attribute, which describes the proposed value delivered by the sharing platform to its users as a result of its key activity.

4.1. Conditions for improved sustainability performance

While our sharing economy business modelling tool may be relevant to describe platform and marketplace business models broadly, we apply the following preconditions to accompany the tool to support improved sustainability performance. We arrived at these preconditions based on our definition of the sharing economy presented in Section 2.3, which prioritises reduced resource extraction and greenhouse gas emissions as well as enhanced social interaction. With interest growing among businesses to capitalise on 'sustainability', these preconditions help platforms reflect on the

contexts and conditions that may improve the sustainability of their offerings. Our intention is that these preconditions scope business and consumption practices that at least have the potential to deliver on the sustainability promised by business, media, and academia.

Operates as a platform. We suggest SEBMs for sustainability operate as a platform that leverages technology to facilitate a two-sided market between a resource owner and resource user. As such, this condition excludes business-to-consumer models that do not operate a two-sided market. However, *peer-to-peer* (e.g. Peerby – a goods marketplace in the Netherlands), *business-to-peer* (e.g. Spacious – a co-working platform in New York City) and *crowd/cooperative* (e.g. Modo – a carsharing cooperative based in British Columbia, Canada) platforms are included as they operate as a two-sided market (see Section 4.2.2). This condition is proposed to promote social cohesion and a sense of community as well as to encourage sharing platforms to leverage an existing stock of goods. While this condition alone is not sufficient to realise improved sustainability outcomes (e.g. the proposition that Airbnb causes gentrification), we suggest two-sided platforms are more likely to enhance social interaction than business-to-consumer models, in addition to the other preconditions.

Leverages idling capacity of an existing stock of goods. Literature suggests that the sharing economy leverages idling capacity of under-utilised assets (Harmaala, 2015; Heinrichs, 2013). We clarify this condition to delimit sharing to an existing stock of goods. This increases the intensity of use and extends lifetimes of products that have already been produced, but otherwise would

not be used, presumably reducing net consumption and preventing unnecessary production of new goods.

Possesses non-pecuniary motivation for ownership. While sharing platforms or resource owners may have a commercial orientation (Section 4.4.1), we suggested that they must not purchase new goods for the purpose of facilitating sharing. This creates an *artificial* idling capacity of under-utilised assets and reduces material efficiency, which can have profound adverse sustainability impacts (e.g. bikesharing graveyards in China). Again, this condition excludes business-to-consumer models, where businesses purchase or produce new goods, which they own, in order to facilitate access. This practice is more akin to use-oriented product-service systems (Mont, 2004).

Facilitates temporary access over ownership. Access is widely stated as a key condition of SEBMs, thereby excluding business models that facilitate transfer of ownership by bartering, swapping, gifting, buying second-hand or through redistribution markets (e.g. Amazon, eBay, Etsy). While transfer of ownership may extend product lifetimes, e.g. buying second-hand, we suggest that facilitating temporary access is a more efficient allocation of resources by increasing the number of people that have access to one shared resource. We suggest this increases the intensity of use and most likely reduces net consumption. However, we propose a caveat to the condition of temporary access. We recommend goods characterised by one-time use – consumables such as food, personal care products, some art supplies or motor oil, for example – can still be considered part of a sharing economy, as their one-time use requires transfer of ownership to use (see Curtis and Lehner (2019) for greater elaboration).

4.2. Value facilitation

Value facilitation describes the practices by which the sharing platform mediates the exchange in a two-sided market, including the extent of user input in shaping the product or service offering. For example, this may be done by providing resources, information or assistance. The relevant attributes identified in our analysis include key activity, platform type, practice, intellectual property, governance model, and price discovery. Below, we articulate the alternate conditions for each of these attributes.

4.2.1. Key activity

The key activity describes the primary action taken by the platform (in contrast to the actions taken by the resource owner and resource user) that contributes to value co-creation. Sharing platforms are described as 'digital matching' markets (Codagnone et al., 2016; Ferrell et al., 2017; Gonzalez-Padron, 2017; Hou, 2018) that leverage idle resources to facilitate value creation by matching a resource owner and resource user (Aboulamer, 2018). This description is at the heart of what constitutes the key activity of a sharing platform: *platform mediation allowing access to under-utilised goods*.

We are not suggesting that sharing platforms do not engage in a wide variety of specialised activities that create value for their users. However, we articulate the key activity coherent with our proposed definition of a sharing economy for sustainability and common across all platforms.

4.2.2. Platform type

The platform type describes the constellation of actors in the two-sided market of the sharing platform. We conceptualise platform types that operate as a two-sided market consistent with our definition. These platform types engage actors along these constellations: *peer-to-peer (P2P)*, *business-to-peer (B2P)*, *business-to-business (B2B)*, and *crowd/cooperative*.

In all cases, the platform mediates sharing between two or more actors, generally a resource owner and a resource user. In the P2P model, this mediation takes place between peers, often having equal standing based on, for example, rank, class, or age. Similarly, the B2B model sees mediation taking place between business or organisational entities beyond individuals, often sharing idling resources particular to their business sector (e.g. construction or medical equipment). However, sometimes there are idling resources owned by a business that may be used by individuals. We suggest this is an example of B2P platform types (e.g. Spacious). Finally, the crowd model describes mediation from one to many, from many to one, or from many to many. This model is inclusive of cooperatives or crowdsourcing models (e.g. car cooperatives, renewable energy cooperatives, or crowdsourcing of classroom art supplies or borrowed costumes for a theatre production). We propose cooperatives operate as a two-sided market, with users fulfilling both the role of resource owner and resource user.

4.2.3. Practice

We suggest this attribute to describe sharing as a practice, which we define as the sharing exchange between a resource owner and a resource user as mediated by the platform. Our postulation suggests that research of SEBMs must also consider this mediated practice when studying the sustainability implications of a sharing platform. This is particularly important in order to distinguish between the disparate practices broadly ascribed to the sharing economy (Davies et al., 2017). Thus, in contrast to discussing the sharing economy from a sectorial perspective, we describe the shared practice to place the emphasis on the practice mediated by the platform. We propose to describe sharing as a practice, i.e. *shared space*, *shared mobility*, *shared goods*, *shared consumables*, and *shared resources*.

Shared space describes, for example, idling rooms, apartments, attic storage space, and parking spots. Shared mobility includes carsharing, bikesharing, ridesharing, boatsharing and e-scooters, in so far as these practices are mediated between two actors across the platform. Shared goods are both durable goods and non-durable goods, such as clothes, furniture, sporting goods, home improvement products, luggage, consumer electronics and other homeware (Curtis and Lehner, 2019). In contrast, shared consumables are goods characterised through one-time use, such as food or personal care products (e.g. perfume, haircare products, fingernail polish) that cannot be shared again after use (Curtis and Lehner, 2019). Finally, there is a growing body of literature describing the sharing of energy (Kalathil et al., 2019; Müller and Welpé, 2018; Plewnia, 2019) and resources more generally, such as excess heat, water and other effluent from urban and industrial processes (Plewnia and Guenther, 2018).

4.2.4. Intellectual property

In accordance with our definition of a sharing economy for sustainability, platforms do not own any of the idling assets being shared on the platform. Instead, the key resources of the platform rest in intellectual property – such as the digital platform, matching algorithm, booking management or review system (Guyader and Piscicelli, 2019) – and other data generated on the platform. Platforms in the sharing economy have vastly different views as to the extent to which intellectual property and other data should be protected or shared. Many of the larger companies, commercially oriented and facing competition, may protect *proprietary* technology and content (e.g. Airbnb). There is also *communal* intellectual property protection, in which intellectual property is only available to those using the platform. Finally, there are platforms that make any intellectual property *open source* to support and encourage others to operate similar platforms (e.g. BikeSurf).

The commercial orientation of the platform may indicate the extent to which intellectual property is protected (Netter et al., 2019). While there may be a commercial interest in protecting intellectual property from competition, transparency and communal forms of consumption tend to facilitate “trust, solidarity and social bonding” (Ciulli and Kolk, 2019).

4.2.5. Governance model

Muñoz and Cohen (2018) seek to capture the diversity of governance models that could be used to describe sharing platforms. They define governance model as “...the approach adopted by the platform with respect to decision making and value exchange” (Muñoz and Cohen, 2018, p. 132). In their empirical study, they postulate three types of governance models: *corporate*, *collaborative* and *cooperative*. While they provide no specific guidance to describe these governance models, we draw from their findings and other articles in our sample to do so.

Corporate governance mirrors existing management practices primarily driven by profit-seeking behaviour. Decision-making rests with the platform, responding to market pressures, with limited input from users. This governance model is more likely to be associated with more formal technology, proprietary in nature, and more commercial value orientation (see Netter et al. (2019) for discussion of commercial sharing platforms). Collaborative governance sees more involvement of users in the decision-making process. While commercial orientation is likely, other value orientations may prevail. This governance model may also impact other business model choices, for example, transparency of intellectual property and pricing mechanisms. Finally, cooperative governance sees users involved in, or even leading, the decision-making process. This governance model describes what are often called platform cooperatives, which are democratic, tech- and mission-driven platforms facilitating sharing and other collaborative forms of consumption (Muñoz and Cohen, 2018).

4.2.6. Price discovery

Price discovery describes the mechanism by which the prices of goods and services are determined in a market through interaction between a buyer and seller (Bakos, 1998). In a platform business model, the platform, the resource owner, and the resource user agree to a price bounded to the mediated sharing practice. While it is often the platform that determines the appropriate mechanism for pricing, the price may be ultimately set by the resource owner or resource user. We identify the following price discovery mechanisms: *set by platform*, *set by resource owner*, *set by resource user*, *negotiation*, *auction*, *pay what you can*, or *free*.

The platform may set the price for goods shared on its platform (e.g. an electric mixer will always cost €4/hr, with the resource owner receiving 75% of the transaction fee paid by the resource user). The resource owner may set the price, of which the platform may take a percentage or charge/embed a transaction fee in the price to the resource user. The resource user may set the price, for example, by placing an advertisement saying they are willing to pay a certain amount for shared access to a good. The price may also be set through negotiation between the resource owner and resource user, a negotiation that may or may not include the platform. While less likely, an auction system could be imagined to set the price for goods in high demand. Other mechanisms for price discovery may include ‘pay what you can’ or the item may be completely free of charge. In these instances, there are probably other revenue streams that are unbounded from the transaction utility (Ritter and Schanz, 2019) (see Section 4.4.2).

4.3. Value delivery

Value delivery describes the way in which the platform delivers value or acts out its contribution of the value proposition for the resource owner and resource user. The relevant dimensions elevated in our morphological analysis include value proposition, mediating interface, venue for interaction, review system and geographical scale.

4.3.1. Value proposition

It is widely stated that the key activity of the sharing platform is matchmaking (Apte and Davis, 2019; Benoit et al., 2017; Guyader and Piscicelli, 2019; Lobbers et al., 2017; Täuscher and Kietzmann, 2017). Therefore, we suggest that the key value proposition of the platform is to *reduce transaction costs associated with sharing*.

Again, in stating the key value proposition in this way, we suggest that this is the primary value delivered as a result of the sharing platform's key activity. This is not to say that the sharing platform does not engage in other crucial activities that enrich value delivery to users, but this is simply the most rudimentary value delivered by the platform to users by providing information and access to a market.

4.3.2. Mediating interface

In contrast to simply sharing, the sharing economy leverages ICT to reduce the transaction costs associated with sharing (Curtis and Lehner, 2019). Academic literature largely describes a suite of technologies used by platforms to facilitate sharing. Some of these technologies are user-facing (e.g. mobile apps, review systems) (Gonzalez-Padron, 2017) whereas others are unseen by users (e.g. matching algorithms, dynamic pricing mechanisms) (Codagnone et al., 2016; Täuscher and Kietzmann, 2017). These unseen technologies facilitate the key activities of the platforms and constitute the intellectual property that platforms harness to facilitate sharing. Instead, with this attribute, we focus on the user-facing technologies that create the marketplace in which a resource owner is matched with a resource user.

We suggest this technology falls into three broad categories: *smartphone app*, *website*, and/or *third-party applications*. More formal, often commercially oriented, sharing platforms may leverage a smartphone app and/or website with technology that is developed ‘in-house’ or purchased/contracted from another vendor and integrated into their branded app or website. Less formal sharing platforms, which include non-traditional organisations and grassroots initiatives, may rely on existing third-party applications to mediate sharing, e.g. Facebook groups, WhatsApp or Slack.

4.3.3. Venue for interaction

Initially, this business model attribute was called transaction type, inspired by analysis from Täuscher and Laudien (2018) about platform models, to describe the location of a transaction. However, we adapted this attribute to describe the venue for interaction – *online*, *offline*, or a *hybrid* of the two – between the resource owner and resource user. For example, the sharing platform Cycle.land – a peer-to-peer bikesharing platform in Oxford, UK – mediates bikesharing among a community of sharers and riders. Many sharers use combination locks, allowing riders to access the bike without ever meeting in person (Anzilotti, 2016). This is an example of online interaction. However, other sharers meet riders in person after communicating online to exchange tips on biking in and around Oxford (Anzilotti, 2016); this may be described as a hybrid interaction, where the sharing platform mediates interaction online and the resource owner and resource user interact in person during the exchange of the shared asset. In contrast, an example of offline interaction may be a MeetUp for a neighbourhood sharing

event, where a grassroots initiative leverages social media to create an offline venue to mediate sharing and where interaction takes place offline.

4.3.4. Review system

A review system or rating system is said to increase trust among resource owners and resource users by seeking to reduce information imbalances (Andreassen et al., 2018; J. Wu et al., 2017; X. Wu and Shen, 2018; Yu and Singh, 2002). A review system can be designed to facilitate reviews for the *resource owner*, the *resource user* and/or the *platform*. It is said that underperforming users can be flagged by others and weeded out over time as well as singled out by the platform and dealt with according to the platform's code of conduct. The same can be said about reviews left for platforms, which users may use to determine whether to use the platform in the first place. While an important trust-building feature, there is increasing criticism about the homogeneity of positive reviews left among users (Bridges and Vásquez, 2018; X. Wu and Shen, 2018). More needs to be done by platforms to ensure that the reviews left are meaningful in that they reflect the quality of the goods and experience. This is especially true when reviews can be used by platforms in differential pricing (see Section 4.4.3).

4.3.5. Geographical scale

The geographical scale describes the proximity between the resource owner and resource user as facilitated by the platform. There is limited discussion in our literature sample concerning geographical scale of the platform. We suggest that this scale has direct implications on the value delivery to the resource owners and resource users in a platform business model, as the availability of goods and facilitation of sharing will differ depending on this scale. However, we also suggest that this attribute is different from the scale of operation of the platform; platforms may facilitate sharing between a resource owner and resource user in close proximity, while the platform may operate internationally.

We describe the geographical scale as operating within an existing *community* or *neighbourhood* or operating at a *local*, *regional*, *national*, or *international* scale. Sharing platforms may be leveraged by or introduced to existing communities. For example, a neighbourhood may begin using a sharing platform to access goods among their neighbours (e.g. Nebenan). Alternatively, a local sports club may use a Facebook group to share sports equipment between members. Beyond this, resource owners and resource users may be dispersed throughout a city, region, nation, or beyond. UberPool facilitates ridesharing within a city, and BlaBlaCar similarly facilitates ridesharing across regions, a nation, or internationally. Lastly, Airbnb facilitates sharing around the world, where resource owners and resource users are dispersed internationally.

4.4. Value capture

Value capture typically describes the mechanisms for capturing economic value for the firm. However, in describing sharing platforms, we also seek to elaborate on other types of value orientation, in addition to traditional dimensions such as revenue streams, pricing mechanisms, pricing discrimination and revenue sources.

4.4.1. Value orientation

The literature in our sample discusses for-profit and not-for-profit ventures in the sharing economy, both of which are consistent with our definition. However, value orientation seeks to further elaborate the underlying motivation of the platform. We propose the following value orientations: *commercial*, *social*, *environmental*, and *societal*.

Commercial orientation sees economic value captured by the

platform as the primary motivation for existence. In contrast, the other orientations are more mission-driven and consistent with sustainable business model literature. Social orientation describes those social enterprises as being largely motivated by the social cohesion and social bonding that may take place between those that share. Environmental orientation prioritises environmental sustainability and sustainable consumption practices. Finally, societal orientation describes those platforms motivated by more normative beliefs of how things should be, potentially returning to simpler and more meaningful exchanges. This orientation is often stated implicitly or explicitly on the website of any sharing platform or can be interpreted according to other attributes (e.g. intellectual property, governance model).

4.4.2. Revenue streams

We build on work by Ritter and Schanz (2019) in describing the revenue streams among platforms in the sharing economy. Here, revenue streams describe economic value captured by the platform. Ritter and Schanz (2019) suggest that literature about revenue streams in particular, and value capture in general, is disparate and limited when describing the sharing economy, with the focus on the financial relationship between actors involved in the mediated exchange.

Revenue streams are described as bounded or unbounded to the utility of the transaction. Streams of revenue that are bounded to utility include one-time *transaction fees* or *commission-based fees* associated with the economic utility of the sharing exchange. A *transaction fee* is a set amount (e.g. €0.50 per transaction) and a *commission-based fee* is a predetermined percentage (e.g. 20% additional fee per transaction) that is included in the price to the resource user, which the sharing platform captures during the exchange. These tend to be the most common revenue streams in commercial sharing platforms (Bradley, 2017). Streams of revenue that are unbounded to utility include *subscription*, *membership*, *advertisements*, *data mining*, *sponsorship*, *donations* and *public and private funding*. We distinguish a *subscription* - which provides access to a resource - from a *membership* - which provides access to a platform and its functions - both of which are recurring fees. For example, a subscription service may provide access to a power tool four times a month or access to ten, twenty, or thirty garments per month, based on an increasingly more expensive subscription model. In contrast, a membership may grant access to additional platform features - e.g. user reviews, forums, trainings - or additional benefits - e.g. discounts, newsletter, involvement in platform governance. Sharing platforms may also generate ad revenue, sell user data created on the platform, or receive funds in the form of sponsorships, donations, or grants. In addition, some sharing platforms may have no revenue streams and are operated on a grassroots or volunteer basis only.

4.4.3. Pricing mechanisms

Pricing mechanisms describe the influence of elasticity of demand on a shared good and a change in its price. Again, we take inspiration from Tauscher and Laudien (2018) in conceptualising this dimension; however, they do not describe their proposed attributes and leave their implementation open to interpretation. To respond to this, we elaborate on the alternate conditions relevant for sharing platforms. Whereas Tauscher and Laudien (2018) posit fixed pricing and market pricing as mutually exclusive mechanisms, we argue that all pricing is influenced by the market. The distinction stems from whether the market price is static or real-time. *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* considers real-time data on supply and demand to adjust the price (e.g. surge pricing). Finally, *differential pricing* describes the process of

offering the same product to customers for different prices (Mohammed, 2017). In applying this thinking to the sharing economy, platforms may determine pricing based on user characteristics (e.g. age, income, location), actions (e.g. membership, friend referral, share on social media), or behaviour (e.g. number of shared goods on the platform, positive ratings or reviews).

4.4.4. Price discrimination

The differential pricing discussed above describes a pricing mechanism that changes prices based on the attributes of the user, whereas price discrimination describes differences in prices based on the product and market. Once again, we depart from Tauscher and Laudien (2018) to describe price discrimination in the sharing economy based on *features*, *location*, and *quantity*. Feature-based discrimination 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 discrimination 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. Finally, quantity-based discrimination may 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.

4.4.5. Revenue source

The revenue stream in itself does not describe the source of the revenue, but simply the mechanism through which monetary revenue is captured by the platform. Therefore, we also seek to elaborate on the underlying source of the revenue. The attribute describes the actor from which the financial flow originates: *resource owner*, *resource user*, *third-party*, or *volunteer*, *none*, or *other*. A revenue stream may stem from either the resource owner or resource user, or third-parties such as advertisers, buyers of data, sponsors, or funding bodies. Finally, we see volunteers giving their time and effort as a source of non-monetary revenue.

4.5. Process of evaluating and testing SEBM tool

Throughout our work, we sought to evaluate and test our tool based on literature, feedback, and empirical observations. Using NVivo, we began by abductively coding academic literature (see Section 3 and Appendix B), which greatly informed our analysis. For example, the initial attribute of *technology* was changed to *mediating interface* (Kumar et al., 2018; Lobbers et al., 2017) to be more descriptive of the use of technology in relation to the key activity of the sharing platform (i.e. platform mediation). Platforms use *smartphone apps*, *web-based platforms* and other *third-party applications* to mediate sharing between users (Aboulamer, 2018; Gonzalez-Padron, 2017). The initial attribute of *openness* was changed to *intellectual property*, as several authors discuss open source characteristics of business models in the sharing economy (Lobbers et al., 2017; Muñoz and Cohen, 2018; Spulber, 2019; Vaskelainen and Piscicelli, 2018). Other authors discussed intellectual property rights (Fraga-Lamas and Fernández-Caramés, 2019; Hamalainen and Karjalainen, 2017; Hou, 2018), which seemed to be a better fit in describing both the type of resources used by platforms and the openness of platforms to share these resources. We suggested three choices, based on literature: *open source* (Codagnone et al., 2016; Forgacs and Dimanche, 2016; Gyimóthy and Meged, 2018; Lobbers et al., 2017; Spulber, 2019), *communal* (Ciulli and Kolk, 2019; Gyimóthy and Meged, 2018; Lan et al., 2017; Light and Miskelly, 2015; Netter et al., 2019), and

proprietary intellectual property rights (Anwar, 2018; Guyader and Piscicelli, 2019; Müller and Welpel, 2018; Spulber, 2019; Tauscher and Kietzmann, 2017).

We tested our tool through three rounds of feedback. The first session focused on discussions with researchers about value co-creation, value proposition, and value orientation. Ultimately, there was consensus that both the resource owner and resource user are important in creating value facilitated by the business model, which justified the substitution of value creation for value facilitation. Other authors have also begun to describe value facilitation in the sharing economy (Jiang et al., 2019). Also based on feedback, we introduced the preconditions needed for improved sustainability performance, which supports the operationalisation of our tool for sustainability. Feedback also resulted in other changes such as moving attributes *mediating interface* and *review system* to the dimension *value delivery*. The rounds of feedback resulted in more specific terminology presented in the schema, as well as greater elaboration for each choice to improve coherence and comprehension.

Finally, our analysis was informed by empirics throughout and in different ways. We drew from our experience of studying the sharing economy in several European and North American cities. For instance, examples we studied from Berlin, Germany – *BikeSurf* and *Nebenan* – informed our understanding of intellectual property and geographical scale, respectively. *BikeSurf* shares its platform infrastructure openly with anyone interested in implementing a bikesharing scheme in their city. *Nebenan* operates within an existing community, with a critical mass within a neighbourhood needed before the company is willing to operate. The choices for price discovery were expanded as a result of studying the altruistic *Velogistics* in Berlin, where the prices were set by the resource owner, set by the resource user, or negotiated, often without input from the platform. Our understanding of price discrimination in the sharing economy was aided by discussions with *Peerby* in Amsterdam, the Netherlands and *Toronto Tool Library* in Toronto, Canada. These sharing platforms use feature- and quantity-based discrimination, respectively.

We also worked through examples to validate our tool. For instance, we can consider the *practice of shared mobility* to exemplify *governance models*: a carsharing cooperative – such as *Modo* in Canada – operates a *cooperative* governance model, which sees the users share risk and benefits captured on the platform by determining rules for membership, policing undesirable behaviour, and sharing costs for repair, accidents or theft. In contrast, *corporate* governance – exemplified by the global peer-to-peer carsharing platform *Turo* – bears the burden of risk and potential benefits with minimal liability on users. These users probably provide solicited feedback that informs the platform's activities and design of its offerings, so are involved in co-creation, but to a lesser and different extent than other governance models.

5. Discussion and conclusions

We are facing a climate crisis and other existential environmental and social challenges, including biodiversity loss, habitat destruction and social and economic inequality. According to Ivanova et al. (2016), household consumption accounts for more than 60% of global greenhouse gas emissions and 60–80% of the total global environmental impact. The sharing economy may address the environmental impact of household consumption, but only if we are deliberate and strategic in how we design SEBMs for sustainability. As such, our aim was to elaborate an improved sharing economy business modelling tool designed specifically to support the design and implementation of SEBMs for improved sustainability performance.

5.1. Key insights and contributions

There is sufficient evidence to demonstrate that the sharing economy is not sustainable by default (Martin, 2016; Parguel et al., 2017; Plepys and Singh, 2019; Schor, 2016), so we must be deliberate and strategic in how we design and implement SEBMs for sustainability. The extant body of knowledge on the sharing economy lacks a consistent definition, business model attributes are divergent and poorly described, and there is lack of understanding as to which preconditions and attributes of business models deliver on its purported sustainability potential. This article builds upon existing SEBM conceptualisations by operationalising a coherent definition, suggesting preconditions needed for improved sustainability performance, and describing a sharing economy business modelling tool in greater detail than earlier studies to support the design and implementation of SEBMs by academics, practitioners, and policymakers. To our knowledge, the sharing economy business modelling tool developed here is the most comprehensive description of business model attributes in the sharing economy in academic literature to date. This research seeks to overcome the design-implementation gap often afflicting research on sustainable business models relevant for research and practice.

5.2. Implications for research and practice

The SEBM tool contributes to both research and practice by advancing knowledge on sustainable business model innovation and sustainable consumption. Specifically, our SEBM tool considers the organisational perspective and incorporates sustainability in the attribute *value orientation*. Other attributes most likely have sustainability implications, particularly *platform type*, *shared practice*, *governance model*, *mediating interface*, *venue for interaction*, *geographical scale*, *review system*, and *revenue streams*. However, to assess the sustainability implications of these attributes, we emphasise the need to consider the facilitated consumption practice. Consider Airbnb as an example: while the business model remains the same, different practices take place on the platform. Airbnb facilitates access to spare rooms in hosts' homes or entire apartments when hosts are away. However, the same business model also facilitates access to entire apartments/homes owned by commercial real estate and property management companies, which possess pecuniary motivation for ownership and create an artificial idling capacity. While the business model remains the same, the first practice may support sustainable consumption in the sharing economy and the second may not (Curtis and Lehner, 2019; Ranjbari et al., 2018).

Much of the sustainable business model literature focuses on the practices of the business (Baldassarre et al., 2020; Weissbrod and Bocken, 2017), and seemingly not on the practices of the users. We suggest that, in order to overcome the design-implementation gap (Baldassarre et al., 2020; Geissdoerfer et al., 2018) and bring about improved sustainability performance, there is a greater need to focus on the practices among users as part of sustainable business model innovation.

We incorporate this focus in two ways: 1) by prescribing preconditions that scope those business and consumption practices that are most likely to contribute to enhanced sustainability performance, and 2) by describing the attribute *shared practice* as part of SEBMs. We suggest that this helps sharing platforms to implement their business models by emphasising the mediated practice as an integral part of their activities. In addition, this focus on the *shared practice* emphasises the source of improved sustainability performance. In this way, we hope research on sustainable business model innovation considers not only business practices but also consumption practices when considering the sustainability impact

of business models.

We intend this research to support the implementation of SEBMs. We have developed the tool into a 'Sharing Platform Workbook', available in print and digital editions. The workbook invites researchers, practitioners, advocacy organisations, and policymakers to reflect, brainstorm, and incorporate business model choices to improve the sustainability performance of sharing platforms. The detailed description of business model attributes and alternate conditions supports reflection, learning, and implementation of business model choices among sharing platforms to enhance their offerings and their sustainability performance. We hope our work supports critical reflection in research and practice about choices made to actualise more sustainable consumption.

5.3. Limitations and future research

We wish to acknowledge the limitations of our work. First, we acknowledge that no person, platform, or policy has the authority to define the sharing economy, wholly. The phenomenon is widely studied across academic disciplines and widely implemented in a variety of contexts. Secondly, we acknowledge that our conceptual propositions need to be supported by future sustainability assessments. We recognise the challenges in doing so, caused by a lack of reliable tools, limited platform transparency, and a lack of available data. Nonetheless, the tool may guide research in studying the impact of business model choices on sustainability performance. For example, future research may isolate choices – such as *platform type*, *shared practice*, *governance model*, *mediating interface*, *venue for interaction*, *geographical scale*, *review system*, and *revenue streams* – to analyse their impacts on sustainability performance, using a scenario-based approach. In addition, future research may operationalise the tool by mapping sharing platforms and isolating *platform type* and *shared practice* attributes, for example, to establish business model patterns that support the viability of SEBMs. For instance, global examples of viable peer-to-peer shared mobility platforms could be examined to determine any patterns in business model choices that support success. It is our hope that sustainability and the need for more sustainable consumption will be a motivating influence for future research on the sharing economy.

Funding

This research has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 771872).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Steven Kane Curtis: Conceptualization, Methodology, Validation, Data curation, Writing - original draft, Writing - review & editing, Visualization. **Oksana Mont:** Conceptualization, Resources, Writing - review & editing, Supervision, Funding acquisition.

Acknowledgements

We would like to thank the Urban Sharing Team at the International Institute for Industrial Environmental Economics (IIIEE), including Andrius Plepys, Jagdeep Singh, Lucie Zvolaska and Ana María Arbeláez Velez, for their feedback and support. In particular,

we wish to thank Yuliya Voytenko Palgan for her critical feedback and proofreading. In addition, we would like to thank those who provided feedback on the morphological analysis, in particular, Nancy Bocken, Julia Nußholz, the PhD students at the IIIIE, and participants at the 4th International Conference on New Business Models in Berlin, Germany. We would also like to thank the peer reviewers who provided high-quality feedback on our article. Thanks for your time and effort!

This morphological box represents the output of the first step in our analysis. We departed from the morphological analysis presented by [Täuscher and Laudien \(2018\)](#), with several of the attributes retained from their analysis: *platform type, key activity, price discovery, review system, value proposition, transaction content, transaction type, geographical scope, revenue streams, price mechanisms, price discrimination, and revenue source*. In the analysis provided by [Täuscher and Laudien \(2018\)](#), there was no description of several of their attributes (e.g. transaction content and transaction type). In addition, these attributes and their choices describe marketplaces. Therefore, the content and context for each attribute

Appendix A. Initial Morphological Box

Value Creation	Key Activity	Platform mediation allowing for access to under-utilised goods										
	Value Formation	Value Co-Creation			Value Co-Recovery		Value Co-Reduction		Value Co-Destruction			
	Sector	Hospitality		Mobility & Transport		Consumer Goods		Food		Energy & Utilities		
	Technology	Smartphone App		Website (In-house)		Website (Integrated)			Third-Party Platform (e.g. Facebook)			
	Governance Model	Cooperative			Collaborative			Corporate				
	Openness	Open Source			Limited			Market Competition				
	Price Discovery	Fixed		Set by Seller		Set by Buyer		Auction		Negotiation		
	Review System	User Reviews		Provider Reviews		Platform Reviews		None				
Value Delivery	Key Value Proposition	Reduction of transaction costs in sharing with strangers										
	Platform Type	Peer-to-Peer		Business-to-Business		Business-to-Peer		Crowd				
	Transaction Content	Space		Durable Goods		Non-durable Goods		Consumables				
	Transaction Type (Venue?)	Online				Offline						
	Geographical Scale	Community / Neighbourhood		City		Regional		National		International		
Value Capture	Profit Orientation	For-Profit		Social-Enterprise		Environment		Non-Profit		Volunteer		
	Revenue Streams	Bounded					Unbounded					
		Transaction Fee	Commission	Subscription Fee	Membership	Advertisements	Data Mining	Sponsorship	Donations	Public or Private Project Funding		
	Pricing Mechanisms	Fixed Pricing		Market Pricing		Differentiated Pricing		Set by Provider		Free		Pay What You Can
	Price Discrimination	Feature-based		Location-based		Quantity-based		None		Other		
	Revenue Source	Seller		Buyer		3rd-Party		Volunteer		None		Other

had to be adapted to the sharing economy, where we needed to interpret the intent of the initial morphological box and the relevant work by others. Additional attributes were added or altered based on other conceptualisations, for example, value facilitation (Camilleri and Neuhofer, 2017), sector (Plewnia and Guenther, 2018), governance model (Muñoz and Cohen, 2018), platform

types (Curtis and Lehner, 2019), and revenue streams (Ritter and Schanz, 2019).

Appendix B. Revised Morphological Box

Dimension	Parameter	Alternate Conditions									
Value Creation	Key Activity	Platform mediation/matchmaking facilitating access to under-utilised assets									
	Practice	Shared Space	Shared Mobility	Shared Goods	Shared Consumables	Shared Resources					
	Mediating Interface	Smartphone App		Website (In-house)		Website (Integrated)		Third-Party Platform (e.g. Facebook)			
	Governance Model	Corporate			Collaborative			Cooperative			
	Intellectual Property	Proprietary/Commercial			Communal			Open Source			
	Price Discovery	Set by Platform (Fixed)	Set by Resource Owner	Set by Resource User	Auction	Negotiation	Pay What You Can	Free			
	Review System	User Reviews		Provider Reviews		Platform Reviews		None			
Value Delivery	Key Value Proposition	Reduction of transaction costs in sharing with strangers									
	Platform Type	Peer-to-Peer	Business-to-Business		Business-to-Peer		Crowd				
	Interaction	Online			Offline			Hybrid			
	Geographical Scale	Community / Neighbourhood	Local	Regional		National	International				
Value Capture	Value Orientation	Commercial		Social		Environmental		Societal			
	Revenue Streams	Transaction Fee	Commission	Subscription Fee	Membership	Advertisements	Data Mining	Sponsorship	Donations	Public or Private Funding	
	Pricing Mechanisms	Static Pricing			Dynamic Pricing			Differential Pricing			
	Price Discrimination	Feature-based		Location-based		Quantity-based		None		Other	
	Revenue Source	Resource Owner	Resource User	3rd-Party	Volunteer	None		Other			

This morphological box represents the output of the second step in our analysis. In this step, we conducted a narrative literature review of 68 academic articles to further refine and elaborate business model attributes and choices. This requires interpretive analysis of the reviewed author's intent in relation to our mental model of the sharing economy. As a result of this analysis, several attributes were revised to make them more precise for the sharing economy. For example, *sector* is now represented as *practice*, *mediating interface as technology*, *openness as intellectual property*, *transaction type as interaction*, *profit orientation as value orientation*, etc. These changes were made as a result of inductive qualitative coding using NVivo, using the initial attributes as an early coding framework.

References

- Aboulamer, A., 2018. Adopting a circular business model improves market equity value. *Thunderbird Int. Bus. Rev.* 60 (5), 765–769. <https://doi.org/10.1002/tie.21922>. Scopus.
- Acquier, A., Daudigeos, T., Pinks, J., 2017. Promises and paradoxes of the sharing economy: an organizing framework. *Technol. Forecast. Soc. Change* 125, 1–10. <https://doi.org/10.1016/j.techfore.2017.07.006>.
- Akbar, Y.H., Tracogna, A., 2018. The sharing economy and the future of the hotel industry: transaction cost theory and platform economics. *Int. J. Hospit. Manag.* 71, 91–101. <https://doi.org/10.1016/j.ijhm.2017.12.004>. Scopus.
- Andreasen, T.W., Lervik-Olsen, L., Snyder, H., Van Riel, A.C.R., Sweeney, J.C., Van Vaerenbergh, Y., 2018. Business model innovation and value-creation: the triadic way. *J. Serv. Manag.* 29 (5), 883–906. <https://doi.org/10.1108/JOSM-05-2018-0125>.
- Anwar, S.T., 2018. Growing global in the sharing economy: lessons from uber and AirbnB. *Glob. Bus. Organ. Excell.* 37 (6), 59–68. <https://doi.org/10.1002/joe.21890>. Scopus.
- Anzilotti, E., 2016. Oxford test drives peer-to-peer bike sharing. *CityLab*. <http://www.citylab.com/commute/2016/09/oxford-road-tests-peer-to-peer-bike-sharing/499709/>.
- Apte, U.M., Davis, M.M., 2019. Sharing economy services: business model generation. *Calif. Manag. Rev.* 61 (2), 104–131. <https://doi.org/10.1177/000812561862025>. Scopus.
- Bakos, Y., 1998. The emerging role of electronic marketplaces on the Internet. *Commun. ACM* 41 (8), 35–42. <https://doi.org/10.1145/280324.280330>.
- Baldassarre, B., Konietzko, J., Brown, P., Calabretta, G., Bocken, N., Karpen, I.O., Hultink, E.J., 2020. Addressing the design-implementation gap of sustainable business models by prototyping: a tool for planning and executing small-scale pilots. *J. Clean. Prod.* 255, 120295. <https://doi.org/10.1016/j.jclepro.2020.120295>.
- Belk, R., 2014a. Sharing versus pseudo-sharing in web 2.0. *Anthropol.* 18 (1), 7–23.
- Belk, R., 2014b. You are what you can access: sharing and collaborative consumption online. *J. Bus. Res.* 67 (8), 1595–1600. <https://doi.org/10.1016/j.jbusres.2013.10.001>.
- Benoit, S., Baker, T.L., Bolton, R.N., Gruber, T., Kandampully, J., 2017. A triadic framework for collaborative consumption (CC): motives, activities and resources & capabilities of actors. *J. Bus. Res.* 79, 219–227. <https://doi.org/10.1016/j.jbusres.2017.05.004>.
- Bocken, N., Short, S.W., Rana, P., Evans, S., 2013. A value mapping tool for sustainable business modelling. *Corp. Govern.: Int. J. Bus. Soc.* 13 (5), 482–497. <https://doi.org/10.1108/CG-06-2013-0078>.
- Bocken, N., Short, S.W., Rana, P., Evans, S., 2014. A literature and practice review to develop sustainable business model archetypes. *J. Clean. Prod.* 65, 42–56. <https://doi.org/10.1016/j.jclepro.2013.11.039>.
- Boons, F., Lüdeke-Freund, F., 2013. Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *J. Clean. Prod.* 45, 9–19. <https://doi.org/10.1016/j.jclepro.2012.07.007>.
- Bradley, K., 2017. *Delningsekonomi: På Avvärdnans Villkor*. Wolters Kluwer.
- Breuer, H., Fichter, K., Freund, F.L., Tiemann, L., 2018. Sustainability-oriented business model development: principles, criteria and tools. *Int. J. Entrepreneurial Ventur.* 10 (2), 256. <https://doi.org/10.1504/IJEV.2018.092715>.
- Bridges, J., Vásquez, C., 2018. If nearly all Airbnb reviews are positive, does that make them meaningless? *Curr. Issues Tourism* 21 (18), 2065–2083. <https://doi.org/10.1080/13683500.2016.1267113>. Scopus.
- Camilleri, J., Neuhof, B., 2017. Value co-creation and co-destruction in the Airbnb sharing economy. *Int. J. Contemp. Hospit. Manag.* 29 (9), 2322–2340. <https://doi.org/10.1108/IJCHM-09-2016-0492>.
- Cennamo, C., Santalo, J., 2013. Platform competition: strategic trade-offs in platform markets. *Strat. Manag. J.* 34 (11), 1331–1350. <https://doi.org/10.1002/smj.2066>.
- Chasin, F., von Hoffen, M., Cramer, M., Matzner, M., 2018. Peer-to-peer sharing and collaborative consumption platforms: a taxonomy and a reproducible analysis. *Inf. Syst. E. Bus. Manag.* 16 (2), 293–325. <https://doi.org/10.1007/s10257-017-0357-8>.
- Cherry, C.E., Pidgeon, N.F., 2018. Is sharing the solution? Exploring public acceptability of the sharing economy. *J. Clean. Prod.* 195, 939–948. <https://doi.org/10.1016/j.jclepro.2018.05.278>. Scopus.
- Chesbrough, H., Rosenbloom, R., 2002. The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Ind. Corp. Change* 11 (3), 529–555. <https://doi.org/10.1093/icc/11.3.529>.
- Choudary, S.P., Parker, G.G., Alystne, M.V., 2015. *Platform Scale: How an Emerging Business Model Helps Startups Build Large Empires with Minimum Investment*. Platform Thinking Labs.
- Ciulli, F., Kolk, A., 2019. Incumbents and business model innovation for the sharing economy: implications for sustainability. *J. Clean. Prod.* 214, 995–1010. <https://doi.org/10.1016/j.jclepro.2018.12.295>. Scopus.
- Codagnone, C., Biagi, F., Abadie, F., 2016. The passions and the interests: unpacking the 'sharing economy'. *SSRN Electron. J.* <https://doi.org/10.2139/ssrn.2793901>.
- Curtis, S.K., Lehner, M., 2019. Defining the sharing economy for sustainability. *Sustainability* 11 (3), 567. <https://doi.org/10.3390/su11030567>.
- Davies, A.R., Donald, B., Gray, M., Knox-Hayes, J., 2017. Sharing economies: moving beyond binaries in a digital age. *Camb. J. Reg. Econ. Soc.* 10 (2), 209–230. <https://doi.org/10.1093/cjres/rxx005>.
- Denegri-Knott, J., 2011. "Have it Now!": Ebay and the Acceleration of Consumer Desire. *ACR European Advances*. E-09. <http://acrwebsite.org/volumes/1006905/eacr/vol9/E-09>.
- Dreyer, B., Lüdeke-Freund, F., Hamann, R., Facer, K., 2017. Upsides and downsides of the sharing economy: collaborative consumption business models' stakeholder value impacts and their relationship to context. *Technol. Forecast. Soc. Change* 125, 87–104. <https://doi.org/10.1016/j.techfore.2017.03.036>.
- Eriksson, T., Ritchey, T., 2002. Scenario Development Using Computerised Morphological Analysis, vol. 8.
- Evans, S., Rana, P., Short, S., 2014. Final Set of Tools and Methods that Enable Analysis of Future Oriented, Novel, Sustainable, Value Adding Business-Models and Value-Networks. Deliverable D2, vol. 6.
- Ferrell, O.C., Ferrell, L., Huggins, K., 2017. Seismic shifts in the sharing economy: shaking up marketing channels and supply chains. *J. Market. Channel* 24 (1–2), 3–12. <https://doi.org/10.1080/1046669X.2017.1346973>. Scopus.
- Forgacs, G., Dimanche, F., 2016. Revenue challenges for hotels in the sharing economy: facing the Airbnb menace. *J. Revenue Pricing Manag.* 15 (6), 509–515. <https://doi.org/10.1057/s41272-016-0071-z>. Scopus.
- Fraga-Lamas, P., Fernández-Caramés, T.M., 2019. A review on blockchain technologies for an advanced and cyber-resilient automotive industry. *IEEE Access* 7, 17578–17598. <https://doi.org/10.1109/ACCESS.2019.2895302>. Scopus.
- Frenken, K., Schor, J., 2017. Putting the sharing economy into perspective. *Environ. Innov. Soc. Transit.* 23, 3–10. <https://doi.org/10.1016/j.eist.2017.01.003>.
- Geissdoerfer, M., Bocken, N.M.P., Hultink, E.J., 2016. Design thinking to enhance the sustainable business modelling process – a workshop based on a value mapping process. *J. Clean. Prod.* 135, 1218–1232. <https://doi.org/10.1016/j.jclepro.2016.07.020>.
- Geissdoerfer, M., Vladimirova, D., Evans, S., 2018. Sustainable business model innovation: a review. *J. Clean. Prod.* 198, 401–416. <https://doi.org/10.1016/j.jclepro.2018.06.240>.
- Gonzalez-Padron, T.L., 2017. Ethics in the sharing economy: creating a legitimate marketing channel. *J. Market. Channel* 24 (1–2), 84–96. <https://doi.org/10.1080/1046669X.2017.1347005>. Scopus.
- Griswold, A., 2019. Shared Scooters Don't Last Long. *Quartz*. <https://qz.com/1561654/how-long-does-a-scooter-last-less-than-a-month-louisville-data-suggests/>.
- Guyader, H., Piscicelli, L., 2019. Business model diversification in the sharing economy: the case of GoMore. *J. Clean. Prod.* 215, 1059–1069. <https://doi.org/10.1016/j.jclepro.2019.01.114>. Scopus.
- Gyimóthy, S., Meged, J.W., 2018. The camano: a communitarian walking trail in the sharing economy. *Tour. Plann. Dev.* 15 (5), 496–515. <https://doi.org/10.1080/21568316.2018.1504318>. Scopus.
- Habibi, M.R., Davidson, A., Laroche, M., 2017. What managers should know about the sharing economy. *Bus. Horiz.* 60 (1), 113–121. <https://doi.org/10.1016/j.bushor.2016.09.007>. Scopus.
- Hamalainen, M., Karjalainen, J., 2017. Social manufacturing: when the maker movement meets interfirm production networks. *Bus. Horiz.* 60 (6), 795–805. <https://doi.org/10.1016/j.bushor.2017.07.007>. Scopus.
- Hamari, J., Sjöklint, M., Ukkonen, O., 2016. The sharing economy: why people participate in collaborative consumption. *J. Assoc. Inf. Sci. Technol.* 67 (9), 2047–2059. <https://doi.org/10.1002/asi.23552>. Scopus.
- Harmaala, M.-M., 2015. The sharing city as a platform for a more sustainable city environment? *Int. J. Environ. Health* 7 (4), 309–328. <https://doi.org/10.1504/IJENVH.2015.077116>. Scopus.
- Hassanli, N., Small, J., Darcy, S., 2019. The representation of Airbnb in newspapers: a critical discourse analysis. *Curr. Issues Tourism* 1–13. <https://doi.org/10.1080/13683500.2019.1669540>, 0(0).
- Heinrichs, H., 2013. Sharing economy: a potential new pathway to sustainability. *GAA-Ecol. Perspect. Sci. Soc.* 22 (4), 228–231.
- Hou, L., 2018. Destructive sharing economy: a passage from status to contract. *Comput. Law Secur. Rev.* 34 (4), 965–976. <https://doi.org/10.1016/j.clsr.2018.05.009>. Scopus.
- Im, K., Cho, H., 2013. A systematic approach for developing a new business model using morphological analysis and integrated fuzzy approach. *Expert Syst. Appl.* 40 (11), 4463–4477. <https://doi.org/10.1016/j.eswa.2013.01.042>.
- Ivanova, D., Stadler, K., Steen-Olsen, K., Wood, R., Vita, G., Tukker, A., Hertwich, E.G., 2016. Environmental impact assessment of household consumption. *J. Ind. Ecol.*

- 20 (3), 526–536. <https://doi.org/10.1111/jiecl.12371>.
- Jiang, Y., Balaji, M.S., Jha, S., 2019. Together we tango: value facilitation and customer participation in Airbnb. *Int. J. Hospit. Manag.* 82, 169–180. <https://doi.org/10.1016/j.ijhm.2019.05.004>.
- Joyce, A., Paquin, R.L., 2016. The triple layered business model canvas: a tool to design more sustainable business models. *J. Clean. Prod.* 135, 1474–1486. <https://doi.org/10.1016/j.jclepro.2016.06.067>.
- Kalathil, D., Wu, C., Poolla, K., Varaiya, P., 2019. The sharing economy for the electricity storage. *IEEE Trans. Smart Grid* 10 (1), 556–567. <https://doi.org/10.1109/TSG.2017.2748519>. Scopus.
- Kathan, W., Matzler, K., Veider, V., 2016. The sharing economy: your business model's friend or foe? *Bus. Horiz.* 59 (6), 663–672. <https://doi.org/10.1016/j.bushor.2016.06.006>. Scopus.
- Keating, D., 2019. Uber adding to air pollution in Europe—report. November 20 Forbes. <https://www.forbes.com/sites/davekeating/2019/11/20/uber-adding-to-air-pollution-in-europe-report/>.
- Kennedy, J., 2016. Conceptual boundaries of sharing. *Inf. Commun. Soc.* 19 (4), 461–474. <https://doi.org/10.1080/1369118X.2015.1046894>.
- Kumar, V., Lahiri, A., Dogan, O.B., 2018. A strategic framework for a profitable business model in the sharing economy. *Ind. Market. Manag.* 69, 147–160. <https://doi.org/10.1016/j.indmarman.2017.08.021>. Scopus.
- Kwon, M., Lee, J., Hong, Y.S., 2019. Product-service system business modelling methodology using morphological analysis. *Sustainability* 11 (5), 1376. <https://doi.org/10.3390/su11051376>.
- Lan, J., Ma, Y., Zhu, D., Mangalagu, D., Thornton, T., 2017. Enabling value Co-creation in the sharing economy: the case of mobike. *Sustainability* 9 (9), 1504. <https://doi.org/10.3390/su9091504>.
- Laukkanen, M., Tura, N., 2020. The potential of sharing economy business models for sustainable value creation. *J. Clean. Prod.* 253, 120004. <https://doi.org/10.1016/j.jclepro.2020.120004>.
- Lee, J.Y., 2015. *Trust and Social Commerce*, vol. 77. University of Pittsburgh Law Review, pp. 137–181. <https://doi.org/10.5195/lawreview.2015.395>, 2.
- Libert, B., Beck, M., Wind, J., 2016. *The Network Imperative: How to Survive and Grow in the Age of Digital Business Models*. Harvard Business Review Press.
- Light, A., Miskelly, C., 2015. Sharing economy vs sharing cultures? Designing for social, economic and environmental good. *ixD&A* 24, 49–62.
- Lobbers, J., von Hoffen, M., Becker, J., 2017. Business development in the sharing economy: a business model generation framework. In: 2017 IEEE 19th Conference on Business Informatics (CBI), pp. 237–246. <https://doi.org/10.1109/CBI.2017.44>.
- Lüdeke-Freund, F., Gold, S., Bocken, N., 2019. A review and typology of circular economy business model patterns. *J. Ind. Ecol.* 23 (1), 36–61. <https://doi.org/10.1111/jiecl.12763>.
- Ma, Y., Lan, J., Thornton, T., Mangalagu, D., Zhu, D., 2018. Challenges of collaborative governance in the sharing economy: the case of free-floating bike sharing in Shanghai. *J. Clean. Prod.* 197, 356–365. <https://doi.org/10.1016/j.jclepro.2018.06.213>. Scopus.
- Martin, C.J., 2016. The sharing economy: a pathway to sustainability or a nightmarish form of neoliberal capitalism? *Ecol. Econ.* 121, 149–159. <https://doi.org/10.1016/j.ecolecon.2015.11.027>.
- Massa, L., Tucci, C.L., Afuah, A., 2017. A critical assessment of business model research. *Acad. Manag. Ann.* 11 (1), 73–104. <https://doi.org/10.5465/annals.2014.0072>.
- Mohammed, R., 2017. *The Art of Pricing: How to Find the Hidden Profits to Grow Your Business*. Charles River Business.
- Mont, O., 2004. *Product-service Systems: Panacea or Myth?* IIIIEE, Lund University. [https://portal.research.lu.se/portal/en/publications/productservice-systems-panacea-or-myth\(0a91751c-f7f1-4ea9-8156-1ba487f8f4b\)/export.html](https://portal.research.lu.se/portal/en/publications/productservice-systems-panacea-or-myth(0a91751c-f7f1-4ea9-8156-1ba487f8f4b)/export.html).
- Müller, S.C., Welpe, I.M., 2018. Sharing electricity storage at the community level: an empirical analysis of potential business models and barriers. *Energy Pol.* 118, 492–503. <https://doi.org/10.1016/j.enpol.2018.03.064>. Scopus.
- Munoz, P., Cohen, B., 2018. *A compass for navigating sharing economy business models*. *Calif. Manag. Rev.* 35.
- Netzer, S., Pedersen, E.R.G., Lüdeke-Freund, F., 2019. Sharing economy revisited: towards a new framework for understanding sharing models. *J. Clean. Prod.* 221, 224–233. <https://doi.org/10.1016/j.jclepro.2019.02.225>. Scopus.
- Osterwalder, A., Pigneur, Y., 2010. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. John Wiley & Sons.
- Osterwalder, A., Pigneur, Y., Tucci, C.L., 2005. Clarifying business models: origins, present, and future of the concept. *Commun. Assoc. Inf. Syst.* 16 <https://doi.org/10.17705/1CAIS.01601>.
- Parguel, B., Lunardo, R., Benoit-Moreau, F., 2017. Sustainability of the sharing economy in question: when second-hand peer-to-peer platforms stimulate indulgent consumption. *Technol. Forecast. Soc. Change* 125, 48–57. <https://doi.org/10.1016/j.techfore.2017.03.029>.
- Piscicelli, L., Ludden, G.D.S., Cooper, T., 2018. What makes a sustainable business model successful? An empirical comparison of two peer-to-peer goods-sharing platforms. *J. Clean. Prod.* 172, 4580–4591. <https://doi.org/10.1016/j.jclepro.2017.08.170>. Scopus.
- Plante, S.G., 2019. Uber and Lyft have admitted to making traffic worse in some US cities. August 6 Vox. <https://www.vox.com/the-goods/2019/8/6/20757593/uber-lyft-traffic-congestion-pricing>.
- Plepys, A., Singh, J., 2019. Evaluating the sustainability impacts of the sharing economy using input-output analysis. In: Mont, O. (Ed.), *A Research Agenda for Sustainable Consumption Governance*. Edward Elgar Publishing, pp. 66–84. <https://doi.org/10.4337/9781788117814.00013>.
- Plewnia, F., 2019. The energy system and the sharing economy: interfaces and overlaps and what to learn from them. *Energies* 12 (3). <https://doi.org/10.3390/en12030339>. Scopus.
- Plewnia, F., Guenther, E., 2018. Mapping the sharing economy for sustainability research. *Manag. Decis.* 56 (3), 570–583. <https://doi.org/10.1108/MD-11-2016-0766>.
- Ranjbari, M., Morales-Alonso, G., Carrasco-Gallego, R., 2018. Conceptualizing the sharing economy through presenting a comprehensive framework. *Sustainability* 10 (7), 2336. <https://doi.org/10.3390/su10072336>.
- Retamal, M., 2017. Product-service systems in Southeast Asia: business practices and factors influencing environmental sustainability. *J. Clean. Prod.* 143, 894–903. <https://doi.org/10.1016/j.jclepro.2016.12.032>. Scopus.
- Richardson, J., 2008. The business model: an integrative framework for strategy execution. *Strat. Change* 17 (5–6), 133–144. <https://doi.org/10.1002/jsc.821>.
- Richardson, L., 2015. Performing the sharing economy. *Geoforum* 67, 121–129. <https://doi.org/10.1016/j.geoforum.2015.11.004>.
- Ritala, P., Huotari, P., Bocken, N., Albarada, L., Puumalainen, K., 2018. Sustainable business model adoption among S&P 500 firms: a longitudinal content analysis study. *J. Clean. Prod.* 170, 216–226. <https://doi.org/10.1016/j.jclepro.2017.09.159>.
- Ritter, M., Schanz, H., 2019. The sharing economy: a comprehensive business model framework. *J. Clean. Prod.* 213, 320–331. <https://doi.org/10.1016/j.jclepro.2018.12.154>.
- Schaltegger, S., Hansen, E.G., Lüdeke-Freund, F., 2016. Business models for sustainability: origins, present research, and future avenues. *Organ. Environ.* 29 (1), 3–10. <https://doi.org/10.1177/1086026615599806>.
- Schor, J., 2016. Debating the sharing economy. *J. Self Govern. Manag. Econ.* 4 (3), 7–22.
- Seegebarth, B., Peyer, M., Balderjahn, L., Wiedmann, K.-P., 2016. The sustainability roots of anticonsumption lifestyles and initial insights regarding their effects on consumers' well-being. *J. Consum. Aff.* 50 (1), 68–99. <https://doi.org/10.1111/joca.12077>.
- Short, S.W., Bocken, N., Barlow, C.Y., Chertow, M.R., 2014. From refining sugar to growing tomatoes: industrial ecology and business model evolution. *J. Ind. Ecol.* 18 (5), 603–618. <https://doi.org/10.1111/jiecl.12171>.
- Sovacool, B.K., Assen, J., Sorrell, S., 2018. Promoting novelty, rigor, and style in energy social science: towards codes of practice for appropriate methods and research design. *Energy Res. Soc. Sci.* 45, 12–42. <https://doi.org/10.1016/j.erss.2018.07.007>.
- Spulber, D.F., 2019. The economics of markets and platforms. *J. Econ. Manag. Strat.* 28 (1), 159–172. <https://doi.org/10.1111/jems.12290>. Scopus.
- Täuscher, K., Kietzmann, J., 2017. Learning from failures in the sharing economy. *MIS Q. Exec.* 16 (4), 253–264. Scopus.
- Täuscher, K., Laudien, S.M., 2018. Understanding platform business models: a mixed methods study of marketplaces. *Eur. Manag. J.* 36 (3), 319–329. <https://doi.org/10.1016/j.emj.2017.06.005>.
- Taylor, A., 2018. Bike share oversupply in China: huge piles of abandoned and broken bicycles. <https://www.theatlantic.com/photo/2018/03/bike-share-oversupply-in-china-huge-piles-of-abandoned-and-broken-bicycles/556268/>.
- Teecle, D.J., 2010. Business models, business strategy and innovation. *Long. Range Plan.* 43 (2–3), 172–194. <https://doi.org/10.1016/j.lrp.2009.07.003>.
- Tussyadiah, I.P., Zach, F., 2017. Identifying salient attributes of peer-to-peer accommodation experience. *J. Trav. Tourism Market.* 34 (5), 636–652. <https://doi.org/10.1080/10548408.2016.1209153>. Scopus.
- Vaskelainen, T., Piscicelli, L., 2018. Online and offline communities in the sharing economy. *Sustainability* 10 (8). <https://doi.org/10.3390/su10082927>. Scopus.
- Vătămănescu, E.-M., Pinzaru, F.M., 2017. *Knowledge Management in the Sharing Economy: Cross-Sectoral Insights into the Future of Competitive Advantage*. Springer.
- Wang, D., Nicolau, J.L., 2017. Price determinants of sharing economy based accommodation rental: a study of listings from 33 cities on Airbnb.com. *Int. J. Hospit. Manag.* 62, 120–131. <https://doi.org/10.1016/j.ijhm.2016.12.007>.
- Weissbrod, L., Bocken, N.M.P., 2017. Developing sustainable business experimentation capability – a case study. *J. Clean. Prod.* 142, 2663–2676. <https://doi.org/10.1016/j.jclepro.2016.11.009>.
- Wirtz, B.W., Pistoia, A., Ullrich, S., Göttel, V., 2016. Business models: origin, development and future research perspectives. *Long. Range Plan.* 49 (1), 36–54. <https://doi.org/10.1016/j.lrp.2015.04.001>.
- Wu, X., Shen, J., 2018. A study on Airbnb's trust mechanism and the effects of cultural values—based on a survey of Chinese consumers. *Sustainability* 10 (9). <https://doi.org/10.3390/su10093041>. Scopus.
- Wu, J., Ma, P., Xie, K.L., 2017. In sharing economy we trust: the effects of host attributes on short-term rental purchases. *Int. J. Contemp. Hospit. Manag.* <https://doi.org/10.1108/IJCHM-08-2016-0480>.
- Yang, M., Vladimirova, D., Evans, S., 2017. Creating and capturing value through sustainability. *Res. Technol. Manag.* 60 (3), 30–39. <https://doi.org/10.1080/08956308.2017.1301001>.
- Yu, B., Singh, M.P., 2002. Distributed reputation management for electronic commerce. *Comput. Intell.* 18 (4), 535–549. <https://doi.org/10.1111/1467-8640.00202>.
- Zott, C., Amit, R., Massa, L., 2011. The business model: recent developments and future research. *J. Manag.* 37 (4), 1019–1042. <https://doi.org/10.1177/0149206311406265>.

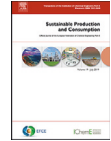
Article III





Contents lists available at ScienceDirect

Sustainable Production and Consumption

journal homepage: www.elsevier.com/locate/spc

Research article

Business model patterns in the sharing economy

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ARTICLE INFO

Article history:

Received 4 January 2021

Revised 4 April 2021

Accepted 5 April 2021

Available online 8 April 2021

Keywords:

Sharing economy

Business models

Sustainable business models

Business model patterns

Business model innovation

ABSTRACT

Sharing platforms struggle to remain financially viable and preserve their prosocial and environmental aspirations; therefore, effort to empirically study successful sharing economy business models (SEBMs) is needed. The aim of this research is to identify business model patterns among existing SEBMs in order to suggest business model attributes that support successful implementation. Patterns describe one or several recurring business model attributes observed among existing business models. This study investigates 63 SEBMs across 93 different configuration options. The k-medoids clustering approach was used to identify configuration options recurring repeatedly across the data. The empirical results were triangulated with existing business model patterns from literature. The study presents a framework to describe and analyse SEBMs; eight prototypical patterns, with a corresponding list of relevant business model attributes; and six solution patterns unique to the sharing economy. The patterns – as well as insights across locations, shared practices, and platform types – advance knowledge on the sharing economy. Furthermore, these patterns support sharing platforms to communicate, learn, and experiment, ideally supporting successful implementation of SEBMs.

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1. Introduction

The sharing economy generally describes digitally-mediated access to under-utilised goods and services (Frenken and Schor, 2017), but the concept lacks any consistent definition in research and practice (Belk, 2014; Curtis and Lehner, 2019). For example, phenomenon such as the gig economy (De Stefano, 2015), time banking (Laamanen et al., 2015), makerspaces (Fitzmaurice et al., 2020), and others are “...uncomfortably corralled under the term ‘sharing economy’” (Davies et al., 2017, p. 110). Even Netflix, Wikipedia, subscription boxes, cinemas, and delivery services are included in the sharing economy by some scholars (Muñoz and Cohen, 2018; Ritter and Schanz, 2019). As a result of this disparity, there exists multiple conceptualisations of sharing economy business models (SEBMs), for example, a sharing business model compass (Muñoz and Cohen, 2018), a typology of sharing economy companies (Trabucchi et al., 2019), a taxonomy of peer-to-peer sharing and collaborative consumption platforms (Chasin et al., 2018), a comprehensive sharing economy business model framework (Ritter and Schanz, 2019), and a typology of digital sharing business models (Pouri and Hilty, 2020).

As such, these conceptualisations offer conflicting input to researchers and practitioners regarding the *design* of sharing econ-

omy business models, while many do not sufficiently elaborate on aspects of their conceptualisation to support *implementation*. For example, Muñoz and Cohen (2018) propose the business model attribute governance model, inclusive of corporate, collaborative, and cooperative governance, yet provide no description of these models. Furthermore, these conceptualisations provide no guidance to support practitioners with the choice of business model attributes in particular contexts. This exemplifies what is regarded in research as the design-implementation gap. Research tends to overemphasise the design of business models, with business model implementation remaining understudied (Baldassarre et al., 2020; Breuer et al., 2018; Geissdoerfer et al., 2018). Yet, research on business model implementation is vital, as some estimate between 70–90% of business models fail (Griffith, 2014; Patel, 2015). In the sharing economy, platforms struggle to remain economically viable, scale operations, and preserve the original prosocial and environmental aspirations of their founding members (Acquier et al., 2017; Laukkanen and Tura, 2020).

Business model patterns are an emerging tool to recognise trends among existing business models, which may prove useful in other contexts, bridging this design-implementation gap in research and practice (Remane et al., 2017). Research suggests that “...most business models can be reduced to recurring patterns” (Rudtsch et al., 2014, p. 313), with Gassmann et al. (2014) asserting that approximately 90% of business models are a result of rearranging existing business model patterns. Therefore, broadly

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speaking, business model patterns are defined as one or several recurring business model attributes observed among existing business models, which are seen as potential solutions to a given problem (Amshoff et al., 2015; Lüdeke-Freund et al., 2018; Remane et al., 2017). Research establishing patterns explores the design of business models, and provides justificatory knowledge to implement patterns in other contexts. Patterns are said to support creativity (Johnson and Lafley, 2010), foster group interactions (Gassmann et al., 2014), and facilitate understanding and communication (Lüdeke-Freund et al., 2018), all of which increases the likelihood of successful implementation (Abdelkafi et al., 2013).

Research has established business model patterns broadly (Gassmann et al., 2014; Lüdeke-Freund et al., 2018; Remane et al., 2017), as well as industry-specific patterns, for example, telemedicine companies (Peters et al., 2015). As of yet, there is no known research specific to the sharing economy. Therefore, the aim of this research is to establish business model patterns in the sharing economy in order to suggest business model attributes that support successful implementation. In the following sections, literature pertaining to business model patterns and the sharing economy is explored (Section 2). Then, the methods to establish patterns are described in detail, for instance, using quantitative cluster analysis in R Studio (Section 3). Next, the results are presented establishing business model patterns in the sharing economy (Section 4). Suggestions to operationalise patterns as well as limitations and future research are proposed (Section 5). Finally, the article concludes with a brief summary (Section 6).

2. Literature review

A growing body of literature exists on business model patterns, although it remains overlapping and incomplete (Remane et al., 2017). Therefore, to position this research, literature on business model patterns and sharing economy business models is reviewed. Furthermore, an examination of this literature demonstrates no known sharing economy business model patterns, further justifying the research gap.

2.1. Business model patterns

Architectural theorist Christopher Alexander first proposed the pattern concept to describe proven solutions to recurring problems, particularly for urban planning and architecture (Alexander, 1999, 1977). They say, “[e]ach pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice” (Alexander, 1977, p. x). While borne out of the field of architecture, the pattern concept has gone on to be used in many other fields of research and practice (Lüdeke-Freund et al., 2018). Among business model scholars, patterns have been used to describe business model patterns generally (Gassmann et al., 2014), sustainable business models (Lüdeke-Freund et al., 2018), as well as specifically internet-of-things (Fleisch et al., 2015; Sánchez et al., 2020; Weinberger et al., 2016), pharmaceutical firms (Tangour et al., 2019), open data platforms (Ahmadi Zeleti et al., 2016), data-driven start-ups (Schirmer et al., 2021), and circular business models (Lüdeke-Freund et al., 2019).

By focusing on the business model – a description of how a company creates, delivers, and captures value for its customers (Osterwalder and Pigneur, 2010) – research can support the design and implementation of SEBMs. The “building blocks” of the business model are called attributes, which describe the material or immaterial functions, features, or actions of the firm (Osterwalder, 2004, p. 30). The various known alternatives for each attribute are often called configuration options (Amshoff et al.,

2015; Echterfeld et al., 2015). Definitions of business model patterns vary, but they are generally understood as attributes of existing business models that recur successfully, which are seen as potential solutions to a given problem (Lüdeke-Freund et al., 2018; Remane et al., 2017; Weking et al., 2018). Establishing patterns supports managers and entrepreneurs by reducing complexity (Ng, 2018; Weking et al., 2018), making business model patterns among the most popular tools for business model innovation (Remane et al., 2017).

However, the challenge lies in identifying and describing these existing patterns and understanding the contexts in which they are successful. Scholars have used several methods to establish business model patterns, some more rigorous and transparent than others. Two methodological approaches are common: a review-based approach, examining existing collections of business model patterns to synthesise and summarise conceptual business model patterns generally (Lüdeke-Freund et al., 2018; Remane et al., 2017); and an empirical-based approach, examining interview and web data to identify novel business model patterns in specific contexts (Abdelkafi et al., 2013; Floercke and Lehner, 2019; Frankenberger et al., 2014). Among those that employ the latter approach, authors used both qualitative (Mosig et al., 2017; Peters et al., 2015; Weking et al., 2019) and quantitative (Amshoff et al., 2015; Hunke et al., 2017; Tangour et al., 2019) methods to cluster recurring business model attributes into patterns.

Amshoff et al. (2015) propose three distinct categories of business model patterns – frameworks, prototypical patterns, and solution patterns – which vary based on their level of granularity (Fig. 1). This distinction highlights that patterns may refer to entire business models or a combination of business model attributes (Amshoff et al., 2015; Lüdeke-Freund et al., 2018). Frameworks (e.g. Business Model Canvas) are abstract reference models useful to describe, analyse, and document whole business models (Amshoff et al., 2015). Prototypical patterns are better suited to holistically describe industry-specific domains (e.g. manufacturer, multi-sided platform), providing a quick orientation for new or existing business models within the domain (Amshoff et al., 2015; Lüdeke-Freund et al., 2018). Of the three categories, solution patterns are the most actionable, at the lowest level of abstraction, because they capture single or several business model attributes used in combination that can be replicated more easily (e.g. peer-to-peer) (Amshoff et al., 2015; Lüdeke-Freund et al., 2018; Remane et al., 2017). Various scholars have used patterns to describe frameworks (Osterwalder and Pigneur, 2010), prototypical patterns (Weill et al., 2005), and solution patterns (Johnson and Lafley, 2010), while others mix patterns among categories (Gassmann et al., 2014).

2.2. Sharing economy business models

Despite ongoing semantic confusion, there is continued interest in the sharing economy as a mode to foster more sustainable consumption (Gupta and Chauhan, 2021). The sharing economy overlaps with other related phenomenon within the domain of sustainable production and consumption, for example, product-service systems (PSS) and the circular economy. SEBMs may be an example of use-oriented PSS, which facilitates sharing, renting, or pooling resources to provide access instead of product ownership itself (Mont, 2002; Tukker, 2004). Additionally, the sharing economy is an extension of the circular economy, if seen as slowing resource loops, as sharing may increase the intensity of use and extend product lifetimes (Bocken et al., 2016). Proponents suggest that the sharing economy improves resource efficiency by leveraging under-utilised assets (McLaren and Agyeman, 2015; Voytenko Palgan et al., 2016). Furthermore, depending on the business model,

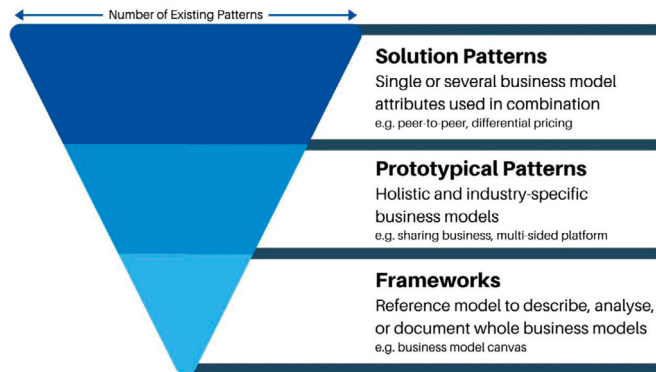


Fig. 1. Categories for classifying business model patterns.
Adapted from Amshoff et al. (2015).

the sharing economy may also support meaningful peer-to-peer interactions, leading to empowering individuals, increasing trust in communities, and stronger social cohesion, (Schor et al., 2016). Yet, Airbnb and Uber remain the focus of the majority of academic research (Ritter and Schanz, 2019). However, there exist many more permutations of SEBMs not yet sufficiently addressed in literature.

With the potential to contribute to sustainable consumption, there is a need to be deliberate and strategic in how SEBMs are designed and implemented (Curtis and Mont, 2020). And, with a number of possible business models, a prescriptive definition is needed to demarcate those business models and consumption practices belonging to the sharing economy for sustainability (Verschuren and Doorewaard, 2010). In this research, the sharing economy is defined as "... a socio-economic system that leverages technology to mediate two-sided markets, which facilitate temporary access to goods that are under-utilised, tangible, and rivalrous" (Curtis and Mont, 2020, p. 4). Such a definition guides subsequent analysis, supporting the development of business model patterns that support the design and implementation of SEBMs.

From this definition, previous research developed a sharing economy business modelling tool (Curtis and Mont, 2020). This research was prescriptive and design-oriented in nature to improve upon existing SEBM conceptualisations by departing from a coherent definition, describing business model attributes to support implementation, and integrating sustainability as design conditions (Curtis and Mont, 2020). Building on existing conceptualisations, expert feedback, and empirics, the sharing economy business modelling tool depicted three value dimensions, sixteen business model attributes, and sixty-six corresponding configuration options (Fig. 2) (Curtis and Mont, 2020). Of significance, the attributes *platform type* and *shared practice* structured the subsequent analysis of business model patterns. Platform type describes "... the constellation of actors in the two-sided market of the sharing platform", including *peer-to-peer*, *business-to-peer*, *business-to-business*, and *crowd cooperatives* (Curtis and Mont, 2020, p. 7). While most are obvious, *business-to-peer* describes mediation between a business with idling resources (e.g. construction or medical equipment) and an individual. Additionally, the attribute *shared practice* sought to overcome a sectorial view to describe the facilitated practice or provided service. This includes *shared space* (e.g. spare rooms, apartments, storage, parking spaces), *shared mobility* (e.g. cars, bikes, scooters), *shared goods* (e.g. tools, clothes, electron-

ics), *shared consumables* (e.g. food, motor oil, paint, perfume), and *shared resources* (e.g. energy, excess heat).

2.3. Sharing economy business model patterns

Previous research on business model patterns have described patterns relevant – but not explicitly – for the sharing economy. However, patterns research recognises the potential of sharing; in their study among the 1000 largest US companies, Weill et al. (2005, p. 1) conclude "... selling the right to use assets is more profitable and more highly valued by the market than selling ownership of assets". Some patterns are more studied in relation to the sharing economy, e.g. the product-to-service pattern exemplified by carsharing business models (Abdelkafi et al., 2013; Laurischkat et al., 2016). Mikusz et al. (2017) present the pattern *personalised sharing*, and invoke the sharing economy when describing carsharing as a business model that facilitates access with a recurring revenue source (e.g. *pay per use*). Pieroni et al. (2021) highlight *sharing* as a pattern to improve circularity in the furniture sector in response to changing functional needs and aesthetic preferences.

Additionally, Lüdeke-Freund et al. (2018) present sustainable business model patterns, of which they propose the pattern *sharing business*. The scholars suggest *sharing businesses* enable both positive environmental and social value creation, but do not elaborate further on relevant attributes to support implementation (Lüdeke-Freund et al., 2018). In a complementary work, Lüdeke-Freund et al. (2019) present a typology of circular economy business model patterns, which they link the sharing economy to the pattern *reuse and redistribution*. However, this thinking sees reuse and redistribution describing the purchase of second-hand goods, whereas the sharing economy is largely (although not entirely) seen as facilitating access over ownership (Harmaala, 2015; Muñoz and Cohen, 2018; Ritter and Schanz, 2019).

Additionally, other relevant patterns scattered across the literature include *multi-sided platforms* (Osterwalder and Pigneur, 2010), *peer-to-peer* (Gassmann et al., 2014), *product-to-service* (Kwon et al., 2019; Weking et al., 2019), *fractional ownership* (Gassmann et al., 2014; Krlewski, 2016) and *unbundling* (Osterwalder and Pigneur, 2010; Remane et al., 2017). The most common example of a *multi-sided platform* is *peer-to-peer* (Krlewski, 2016; Remane et al., 2017; Weking et al., 2018). This pattern describes platform mediation facilitating a transaction – including sharing

		Attributes		Alternate Conditions								
Value Facilitation	Key Activity	Platform mediation allowing for access to under-utilised goods										
	Platform Type	Peer-to-Peer		Business-to-Business			Business-to-Peer		Crowd			
	Practice	Shared Space		Shared Mobility		Shared Goods		Shared Consumables		Shared Resources		
	Intellectual Property	Open Source			Communal			Proprietary				
	Governance Model	Cooperative			Collaborative			Corporate				
	Price Discovery	Free		Pay What you Can	Negotiation / Bargaining		Auction	Set by Resource User	Set by Resource Owner		Set by Platform	
	Value Delivery	Value Proposition	Reduction of transaction costs in sharing									
Mediating Interface		Smartphone App			Website			Third-Party App				
Venue for Interaction		Offline			Hybrid			Online				
Review System		Resource Owner Reviews		Resource User Reviews			Platform Reviews		None			
Geographical Scale		Existing Community		Local		Regional		National		International		
Value Capture	Value Orientation	Societal / Public			Social			Environmental		Commercial		
	Revenue Streams	None	Transaction Fee	Commission	Subscription Fee	Membership	Advertisements	Data Mining	Sponsorship	Donations	Project Funding	
	Pricing Mechanisms	Static Pricing			Dynamic Pricing			Differential Pricing				
	Price Discrimination	None		Feature-based			Location-based		Quantity-based			
	Revenue Source	None	Volunteer		Other		Resource Owner		Resource User	3rd-Party		

Fig. 2. Sharing economy business modelling tool adapted from Curtis & Mont (2020).

– between users (Amshoff et al., 2015; Remane et al., 2017). Remane et al. (2017) suggests this pattern is relevant for designing peer-to-peer carsharing services. There are no further explanations of the peer-to-peer pattern across known literature to support implementation of SEBMs.

The *product-to-service* pattern (Abdelkafi et al., 2013) – also called *servitisation* (Remane et al., 2017; Weking et al., 2019) – is mentioned across the sample, again, when describing carsharing. Servitisation sees companies “...integrating or increasing the share of service components in a firm’s portfolio” (Weking et al., 2019, p. 4). While this type of business model is not new, Abdelkafi (2013, p. 21) suggests it is “...very promising, as it can increase market penetration and support the wide diffusion of the electric car”, for example, via carsharing. In addition, PSS is described as a type of servitisation. In their work, Weking et al. (2019) describe *servitisation* as a super-pattern and *product as a service* as the corresponding sub-pattern. *Product as a service* describes business models that offer renting options – as opposed to selling products – generating value based on availability and access, with use-based revenue streams (Weking et al., 2019).

Fractional ownership describes the sharing of an asset amongst a group of co-owners (Kralewski, 2016; Remane et al., 2017). This type of pattern is common for expensive or luxury goods used infrequently (e.g. car, condo, private jet, renewable energy infrastructure) (Abdelkafi et al., 2013; Facchinetti and Sulzer, 2016; Kralewski, 2016). The pattern *unbundling* suggests businesses focus on one business area (e.g. product innovation, customer relationship management, infrastructure management), instead of the entire value chain (Abdelkafi et al., 2013; Osterwalder and

Pigneur, 2010; Remane et al., 2017). Again, this is discussed in the context of carsharing services, which suggests unbundling the business areas of car manufacturers, suppliers, and customer relationship management, the latter facilitating carsharing services (Abdelkafi et al., 2013).

Beyond these examples, there are no other patterns across known literature related to sharing or the sharing economy. Carsharing is most discussed, suggesting a greater degree of institutionalisation compared with other shared practices, for example, shared space and shared goods. However, the elaboration in existing literature is insufficient and confirms the need to establish empirically-derived business models patterns in the sharing economy.

3. Methods

Business model scholars are increasingly calling for improved methodological rigour and transparency (Schneider and Spieth, 2013; Spieth et al., 2014; Zott et al., 2011), including in business model patterns research (Hunke et al., 2017). Therefore, this research replicates the methods used by Amshoff et al. (2015) and Hunke et al. (2017) to establish business model patterns in the sharing economy. The research draws on both literature and empirical data to perform abductive data collection and analysis of existing sharing economy business models. The research methods are described in detail, consisting of six stages: 1) literature review; 2) refining an SEBM framework and configuration options; 3) data collection and preparation; 4) quantitative cluster analysis; 5) data validation; and 6) business model pattern interpretation.

3.1. Literature review

A literature review was first conducted to review methodological approaches to establish business model patterns and to catalogue existing patterns. A Scopus database search was executed on 14 April 2020 using the query “business model patterns” contained in the title, abstract, or keywords. The search comprised all document types, including articles, conference papers, and book chapters. The results returned 56 documents in English, with full access to 52 documents obtained. The excluded documents included a retracted article and three book chapters from the same volume that was unable to be obtained.

All collected documents were imported into NVivo and analysed. NVivo is a software by QSR International to support with the management and analysis of qualitative data. The purpose of this analysis was threefold: 1) to review existing literature on business model patterns, including state-of-the-art and research gaps; 2) to establish a methodological approach informed by literature that was rigorous, transparent, and reproducible; and 3) to collect existing business model patterns broadly, as well as relevant to the sharing economy, to triangulate and interpret emerging sharing economy business model patterns. Conducting the literature review in NVivo allows for structured coding of the literature, for example, of methods to establish business model patterns and existing solution patterns. Based on this review, quantitative cluster analysis was selected to establish patterns among existing SEBMs.

3.2. Framework and configuration options

Any such investigation of business model patterns in a specific industry or sector shall take into account their context and defining features (Ruseva, 2015). As such, the second stage saw the formulation of a business model framework and configuration options specific to the sharing economy to support pattern identification (Hunke et al., 2017). Configuration options characterise the known alternatives available for each variable, in this instance, configuration options describe the different choices available for each business model attribute (Amshoff et al., 2015; Echterfeld et al., 2015). Using these configuration options, mapping of each identified business model may proceed.

This research departs from the sharing economy business modelling tool described in Section 2.2. This previous research used morphological analysis, a customary qualitative modelling method to comprehensively structure and analyse multidimensional objects such as business models (Müller and Welpel, 2018; Plewnia and Guenther, 2018; Täuscher and Laudien, 2018). Similarly, several scholars have used morphological analysis to establish a business model framework to identify configuration options and to support pattern identification (Kwon et al., 2019; Lüdeke-Freund et al., 2019; Peters et al., 2015).

The framework served as a starting point to analyse SEBMs. However, additional configuration options were added abductively as they emerged from data collection (see Section 3.3). Additionally, modest changes were made to the framework for the purpose of this study. Firstly, the *business-to-consumer* configuration option was added to the attribute *platform type*. This configuration option was previously excluded because these business models create an artificial idling capacity and do not operate as a two-sided platform (e.g. ZipCar, ShareNow, DropBike). However, in research and practice, these companies are commonly ascribed to the sharing economy. By including the *business-to-consumer* configuration option, analysis may be able to demarcate differences between these business models and others in the sharing economy to support future implementation. Then, each configuration option was defined in detail to support data collection (see Appendix). The definitions of each configuration option were based on literature and trian-

Table 1
Configuration options for the dimension value facilitation.

Business model attribute	Known configuration options	
Platform Type	1A	Peer-to-Peer
	1B	Business-to-
	1C	Business
	1D	Business-to-Peer
	1E	Crowd/Cooperative
	1F	Business-to-Consumer
Practice	2A	Public-to-Citizen
	2B	Shared Space
	2C	Shared Mobility
	2D	Shared Goods
	2E	Shared
Intellectual Property	3A	Shared Resources
	3B	Open Source
	3C	Communal
Governance Model	4A	Proprietary
	4B	Cooperative
	4C	Collaborative
	4D	Corporate
Price Discovery	5A	Free
	5B	Pay What You Can
	5C	Negotiation /
	5D	Bargaining
	5E	Auction
	5F	Bartering
	5G	Set by Resource
	5H	User
		Set by Resource
	Owner	
	Set by Platform	

gulated with examples from existing business models, using the query function and related keywords in NVivo. The final framework had 17 business model attributes and 93 configuration options. The complete list of configuration options is presented in the Appendix, with a subset presented in Table 1.

3.3. Data collection and preparation

This stage consisted of data collection and data preparation for quantitative cluster analysis. First, data was collected across 63 sharing platforms – 14 platforms in Toronto, 14 platforms in Amsterdam, and 35 international platforms (see Appendix). These case cities were selected as part of the Urban Sharing research programme as they represent similar political, economic, and social contexts in North America and Europe. The sample also includes a variety of global and local initiatives to explore potential differences in patterns based on context, including business model attributes *platform type*, *shared practice*, and *geographic scale*.

Of the identified sharing platforms, data was collected from their websites, social media, and relevant news articles. When data was absent or inconsistent, a cursory internet search was conducted, which reviewed the top ten search results and news items. All relevant data was imported as webpages into NVivo using the NCapture plug-in. This qualitative data was coded abductively, which sees the researcher recursively moving between theory and observations (Tavorly and Timmermans, 2014). As such, the analysis started with the framework and initial configuration options presented in Section 2.2. However, additional configuration options were added to the framework, based on examples observed during data analysis (Creswell, 2014). Finally, abductive analysis requires review and revision of all coding in relation to existing and new configuration options (Miles et al., 2013). The resulting analysis arrived at a final business model framework, with each SEBM coded

Table 2
Subset of binary coding of platforms and attributes Adapted from Amshoff et al. (2015).

Attribute	Configuration Option	No.	ZipCar	Toronto Tool Library	Peerby
Platform Type	Peer-to-Peer	1A	0	0	1
	Business-to-Business	1B	0	0	0
Practice	Business-to-Peer	1C	0	0	0
	Crowd / Cooperative	1D	0	1	0
	Business-to-Consumer	1E	1	0	0
	Public-to-Citizen	1F	0	0	0
	Shared Space	2A	0	0	0
	Shared Mobility	2B	1	0	0
	Shared Goods	2C	0	1	1
Intellectual Property	Shared Consumables	2D	0	0	0
	Shared Resources	2E	0	0	0
	Open Source	3A	0	1	0
Governance Model	Communal	3B	0	0	0
	Proprietary	3C	1	0	1
Price Discovery	Cooperative	4A	0	0	0
	Collaborative	4B	0	1	0
Discovery	Commercial	4C	1	0	1
	Free	5A	0	0	1
	Pay What You Can	5B	0	0	0
	Negotiation / Bargaining	5C	0	0	0
	Auction	5D	0	0	0
	Bartering	5E	0	0	0
	Set by Resource User	5F	0	0	0
	Set by Resource Owner	5G	0	0	1
	Set by Platform	5H	1	1	0

qualitatively based on available data in relation to the configuration options.

The coded data from NVivo was translated from qualitative data to quantitative data to be useful for cluster analysis. Binary coding in Excel was used to correspond with the framework – 1 for the presence of the configuration option and 0 for its absence (Tangour et al., 2019). The absence of a configuration option did not necessarily mean it was not employed by the business model; however, in the absence of evidence, only those configuration options that exhibited a distinct incident were coded (Hunke et al., 2017). Following the approach by Schief et al. (2012), two principles guided the binary coding: 1) to provide evidence for the binary classification; and 2) to choose the dominant configuration option (with few exceptions, e.g. *revenue streams*). The attributes corresponding to *key activity* and *value proposition* were coded qualitatively, as these were context specific, and are not captured by the binary coding. A subset of the resulting binary coding is presented in Table 2, while the complete dataset is available as supplementary materials.

Once data collection was completed, the dataset was prepared to be suitable for cluster analysis. There were more or less data available for some sharing platforms and some configuration options. Those characteristics absent in every business model, as well as only observed in one business model, were excluded from further analysis, as these configuration options would have no bearing on the formation of clusters (Hunke et al., 2017). In total, eleven target datasets were prepared for cluster analysis. Target datasets included the full collection of business models (63) as well as filtering the data based on business model attributes of location (e.g., Toronto, Amsterdam, and multiple locations), shared practice (shared space, shared mobility, and shared goods), and platform type (e.g. peer-to-peer, business-to-peer, crowd cooperatives, and business-to-consumer).

3.4. Quantitative cluster analysis

Quantitative cluster analysis was performed on all eleven target datasets, providing patterns across all the data as well as more nuanced analysis controlling for business model attributes, in other words, patterns for shared mobility or peer-to-peer plat-

forms. Cluster analysis is the only known quantitative method to identify business model patterns from empirical data (Camisón and Villar-López, 2010; Morris et al., 2013; Tangour et al., 2019). Different quantitative clustering approaches have been used previously to establish patterns, for example, multidimensional scaling (Amshoff et al., 2015) using SPSS as well as hierarchical agglomerative clustering (Schief et al., 2012; Weking et al., 2018), and k-medoids (Hunke et al., 2017) using R Studio. The k-medoids algorithm was selected to establish clusters. Compared to hierarchical agglomerative clustering, this is a partitioning method, which seeks to create mutually exclusive clusters. In contrast to the k-means algorithm, the k-medoids algorithm sets the centre of the cluster as an existing observation and not an average, which can be used to describe the cluster and support pattern identification. In computing clusters, the manhattan distance was used, which is the sum of absolute distances between the observations, as it was less influenced by outliers (Kassambara, 2017).

One must determine the number of clusters k when using the k-medoids algorithm. There are several methods to determine the ideal number of clusters, including the silhouette method and the gap statistic method. The silhouette method is seen as less sophisticated compared to the gap statistic, which uses a more advanced statistical procedure to formalise the number of clusters (Kassambara, 2017). For each data set, the ideal number of clusters was calculated using each method and selected the number of clusters k based on agreement (Table 3). When there was no agreement, the gap statistic method was favoured. Once the number of clusters was determined, the analysis was performed resulting in a cluster of configuration options used in combination relevant for each target dataset. There were 29 clusters across the 11 datasets. The full dataset and corresponding R code are available as supplementary materials.

3.5. Cluster validation

Relative and internal cluster validation methods were used to evaluate the optimal number of clusters and the appropriateness of the cluster structures, respectively. First, the number of clusters k were varied for the same cluster analysis to compare results and confirm the optimal number of clusters for each target

Table 3
Number of clusters for each target dataset.

Target dataset	Number of clusters
All Data	4
Toronto	2
Amsterdam	2
Multiple Locations	3
Shared Space	2
Shared Mobility	4
Shared Goods	3
Peer-to-Peer	2
Business-to-Peer	2
Business-to-Consumer	2
Crowd Cooperatives	3
Total	29

dataset. Then, the silhouette coefficient was used to evaluate the “goodness” of a clustering structure (Kassambara, 2017). The silhouette coefficient measures the similarity between objects in the same cluster, with value range from -1 to 1, and may describe each cluster as well as an average for the clustering structure. Similar to Hunke et al. (2017), the clustering results with a silhouette coefficient less than 0.25 were neglected, which suggests that no substantial structure in the data exists.

3.6. Business model pattern interpretation

Finally, the quantitative results of each of the eleven cluster analyses were interpreted to establish business model patterns in the sharing economy. Each cluster contained a grouping of configuration options that are compatible with each other (Facchinetti and Sulzer, 2016), where dissimilarity between the observations in the group is minimised (Kassambara, 2017). For each cluster, a list of corresponding configuration options was determined. Using this list, each cluster was characterised, for example, based on the prevalent shared practice, platform type, or value orientation. As a result, there were overlaps between clusters, for instance, business-to-consumer mobility sharing platforms were represented by clusters across all data and shared mobility datasets. Therefore, the combination of configuration options among similar clusters were merged and projected onto empirically-derived sharing platform archetypes.

Projecting onto archetypes sought to ground the merging of clusters within the data, as opposed to relying only on personal experience. The archetypes were established by performing additional quantitative cluster analysis, this time using the hierarchical agglomerative clustering algorithm. In contrast to a partitioning method (e.g. k-medoids), the hierarchical agglomerative clustering algorithm is a bottom-up approach, which does not develop mutually-exclusive clusters (Kassambara, 2017). Instead, this method generates a tree-like dendrogram where each SEBM is considered as a single cluster, which are merged to form a new cluster again and again until left with an overarching root cluster (Kassambara, 2017). As such, it is up to the researcher to choose at which hierarchy generates suitable groups of data objects (Kassambara, 2017). While the clusters are determined quantitatively based on similarity in the data, personal knowledge was needed to interpret these clusters based on the SEBMs contained within each cluster, for example, that Airbnb is a commercial peer-to-peer space sharing platform. This clustering analysis resulted in eight empirically-derived archetypes, each with a list of configuration options used in combination, representing prototypical business model patterns.

Finally, drawing on the framework and prototypical patterns, solution patterns were proposed in the sharing economy. In comparison, solution patterns represent one or a few business model

attributes and are seen as the most actionable for business model innovation. The solution patterns observed were then triangulated with the literature analysed in stage one (Section 4.1) to reduce overlap and identify new patterns compared with existing literature. All solution patterns are then defined in detail, with examples, to support the design and implementation of SEBMs.

4. Results

This study produced several relevant business model patterns in the sharing economy, corresponding to the categories of patterns presented in Section 2.1, including a framework, prototypical patterns, and solution patterns. The patterns are described in detail below, and suggestions to use these patterns in practice are provided in Section 5.

4.1. Sharing economy business model framework

Acting as a two- or multi-sided market, with multiple user segments and value propositions, SEBMs are complex in nature. A clear framework is necessary to analyse complex business models (Peters et al., 2015). As such, the analysis produced the Sharing Economy Business Model Framework, which built on previous research (Curtis and Mont, 2020), but incorporated additional configuration options identified throughout this study (Fig. 3). These additional configuration options were primarily relevant for value capture – describing *revenue streams* and *price discrimination*. In addition, there was a further configuration option describing *geographical scale*. This framework offers an abstract reference model that helps to document, analyse, and describe sharing economy business models. This represents the most elaborate known framework of sharing economy business models – cf. Muñoz and Cohen (2018); Plewnia and Guenther (2018); Täuscher and Laudien (2018) – with twenty-five unique revenue streams and sustainability performance as boundary conditions. Additional configuration options emerged during analysis of each sharing platform. A full description of each configuration option in the framework is provided in the Appendix.

The ability of the sharing platform to create and deliver value relies on adequate *revenue streams* to compensate the costs of the platform (Abdelkafi et al., 2013). *Revenue streams* may be bound or unbound to the utility of the service (Ritter and Schanz, 2019), for example, a *commission* paid during each transaction or a *membership fee* paid at the end of every month, respectively. Alternative revenue streams may also include *donations*, *sponsorships*, or *public or provide project funding*. Additional revenue streams emerged relevant for analysis: *finances and other fees*; *lead generation*; *usage rates*; *convenience fee*; *promotions*; *buy-out*; *credits*, *tokens*, or *digital currency*; *additional services*; *service retainer*; *verification*; *franchise*; *revenue sharing*; *ownership shares*; and *registration fee*.

Price discrimination generally describes difference in price based on attributes of the product or characteristics of the market in which the business operates (Curtis and Mont, 2020). Additional configuration options relevant for price discrimination included *access-based*, *market-share-based*, and *user-based*. *Access-based* discrimination 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. Only observed in one case – Sijpit – *market-share-based* discrimination describes variable pricing based on the number of customers the platform services. For instance, Sijpit offered discounted services to their first 1000 users or any user joining in the first year of operations as an incentive to join the service. *User-based* discrimination depicts attributes of the user using the product that influences its cost. This form of price discrimination was most common among carsharing platforms, where those under a

Attribute		Configuration Options															
Value Facilitation	Key Activity	Platform mediation allowing for access to under-utilised goods															
	Platform Type	Peer-to-Peer	Business-to-Business		Business-to-Peer		Crowd / Cooperative		Business-to-Consumer		Public-to-Citizen						
	Practice	Shared Space		Shared Mobility		Shared Goods		Shared Consumables		Shared Resources							
	Intellectual Property	Open Source				Communal				Proprietary							
	Governance Model	Cooperative				Collaborative				Corporate							
	Price Discovery	Free	Pay What You Can		Negotiation / Bargaining		Auction	Bartering	Set by Resource User		Set by Resource Owner		Set by Platform				
Value Delivery	Key Value Proposition	Reduction of transaction costs in sharing															
	Mediating Interface	Smartphone App			Website			Third-Party App or Integration			Other						
	Venue for Interaction	Offline			Hybrid			Online			None						
	Review System	Resource Owner Reviews			Resource User Reviews			Platform Reviews			None						
	Geographical Scale	Existing Community		Local		Regional		National		International		Nodes					
Value Capture	Value Orientation	Societal / Public				Social				Environmental				Commercial			
	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				
	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			
	Revenue Source	None		Volunteer		Other		Resource Owner		Resource User		3rd-Party					
	Sustainability Performance	Operates as a platform			Leverages idling capacity of an existing stock of goods			Possesses non-pecuniary motivation for ownership			Facilitates temporary access over ownership						

Fig. 3. Sharing economy business model framework.

certain age were required to pay more for access to shared vehicles (e.g. ZipCar, ShareNow, Kangaride).

Finally, *geographical scale* describes the proximity between the resource owner and resource user (Curtis and Mont, 2020). This was difficult to ascertain in every case, as this varied between each interaction on the platform. Therefore, the scale at which the sharing platform operated was also considered, which induced an additional configuration option: *nodes*. This configuration option responded to examples in which sharing platforms provided franchising opportunities (e.g. SailTime), or allowed interested actors to develop the platform in their own contexts (e.g. BikeSurf). In comparison to *international* scale, these sharing platforms may have international presence, but operate more autonomously than, for example, Airbnb. This is made possible because of *collaborative* governance and *communal* or *open source* intellectual property structures.

4.2. Prototypical patterns

Prototypical patterns describe industry-specific business models, often with a list of relevant configuration options to support implementation. As such, each of the 29 clusters across the 11 datasets represents an initial prototypical pattern, however, without context. With each of the clusters characterised based on platform type, shared practice, or value orientation, the clusters were merged and projected onto the archetypes of sharing platforms. The results of the hierarchical clustering analysis described in Section 3.6 generated eight archetypes inclusive of the 63 sharing platforms analysed in this study (Fig. 4):

- Collaborative Community Platforms

- Niche P2P Platforms
- Niche Corporate Platforms
- Commercial P2P Platforms
- Coworking Space Platforms
- Commercial Space Sharing Platforms
- P2P Mobility Sharing Platforms
- B2C Mobility Sharing Platforms

Each of the archetypes are described below, presenting the dominant configuration options for each (Table 4). These prototypical patterns are based on existing SEBMs, providing an indication of the contexts where configuration options are used in combination, addressing the design-implementation gap.

4.2.1. Collaborative community platforms (e.g. Toronto tool library, not far from the tree)

These platforms prioritise *environmental* or *societal* value creation and capture, and rely on the power of the community to drive their efforts. As such, their scale remains *local*, leveraging *collaborative* governance, interactions that take place in-person (*off-line*), and support from *volunteers*. This ethos is observed in the dominant revenue streams, including *membership*, *donations*, as well as *public* and *private* funding.

4.2.2. Niche peer-to-peer platforms (e.g. SmartCommute, BKSY, WarmShowers)

This pattern describes peer-to-peer platforms that are less formalised than some of their competitors, for example, these platforms likely do not employ a review system, a pricing mechanism, or price discrimination. Furthermore, they only utilise a *website* to reach their users, and rely on *volunteers* to support their efforts.

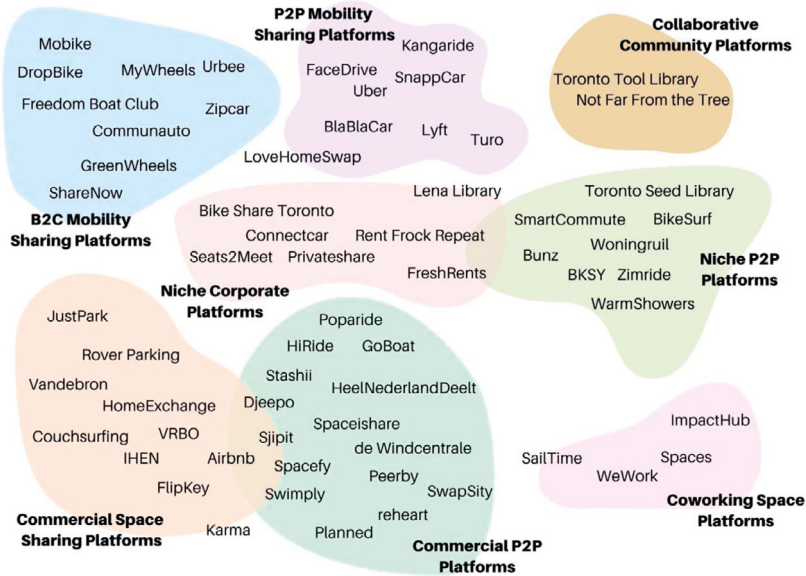


Fig. 4. Sharing platform archetypes.

Table 4
Prototypical patterns in the sharing economy.

Collaborative Community Platforms (e.g. Toronto Tool Library)	Niche Peer-to-Peer Platforms (e.g. BKSy, WarmShowers)	Niche Corporate Platforms (e.g. FreshRents, Seats2Meet)	Commercial Peer-to-Peer Platforms (e.g. Poparide, Swimpily)
4B Collaborative	1A Peer-to-Peer	3C Proprietary	1A Peer-to-Peer
5H Set by Platform	3C Proprietary	4C Corporate	3C Proprietary
7B Website	4A Cooperative	5H Set by Platform	4C Corporate
8A Offline	4C Corporate	7B Website	5G Set by Resource Owner
9D None	5A Free	9D None	7A Smartphone App
10B Local	5C Negotiation / Bargaining	11D Commercial	7B Website
11A Societal / Public	7B Website	12B Transaction Fee	8B Hybrid
11C Environmental	8B Hybrid	12L Fines or Other Fees	9A Resource Owner Reviews
12E Membership	9D None	12N Usage Rates	9B Resource User Reviews
12I Donations	10F Nodes	13D Differential Pricing	10D National
12J Public Project Funding	11A Societal / Public	15E Resource User	11D Commercial
12K Private Project Funding	12I Donations		12C Commission
15B Volunteer	13A None		12L Fines or Other Fees
15E Resource Use	14A None		13A None
	15B Volunteer		14A None
			15D Resource Owner
			15E Resource User
Peer-to-Peer Space Sharing Platforms (e.g. Airbnb, RoverPark)	Peer-to-Peer Mobility Sharing Platforms (e.g. Turo, BlaBlaCar)	Business-to-Consumer Sharing Platforms (e.g. ZipCar, DonkeyRepublic)	Coworking Space Platforms (e.g. WeWork, ImpactHub)
1A Peer-to-Peer	3C Proprietary	3C Proprietary	3C Proprietary
1C Business-to-Peer	4C Corporate	4C Corporate	4C Corporate
3C Proprietary	5G Set by Resource Owner	5H Set by Platform	5H Set by Platform
4C Corporate	5H Set by Platform	7A Smartphone App	7A Smartphone App
5G Set by Resource Owner	7A Smartphone App	7B Website	7B Website
5H Set by Platform	7B Website	8D None	8D None
7A Smartphone App	8B Hybrid	9D None	9D None
7B Website	9A Resource Owner Reviews	10E International	10E International
8C Online	9B Resource User Reviews	11C Environmental	11A Environmental
9A Resource Owner Reviews	10E International	11D Commercial	11D Commercial
9B Resource User Reviews	11D Commercial	12B Transaction Fee	12E Transaction Fee
10E International	12B Transaction Fee	12D Subscription Fee	12M Subscription Fee
11D Commercial	12C Commission	12L Fines or Other Fees	12S Fines or Other Fees
12C Commission	12L Fines or Other Fees	12N Usage Rates	12V Usage Rates
14A None	12N Usage Rates	13D Differential Pricing	13D Differential Pricing
15D Resource Owner	13C Dynamic Pricing	14C Location-Based	14B Feature-Based
15E Resource User	13D Differential Pricing	14F Access-Based	14C Location-Based

While they may maintain *proprietary* intellectual property and operate *collaborative* or *corporate* governance models, they rely on less common mechanisms for price discovery – *free* or *negotiation* – and revenue streams – *donations*. These platforms may possess *societal* value orientation.

4.2.3. Niche corporate platforms (e.g. *FreshRents*, *Privateshare*, *Seats2Meet*)

While these platforms operate with *commercial* value orientation, *proprietary* intellectual property, and *corporate* governance model, they are less formalised than some of their larger competitors. For example, they do not tend to have a smartphone app, instead relying only on a *website* to reach their users. Potential revenue streams include a *transaction fee*, *usage rates*, and *finest or other fees*. These platforms may utilise a *differential pricing* mechanism, although no clear means for discrimination is observed. The source of the revenue is the *resource user*.

4.2.4. Commercial peer-to-peer platforms (e.g. *Poparide*, *reheart*, *Swimply*)

This pattern exemplifies more formalised peer-to-peer platforms, which possess a *commercial* value orientation. They operate *proprietary* intellectual property and *corporate* governance, and employ both a *smartphone app* and *website* to reach their users. These platforms leverage a *review system* – for both resource owners and resource users – to ensure trust and quality of service on the platform. In contrast to commercial space sharing platforms as well as B2C and P2P mobility sharing platforms, this pattern operates at a *national* level and does not employ a pricing mechanism or price discrimination. The price is *set by the resource owner*, with the dominant revenue streams *commission* and *finest or other fees* leveraged on both the *resource owner* and *resource user* as the source of revenue.

4.2.5. Peer-to-peer space sharing platforms (e.g. *Airbnb*, *FlipKey*, *RoverPark*)

The primary difference between this pattern and commercial peer-to-peer platforms lies in the shared practice and geographical scale. This pattern specifically considers space sharing platforms (e.g. idling rooms, homes, storage, and parking spots), which operate *internationally*, suggesting this pattern is more formalised than the prior. These platforms operate as a two-sided market, including *peer-to-peer* and *business-to-peer* platform types. They have a *commercial* value orientation, with *proprietary* intellectual property and *corporate* governance. They implement a *review system* and use a *smartphone app* and *website* to reach their users. The price is *set by the resource owner*, with the dominant revenue stream being *commission*, leveraged on both the *resource owner* and *resource user* as the source of revenue.

4.2.6. Peer-to-peer mobility sharing platforms (e.g. *Turo*, *Uber*, *BlaBlaCar*)

This pattern is very similar to the business-to-consumer mobility sharing pattern, with some differences as this pattern sees platforms operate *peer-to-peer* platform type. This distinction sees the introduction of a *review system* for both resource owners and resource users, and the price is either *set by the resource owner* or *set by the platform*. They use a *smartphone app* and *website* to reach their users. These platforms tend to operate *internationally*. The dominant revenue streams are similar to the previous pattern, although a subscription fee is not common among these platforms. Price discrimination may also include *feature-based* discrimination, where the platform provides input to the resource owner to set the price based on the features of their vehicle. The source of revenue may be both the *resource owner* and *resource user*.

4.2.7. Business-to-consumer mobility sharing platform (e.g. *ZipCar*, *ShareNow*, *DropBike*)

This pattern is the only business-to-consumer pattern to emerge from the analysis, suggesting this platform type is more common for mobility sharing platforms. These platforms are *commercially-oriented* and leverage *proprietary* intellectual property and *corporate* governance models, although they may also communicate an *environmental* orientation associated with more sustainable transportation. The nature of a business-to-consumer platform dictates that the price is *set by the platform*, and there are is no review system or venue of interaction. These platforms tend to operate *internationally*. The dominant revenue streams are *transaction fee*, *subscription fee*, *usage rates*, and *finest or other fees*. The platform does leverage *differential pricing* mechanisms, including *location-based* and *access-based* price discrimination.

4.2.8. Coworking space platforms (e.g. *WeWork*, *Spaces*, *Impact Hub*)

This pattern represents large *commercial* coworking spaces, which operate *proprietary* intellectual property and *corporate* or *collaborative* governance. This pattern is different from the others, where these platforms provide the opportunity to *franchise* their service, with very different value propositions for the property manager and the user. They tend to operate *internationally*, and use a *smartphone app* and *website* to reach their users. The dominant revenue streams include *membership*, *lead generation*, and *additional services*. These platforms leverage *differential pricing* mechanisms, including *feature-based*, *location-based*, and *access-based* discrimination.

4.3. Solution patterns

From literature, only four solution patterns are linked to the sharing economy (*peer-to-peer*; *product-to-service*; *fractional ownership*; and *unbundling* – see Section 2.3). Building on the sharing economy business model framework (Section 4.1), the results of the literature review also identified several more solution patterns already described in literature for other contexts (Table 5). The existing solution patterns can be said to describe various aspects of sharing economy business models: key activity and value proposition (e.g. *servitisation*, *rent instead of buy*, *unbundling*); value networks (e.g. *peer-to-peer*, *fractional ownership*); price discovery (e.g. *free*, *barter*, *pay what you can*); revenue streams (e.g. *subscription*, *membership*, *pay per use*, *crowdfunding*), and price discrimination (e.g. *differential pricing*). However, there are additional solution patterns identified in this analysis that have not yet been described in the wider body of literature on business model patterns. Context-specific solution patterns that seek to address a business model challenges in the sharing economy include *community governance*, *price set by users*, *review system*, *existing community*, *nodes*, and *mixed revenue source*.

The *community governance* pattern describes a greater degree of user involvement in the daily operations and strategic decisions of the platform, inclusive of collaborative or cooperative governance configuration options. Because sharing platforms generally operate as multi-sided platforms (e.g. *peer-to-peer*), there is greater opportunity and need to involve users in the sharing practice. For example, each user must carry out their own key activities in order to generate value on the platform (e.g. the resource owner must provide an asset, the resource user must access an asset) (Curtis and Mont, 2020). This pattern influences other aspects of the business model, namely, intellectual property, price discovery, value orientation, and revenue streams. For example, this pattern is observed with open source or communal intellectual property (e.g. *ImpactHub*, *BikeSurf*) and less formal mechanisms for setting the price, for example, *free* and *bargaining* (e.g. *Bunz*, *Toronto Seed*

Table 5
Solution patterns in the sharing economy.

Solution Pattern	Description	Examples	BMP Literature
Add-on (Additional services)	Platform offers extra or additional services beyond their primary offering, typically at a higher profit margin	BlaBlaCar, SnappCar, WeWork	Gassman et al. (2014); Mikusz & Csiszar (2015); Remane et al. (2017); Weinberger et al. (2016)
Barter	Allow users to exchange non-monetary compensation for a product or service	Bunz, SwapSity	Facchinetti & Sulzer (2016); Gassman et al. (2014); Remane et al. (2017)
Community governance*	Sees users involved to a greater degree in the daily operations and strategic decisions of the platform	Karma, ImpactHub, Toronto Seed Library	–
Crowdfunding	Financing the platform by soliciting contributions from the larger community, often offering a non-monetary reward	Toronto Tool Library	Gassman et al. (2014); Hankammer & Kleer (2018); Remane et al. (2017)
Differential pricing	Offering the same product to users at different prices, based on the market and user characteristics or behaviour	Djeepo, Spaces, ZipCar	Curtis & Mont (2020); Lüdeke-Freund et al. (2018)
Existing community*	Introduce platform among a group of people possessing something in common (e.g. neighbourhood, school)	Poparide, Zimride	–
Fractional ownership (Cooperative Ownership)	Shared ownership of an asset among a group of consumers (e.g. crowd cooperative)	Connectcar, de Windcentrale	Abdelkafi et al. (2013); Facchinetti & Sulzer (2016); Krlewski (2016); Remane et al. (2017); Gassman et al. (2014); Remane et al. (2017)
Franchising	Allow franchisees to licence the business concept – including training, branding, technical infrastructure – for a recurring fee and/or revenue sharing	Spaces, SailTime	–
Free	Allow users free access to the platform and its primary offering, using additional sources to generate revenue (e.g. donation, crowdsourcing, advertising)	BKSV	Oserwalder & Pigneur (2010); Remane et al. (2017)
Membership	Recurring cost to users for access to the platform	LoveHomeSwap, Peerby, WeWork	Remane et al. (2017); Weking et al. (2018)
Mixed revenue source*	Revenue in a multi-sided market may come from a multitude of sources	Airbnb, Peerby, SnappCar	–
Nodes*	The fragmented diffusion of sharing platforms geographically, driven by interested actors wanting to start operations in their own contexts	BikeSurf, ImpactHub	–
Open source	Offer to make available platform's intellectual property (e.g. matching algorithm, booking management, review system)	BikeSurf	Bonvoisin (2016); Curtis & Mont (2020); Zeleti et al. (2014)
Pay per use (Transaction fee)	One-time charge to users each time the good or service is accessed	Bike Share Toronto, FaceDrive, VRBO	Gassman et al. (2014); Remane et al. (2017)
Pay what you want	Invite users to set the fee to access the platform (e.g. transaction fee, commission, donation)	BikeSurf, SwapSity, WarmShowers	Gassman et al. (2014); Remane et al. (2017)
Peer-to-peer	Platform mediation between users having equal standing based on rank, class, age, etc.	Swimply, SnappCar, JustPark, Peerby	Curtis & Mont (2020); Gassman et al. (2014); Remane et al. (2017)
Price set by users*	In a multi-sided market, users set the price of the exchange	FlipKey, Spacefy, Turo	–
Rent instead of buy	Temporarily lend a product for a fee, instead of transfer of ownership (e.g. goods sharing platforms)	LENA Library, Toronto Tool Library	Gassman et al. (2014); Remane et al. (2017); Weking et al. (2018)
Review system*	Provide feedback about the service quality or social interaction	Airbnb, BlaBlaCar, GoBoat	–
Servitisation (Product-to-service)	Offer renting options to access products instead of purchasing new products (e.g. B2C platforms)	ZipCar, ShareNow, Mobike	Abdelkafi et al. (2013); Remane et al. (2017); Weking et al. (2019)
Subscription	Recurring cost to users for access to goods or services	Communauto, GreenWheels, ShareNow	Lüdeke-Freund et al. (2018); Remane et al. (2017); Weking et al. (2018)
Unbundling	Focus on customer relationship management, facilitating access to shared assets (e.g. carsharing)	MyWheels, Dropbike, WeWork	Abdelkafi et al. (2013); Oserwalder & Pigneur (2010)

* New sharing economy solution patterns

Library, Couchsurfing, WarmShowers, BikeSurf). Platforms that implement this pattern may also possess environmental or social value orientations (e.g. ImactHub, Karma, Lena Library); as such, revenue may also rely on community support through membership and donations (e.g. Toronto Tool Library, Couchsurfing).

Describing the predominant mechanisms for price discovery, the *price set by users* pattern describes either the resource owner or resource user setting the price in the marketplace. This is similar to *pay what you want*; however, the *pay what you want* pattern describes the users setting the fee to access the platform, instead of the fee to access the asset involved in the exchange.

Many multi-sided platforms analysed in this study saw the resource owner setting the price for access to their shared asset, with the platform charging a commission to the resource owner on this set price. For example, the peer-to-peer carsharing platform Turo allows the vehicle owner to set the price to access their vehicle, including add-ons provided by the owner such as a children's car seat or pre-paid fuel card. The platform provides support for the owner to set the price, depending on the age of the vehicle, features, and ease of access (Turo, 2020a). On the price set by the resource owner, they charge a variable commission based on the protection plan chosen, including desired deductible, insurance, cancellation policy, etc. (Turo, 2020b, 2020c).

The *review system* pattern is quite common among multi-sided platforms in the sharing economy, as a review or rating system is seen as a mechanism to increase trust among users (Andreassen et al., 2018; Curtis et al., 2020; Wu and Shen, 2018). A review system seeks to provide information to users about each other by providing feedback about the quality of the goods or interaction on the platform (Curtis and Mont, 2020). However, empirical evidence suggests that reviews are largely positive and provide little meaningful information (Bridges and Vásquez, 2018). Review systems were not found among business-to-consumer companies and more niche peer-to-peer platforms.

One promising pattern is operating within an *existing community*. Sharing platforms struggle to achieve scalability and remain financially viable, especially initially when investment of time and money are needed to access the market widely. Instead, sharing platforms may target existing communities – e.g. an apartment complex, neighbourhood, sports club, school – as a means to reduce the transaction costs and achieve the critical mass needed to deliver value within the community. For example, this pattern is observed among carsharing platforms like Zipcar, Poparide, Kangaride, and Zimride. All of these platforms have a version of their offering available to corporate and university partners.

The pattern identified as *nodes* describes the fragmented diffusion of sharing platforms geographically. While this pattern may be inclusive of *franchising*, it also describes less formal licencing of business operations to dedicated individuals wanting to implement a similar service in their context. Of those platforms that franchise their operations, SailTime markets their operations as part of the sharing economy, providing franchisees with a full suite of corporate materials including technical infrastructure, pricing structure, and aggressive marketing programs (SailTime, n.d.). In contrast, BikeSurf encourages and provides resources to other individuals to set up their own BikeSurf project in their city, including technical infrastructure, logos, and training documents (Pope, 2018). This differs from franchising, where there is no strategic or coordinated effort to increase the geographical scale, instead relying on champions to leverage existing models in their own contexts with limited support and often limited revenue sharing.

The *mixed revenue source* pattern recognises that the revenue in a multi-sided market may come from a multitude of sources, e.g. resource owner, resource user, volunteer. There are numerous examples of unique configurations of revenue streams targeting each side of the market. For example, Airbnb has what they call a "split-fee structure", where the host typically pays a service fee of 3%, depending on the location of the listing and selection of cancellation policy (Airbnb, 2021). Guests also pay a service fee, typically less than 14.2% of the booking subtotal, dependent on a "variety of booking factors" (Airbnb, 2021). In addition, peer-to-peer goods sharing platform Peerby requires both the resource owner and resource user to pay a membership fee, which covers platform administration and product warranty (Peerby, 2021). While Peerby allows lending for free, they also charge a 15% commission of the rental price to the resource owner, if the owner chooses to set a price to access their asset (Peerby, 2021). Finally, peer-to-

peer carsharing platform SnappCar splits the service fee and insurance costs between the vehicle owner and vehicle user, because "... both benefit from the services of SnappCar... so both should pay a part of the cost" (SnappCar, 2021).

5. Discussion

Despite claims about the sustainability potential of the sharing economy, empirical evidence suggests untoward social and environmental rebound effects (Curtis et al., 2020; Kathan et al., 2016; Plepys and Singh, 2019; Schor, 2016). Those sharing platforms with environmental, social, or societal value orientation struggle to remain financially viable (Acquier et al., 2017; Laukkanen and Tura, 2020). Therefore, systematic knowledge is needed to provide useful prescriptive business model configurations to support business model innovation (Mikusz et al., 2017). However, the process of integrating business model patterns remains underexplored in literature. As such, this section suggests how researchers and practitioners may use business model patterns in the sharing economy. Finally, this section reflects on reliability and validity of the findings, and discusses potential limitations and future research.

5.1. Using business model patterns

While literature suggests patterns supports successful implementation (Abdelkafi et al., 2013), the process of using business model patterns remains underexplored (Romero et al., 2016). To begin, successful business models are said to meet three criteria: align with the company values; consistent across design choices and decision-making; and robust against competition (Casadesu-Masanell and Ricart, 2011). However, a business model may meet all three criteria and still fail. Therefore, researchers and practitioners may wish to look towards business model innovation to explore the various processes to use business model patterns. According to Foss and Saebi (2017, p. 201), business model innovations are "designed, novel, nontrivial changes to the key elements of a firm's business model and/or the architecture linking these elements". Business model innovation is seen as both an outcome and a process (Foss and Saebi, 2017). When seen as a process, it involves identifying examples or templates, experimenting with existing patterns or new attributes, and transforming organisational governance in line with new innovations (Amit and Zott, 2015; Chesbrough, 2010; Foss and Saebi, 2017).

Business model innovation is inextricably linked with business model design and implementation (Leih et al., 2015). For example, Gronum et al. (2016, p. 601) state "...innovation without clarity in the business model leads to modest or negligible performance outcomes". Yet, business model innovations often fail due to a lack of requisite knowledge or understanding to enable successful experimentation (Johnson et al., 2008; Weking et al., 2019). Therefore, business model patterns provide a structure and language to improve the likelihood of successful business model innovation (Abdelkafi et al., 2013; Rudtsch et al., 2014). In relation to the three criteria of successful business models, business model patterns provide a template to support creativity and experimentation (Amit and Zott, 2015; Johnson and Laffey, 2010), ensure internal consistency by suggesting configuration options that occur together (Facchinetti and Sulzer, 2016), and facilitate understanding and communication among a team and its stakeholders (Lüdeke-Freund et al., 2018).

However, business model innovations are more difficult to replicate than, for example, product innovation (Amit and Zott, 2012). To overcome this, Schief et al. (2012) suggest practitioners may compare their existing business models with established patterns to support learning and experimentation. Furthermore, business

model patterns are said to be at the center of business model innovation and experimentation (Mikusz et al., 2017), by providing the knowledge to adopt, copy, or imitate aspects of other business models that have proven successful previously (Amit and Zott, 2015; Doganova and Eyquem-Renault, 2009; Teece, 2010). As such, contextual and justificatory knowledge is necessary to successfully use business model patterns. Analysis of the 29 clusters provided the following insights to support business model innovation in the sharing economy:

- *Commercial-oriented* platforms generally possess a *corporate* governance model with *proprietary* intellectual property and leverage both a *website* and a *smartphone* app to facilitate exchanges.
- *Commission on the price set by the resource owner* is the dominant revenue stream among *peer-to-peer* platforms, generally on the financial flow back to the resource owner, whereas the resource user does not necessarily pay to access the platform.
- *Goods sharing platforms* generally see more diversity in business models. While there is some formality to their operations, these platforms remain niche, motivated beyond economic value, compared to commercial *shared space* and *shared mobility* platforms.
- *Crowd cooperatives* generally possess a *communal* intellectual property and *cooperative* governance model. They are motivated by other forms of value orientation, seeking to create and capture *environmental* and *societal* value through their operations. They may be less formalised, relying only on a *website* and *in-person* interactions to reach their users. However, their community is important, relying on paid *membership* and *donations* as well as *volunteers*.
- Those platforms studied in Toronto were often *peer-to-peer* and *local* platforms operating with *open source* intellectual property and *collaborative* governance. However, Toronto offered more diversity across business models, which were often grassroots and volunteer-driven. This meant platforms relied on *public and private funding* as well as actions of *volunteers* to remain viable.
- Those platforms studied in Amsterdam had a very pronounced *business-to-consumer shared mobility* cluster, with a clear signal suggesting *commercial* value orientation, with *corporate* governance and *proprietary* intellectual property.
- The *business-to-consumer* platform type dictates that there are no *reviews* of users and no *venue for interaction*, as it does not operate as a two-sided market. Similarly, the *business sets the price* and commonly uses a *transaction fee* for each use. This platform type almost exclusively described mobility sharing platforms.

5.2. Reliability and validation

Effort to identify business model patterns is criticised for incompleteness, overlap, and inconsistent structure of proposed patterns (Remane et al., 2017). To be useful for researchers and practitioners, these challenges were addressed by reviewing reliability and validity of the results. This was ensured by using NVivo to systematically code qualitative data and cluster analysis to quantitatively determine the minimal distance among configuration options constituting each pattern. Relative and internal validation methods were used to assess the robustness of the cluster analysis. The clusters produced were robust and meaningful: internal validation showed that all cluster plots had an average silhouette coefficient above 0.25, representing substantial structure (Appendix). Additionally, the results were triangulated with existing literature. For example, the sample literature was coded in NVivo and was compared to the business model attributes, configuration options, prototypical patterns, and solution patterns presented in this re-

search. Finally, the dataset, R code, and cluster plots are provided as supplementary materials.

5.3. Limitations and future research

At present, a limitation of business model research is the static perspective in defining, describing, and analysing business models, which is unable to capture their dynamic nature (Remane et al., 2017; Romero et al., 2017). Likewise, this analysis represents a snapshot of each sharing economy business model, not accounting for previous or future iterations. Furthermore, data collection was limited to the sharing platform website and a cursory internet search. While similar to other studies, the analysis is limited to only publicly available information, leaving room for interpretation or extrapolation by the observer, for example, regarding governance model and value orientation. Finally, questions remain about what constitute the business model in instances of diversification. For example, Airbnb provides access to stays and experiences; BlaBlaCar provides access to long-distance carpooling, in addition to recent expansion of their bus fleet and partnerships with Voi to provide access to scooters. In the context of this study, only their primary/initial business model is considered.

The number of platforms studied was substantial – 63 platforms – compared with other studies utilising quantitative cluster analysis to produce business model patterns, for example, 18 (Floercke and Lehner, 2019), 20 (Amshoff et al., 2015), 32 (Weking et al., 2019), 48 (Holzmann et al., 2019), or 58 case companies (Hunke et al., 2017). However, the analysis demonstrated significant diversity of business models within the sharing economy considering location, shared practice, and platform type. A greater number of cases may allow for greater granularity of business model patterns, considering governance models, value orientation, or revenue streams, for example.

While this research only focuses on the structural design of business models, to overcome some of these limitations, future research may explore the processes by which sharing platforms – or any business – experiment with their business models and interact with stakeholders during the process (Romero et al., 2016). For example, in partnership with sharing platforms, action research may seek to study the processes of experimentation and use of patterns to support successful implementation. Additionally, more research is needed to understand the risks associated with business model innovation in the sharing economy, for example, internal, external, and cooperation risks (Rudtsch et al., 2014). Changes to the business model may illicit negative response among users, for instance, when Couchsurfing changed their non-profit status and later implemented a paid membership fee. The effort to remain viable while still creating value is not without risks.

Finally, while this research suggests attributes of existing business models that recur successfully, it cannot elaborate on why this is the case. Future research may involve practitioners or entrepreneurs to identify the problem that each pattern solves, providing insights to support successful business model innovation. Moreover, such effort would allow to develop the “Alexandrian form” describing each sharing economy business model pattern, including the name, context, problem, solution, and examples. This would support comparing business model patterns across contexts to develop a more unified pattern language for business model innovation.

6. Conclusion

The aim of this research was to identify business model patterns among existing SEBMs in order to suggest business model attributes that support successful implementation. This study established business model patterns in the sharing economy, including

a framework, eight prototypical patterns, and six unique solution patterns relevant to the sharing economy. Broadly, this comprehensive research contributes to the body of knowledge describing business model patterns and helps to further structure knowledge about the sharing economy. Specifically, this research makes several academic and empirical contributions: 1) expands existing understanding of sharing economy business model patterns in literature beyond carsharing; 2) provides an updated sharing economy business model framework; and 3) elaborates prototypical and solution patterns to support business model innovation.

Furthermore, the analysis demonstrated that context plays an important part in the successful implementation of SEBMs, depending on location, shared practice, and platform type. Platforms in Toronto represented more collaborative and community-oriented platforms. In contrast, commercially-oriented and mobility sharing platforms dominated in Amsterdam. This suggests contextual factors may influence the success of any business model pattern, for example, the politics of the municipal or national government, the role of business, the needs of citizens, and dominant socio-cultural characteristics. Additionally, the analysis produced interesting insights differentiating business models based on shared practice and platform type. For example, peer-to-peer platforms (excluding space sharing) tend to operate locally or nationally, and are motivated by additional value orientations. Space sharing platforms tend to operate as peer-to-peer platforms, which are commercially-oriented and operate internationally. Business-to-consumer platforms largely describe mobility sharing platforms, with some exceptions (e.g. Lena Library). Ultimately, these patterns may support creativity, communication, and group interaction during experimentation, improving the successful implementation of SEBMs. And, instead of adopting trial-and-error experimentation, platforms with environmental and social value orientation may use these patterns to remain viable, institutionalising more sustainable modes of production and consumption.

Funding

This research has received funding from the [European Research Council](#) (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 771872).

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Steven Kane Curtis: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, Visualization.

Acknowledgements

This research represents the final individual effort of my PhD dissertation. I am thankful for the support of my research team and colleagues at Lund University, including my supervisors Ok-sana Mont and Yuliya Voytenko Palgan. They have provided meaningful support and feedback on this manuscript, as well as offering supervision and securing funding to conduct this research.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.spc.2021.04.009](https://doi.org/10.1016/j.spc.2021.04.009).

Appendix

In this manuscript, the Appendix is important to provide further context to improve clarity and transparency of the research process. First, a complete list of configuration options and the associated code is provided. This code is helpful to interpret [Table 4. Prototypical Patterns in the Sharing Economy](#) as well as [Fig. A.1 Cluster Plots](#). Second, a list of the investigated sharing platforms is provided. Then, one finds a table summarising the silhouette coefficients for each cluster and the cluster plots produced in R Studio, which guided the development of the prototypical patterns. Finally, a detailed list of configuration options and their definitions is provided. These definitions guided the coding of data, and help to interpret and implement the sharing economy business model patterns proposed in this manuscript.

[Table A1](#)

[Table A2](#)

[Table A3](#)

[Table A4](#)

Table A1
Complete list of configuration options.

Business Model Attribute	Configuration Options	
Key Activity	[Qualitative Statement]	0
Platform Type	Peer-to-Peer	1A
	Business-to-Business	1B
	Business-to-Peer	1C
	Crowd / Cooperative	1D
	Business-to-Consumer	1E
	Public-to-Citizen	1F
Practice	Shared Space	2A
	Shared Mobility	2B
	Shared Goods	2C
	Shared Consumables	2D
	Shared Resources	2E
Intellectual Property	Open Source	3A
	Communal	3B
	Proprietary	3C
Governance Model	Cooperative	4A
	Collaborative	4B
	Corporate	4C

(continued on next page)

Table A1 (continued)

Business Model Attribute	Configuration Options	
Price Discovery	Free	5A
	Pay What You Can	5B
	Negotiation / Bargaining	5C
	Auction	5D
	Bartering	5E
	Set by Resource User	5F
	Set by Resource Owner	5G
	Set by Platform	5H
Key Value Proposition	[Qualitative Statement]	6
Mediating Interface	Smartphone App	7A
	Website	7B
	Third-Party App or Integration	7C
Venue for Interaction	Other	7D
	Offline	8A
	Hybrid	8B
	Online	8C
	None	8D
Review System	Resource Owner Reviews	9A
	Resource User Reviews	9B
	Platform Reviews	9C
	None	9D
Geographical Scale	Existing Community	10A
	Local	10B
	Regional	10C
	National	10D
	International	10E
	Nodes	10F
	Societal / Public	11A
Value Orientation	Social	11B
	Environmental	11C
	Commercial	11D
	None	12A
Revenue Streams	Transaction Fee	12B
	Commission	12C
	Subscription Fee	12D
	Membership	12E
	Advertisements	12F
	Data Mining	12G
	Sponsorship	12H
	Donations	12I
	Public Project Funding	12J
	Private Project Funding	12K
	Fines or Fees	12L
	Lead Generation	12M
	Usage Rates	12N
	Convenience Fee	12O
	Promotions	12P
	Buy-Out	12Q
	Credits, Tokens, or Digital Currency	12R
	Additional Services	12S
	Service Retainer	12T
	Verification	12U
	Franchise	12V
	Revenue Sharing	12W
	Ownership Share	12X
Registration Fee	12Y	
None	13A	
Pricing Mechanisms	Static Pricing	13B
	Dynamic Pricing	13C
	Differential Pricing	13D
	None	14A
Price Discrimination	Feature-Based	14B
	Location-Based	14C
	Quantity-Based	14D
	User-Based	14E
	Access-Based	14F
	Market Share-Based	14G
	None	15A
Revenue Source	Volunteer	15B
	Other	15C
	Resource Owner	15D
	Resource User	15E
	3rd-Party	15F
Sustainability Performance	Operates as a platform	16A
	Leverages idling capacity of an existing stock of goods	16B
	Possesses non-pecuniary motivation for ownership	16C
	Facilitates temporary access over ownership	16D

Table A2
List of sharing platforms investigated.

Sharing Platforms	Location	Platform Type	Shared Practice
Airbnb (Stays)	Multiple Locations	Peer-to-Peer	Shared Space
Bike Share Toronto	Toronto, Canada	Public-to-Citizen	Shared Mobility
BikeSurf	Multiple Locations	Crowd Cooperative*	Shared Mobility
BKSY	Amsterdam, the Netherlands	Peer-to-Peer	Shared Goods
BlaBlaCar	Multiple Locations	Peer-to-Peer	Shared Mobility
Bunz	Multiple Locations	Peer-to-Peer	Shared Goods
Communauto	Multiple Locations	Business-to-Consumer	Shared Mobility
Connectcar	Amsterdam, the Netherlands	Crowd Cooperative	Shared Mobility
Couchsurfing	Multiple Locations	Peer-to-Peer	Shared Space
de Windcentrale	Amsterdam, the Netherlands	Crowd Cooperative	Shared Resources
Djeepo	Amsterdam, the Netherlands	Peer-to-Peer	Shared Space
DropBike	Multiple Locations	Business-to-Consumer	Shared Mobility
FaceDrive	Multiple Locations	Peer-to-Peer	Shared Mobility
FlipKey	Multiple Locations	Peer-to-Peer	Shared Space
Freedom Boat Club	Multiple Locations	Business-to-Consumer	Shared Mobility
FreshRents	Toronto, Canada	Crowd Cooperative	Shared Goods
GoBoat	Amsterdam, the Netherlands	Peer-to-Peer	Shared Mobility
GreenWheels	Multiple Locations	Business-to-Consumer	Shared Mobility
HeelNederlandDeelt	Amsterdam, the Netherlands	Peer-to-Peer*	Shared Goods*
HiRide	Toronto, Canada	Peer-to-Peer	Shared Mobility
Home Exchange	Multiple Locations	Peer-to-Peer	Shared Space
ImpactHub	Multiple Locations	Business-to-Peer	Shared Space
International Home Exchange Network	Multiple Locations	Peer-to-Peer	Shared Space
JustPark	Multiple Locations	Peer-to-Peer	Shared Space
Kangaride	Multiple Locations	Peer-to-Peer	Shared Mobility
Karma	Multiple Locations	Business-to-Peer	Shared Consumables
Lena Library	Amsterdam, the Netherlands	Business-to-Consumer	Shared Goods
LoveHomeSwap	Multiple Locations	Peer-to-Peer	Shared Space
Lyft	Multiple Locations	Peer-to-Peer	Shared Mobility
Mobike	Multiple Locations	Business-to-Consumer	Shared Mobility
MyWheels	Amsterdam, the Netherlands	Business-to-Consumer	Shared Mobility
Not Far from the Tree	Toronto, Canada	Peer-to-Peer	Shared Consumables
Peerby	Amsterdam, the Netherlands	Peer-to-Peer	Shared Goods
Planned	Multiple Locations	Business-to-Business	Shared Space
Poparide	Toronto, Canada	Peer-to-Peer	Shared Mobility
Privateshare	Amsterdam, the Netherlands	Peer-to-Peer	Shared Mobility
reheart	Toronto, Canada	Peer-to-Peer	Shared Goods
Rent Frock Repeat	Toronto, Canada	Business-to-Consumer	Shared Goods
Rover Parking	Toronto, Canada	Peer-to-Peer	Shared Space
SailTime	Multiple Locations	Peer-to-Peer	Shared Mobility
Seats2Meet	Multiple Locations	Business-to-Peer*	Shared Space
ShareNow	Multiple Locations	Business-to-Consumer	Shared Mobility
Sjipit	Amsterdam, the Netherlands	Business-to-Business*	Shared Space
SmartCommute	Toronto, Canada	Peer-to-Peer	Shared Mobility
SnappCar	Multiple Locations	Peer-to-Peer	Shared Mobility
Spacefy	Multiple Locations	Peer-to-Peer	Shared Space
Spaceishare	Toronto, Canada	Peer-to-Peer	Shared Space
Spaces	Multiple Locations	Business-to-Consumer	Shared Space
Stashii	Toronto, Canada	Peer-to-Peer	Shared Space
SwapSity	Toronto, Canada	Peer-to-Peer	Shared Goods
Swimply	Multiple Locations	Peer-to-Peer	Shared Space
Toronto Seed Library	Toronto, Canada	Peer-to-Peer	Shared Consumables
Toronto Tool Library	Toronto, Canada	Crowd Cooperative	Shared Goods
Turo	Multiple Locations	Peer-to-Peer	Shared Mobility
Uber (Ride Hailing)	Multiple Locations	Peer-to-Peer	Shared Mobility
Urbee	Amsterdam, the Netherlands	Business-to-Consumer	Shared Mobility
Vandebron	Amsterdam, the Netherlands	Peer-to-Peer	Shared Resources
VRBO	Multiple Locations	Peer-to-Peer	Shared Space
WarmShowers	Multiple Locations	Peer-to-Peer	Shared Space
Wework	Multiple Locations	Business-to-Peer*	Shared Space
Woningruil	Amsterdam, the Netherlands	Peer-to-Peer	Shared Space
Zimride	Multiple Locations	Peer-to-Peer	Shared Mobility
Zipcar	Multiple Locations	Business-to-Consumer	Shared Mobility

* Predominant configuration option

Table A3
Number of observed configuration options & silhouette coefficient.

Target Datasets	# of Configuration Options	Silhouette Coefficient
All Data		
Cluster 1	7	0.34
Cluster 2	52	0.43
Cluster 3	9	0.07
Cluster 4	7	0.26
total / average	75	0.36
Toronto		
Cluster 1	14	0.16
Cluster 2	31	0.36
total / average	45	0.30
Amsterdam		
Cluster 1	27	0.30
Cluster 2	17	0.22
total / average	44	0.27
Multi-Location		
Cluster 1	9	0.27
Cluster 2	41	0.41
Cluster 3	10	0.41
total / average	60	0.39
Shared Space		
Cluster 1	17	0.34
Cluster 2	32	0.51
total / average	49	0.45
Shared Mobility		
Cluster 1	8	0.41
Cluster 2	26	0.26
Cluster 3	7	0.30
Cluster 4	9	0.48
total / average	50	0.33
Shared Goods		
Cluster 1	14	0.25
Cluster 2	23	0.27
Cluster 3	6	0.28
total / average	43	0.27
Peer-to-Peer		
Cluster 1	13	0.4
Cluster 2	47	0.5
total / average	60	0.48
Business-to-Peer		
Cluster 1	15	0.52
Cluster 2	22	0.31
total / average	37	0.39
Business-to-Consumer		
Cluster 1	18	0.45
Cluster 2	15	0.42
total / average	33	0.44
Crowd / Cooperatives		
Cluster 1	9	0.43
Cluster 2	9	0.32
Cluster 3	14	0.26
total / average	32	0.33

Table A4
Description of configuration options.

Business Model Attribute	Configuration Options	Description
Key Activity Platform Type	[Qualitative Statement]	Platform mediation allowing for access to under-utilised goods.
	Peer-to-Peer	Platform mediation between users having equal standing based on rank, class, age, etc.
	Business-to-Business	Platform mediation taking place between business or organisational entities beyond individuals, often sharing idling resources particular to their business sector (e.g. construction or medical equipment)
	Business-to-Peer Crowd / Cooperative	Platform mediation between a business with idling resources that may be used by individuals Platform mediation from one to many, from many to one, or from many to many. This model is inclusive of cooperatives or crowdsourcing models (e.g. car cooperatives, renewable energy cooperatives, or crowdsourcing of classroom art supplies or borrowed costumes for a theatre production)
Practice	Business-to-Consumer	Company offering access to goods, which they own. Does not operate as a two-sided market.
	Public-to-Citizen	Government- maintained or supported sharing platforms facilitating access
	Shared Space	Providing access to idling space, for example, rooms, apartments, attic storage space, and parking spots.
	Shared Mobility	Providing access to assets facilitating mobility, for example, carsharing, bikesharing, ridesharing, boatsharing and e-scooters.
Intellectual Property	Shared Goods	Providing access to both durable goods and non- durable goods, for example, clothes, furniture, sporting goods, home improvement products, luggage, consumer electronics and other homeware
	Shared Consumables	Providing access to goods characterised through one-time use, for example, food or personal care products (e.g. perfume, haircare products, fingernail polish) that cannot be shared again after use
	Shared Resources	Providing access to cooperative energy, excess heat, and other municipal or industrial effluent
	Open Source	Open intellectual property, available without limitations
Governance Model	Communal	Open intellectual property, but limited to those using the platform
	Proprietary	Protected intellectual property, as stated in terms and conditions
	Cooperative	User involvement drives all governance, as they are involved in, or even leading, the decision-making process. This governance model describes what are often called platform cooperatives.
Price Discovery	Collaborative	Increased involvement of users in the decision-making process. While commercial orientation is likely, other value orientations may prevail. This governance model may also impact other business model choices, for example, transparency of intellectual property and pricing mechanisms.
	Corporate	Mirrors existing management practices primarily driven by profit-seeking behaviour. Decision-making rests with the platform, responding to market pressures, with limited input from users. This governance model is more likely to be associated with more formal technology, proprietary in nature, and more commercial value orientation .
	Free	Allow users free access to the platform and its primary offering, using additional sources to generate revenue (e.g. donation, crowdsourcing, advertising)
Key Value Proposition Mediating Interface	Pay What You Can Negotiation / Bargaining	The resource user offers to pay to access an asset provided by the resource owner. 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 Set by Platform	In a multi-sided market, the resource owner set the price of the exchange The price is set by the platform.
Venue for Interaction	Smartphone App	Users access the platform via a smartphone app.
	Website	Users access the platform via a website.
	Third-Party App or Integration	Users access the marketplace via a third-party application (e.g. Facebook) or integration into the platform website.
	Other	Open to alternative pathways to access the marketplace / platform.
Review System	Offline	The users interact offline, having learned about the market via social media, website, etc.
	Hybrid	The users interact both online and offline, typically making connection via a digital platform and meeting in person during the exchange.
	Online	The users interact online, making connection via a digital platform and discussing the exchange online, without needing to meet in person (e.g. keypad, keyless entry, shipping)
Geographical Scale	None	There is no venue for interaction in the case of B2C models, which does not operate as a two-sided market.
	Resource Owner Reviews	The platform allows for reviews of the resource owner, which are displayed to the resource user.
	Resource User Reviews Platform Reviews	The platform allows for reviews of the resource user, which are displayed to the resource owner. The platform provides a mechanism to provide feedback, which is made publicly available.
	None	The platform offers to review system.
Value Orientation	Existing Community	Platform operates among a group of people possessing something in common (e.g. neighbourhood, school)
	Local	Platform operates within a city or district.
	Regional	Platform operates within a provincial or regional area within a nation.
	National	Platform operates within a country.
	International Nodes	Platform operates internationally, in multiple locations. Platform operates with fragmented diffusion geographically, driven by interested actors wanting to start operations in their own contexts
Commercial	Societal / Public	Sees platforms motivated by more normative beliefs of how things should be, potentially returning to simpler and more meaningful exchanges.
	Social	Sees social enterprises largely motivated by the social cohesion and social bonding that may take place between those that share. (more granular – on an individual level – compared to societal value)
	Environmental	Sees platforms prioritise environmental sustainability and sustainable consumption practices.
		Sees platforms prioritise economic value as the primary motivation for existence.

(continued on next page)

Table A4 (continued)

Business Model Attribute	Configuration Options	Description
Revenue Streams	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
	Pricing Mechanisms	Service Retainer
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.
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.
Revenue Source	Market Share-Based	Describes variable pricing based on the number of customers the platform services.
	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
Sustainability Performance	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.
Sustainability Performance	Operates as a platform	leverages technology to facilitate a two- or multi-sided market between a resource owner and resource user
	Leverages idling capacity of an existing stock of goods	Delimit sharing of under-utilised assets to an existing stock of goods. This increases the intensity of use and extends lifetimes of products that have already been produced.
	Possesses non-pecuniary motivation for ownership	Platforms must not purchase new goods for the purpose of facilitating sharing.
	Facilitates temporary access over ownership	Access is widely stated as a key condition of SEBMs, thereby excluding business models that facilitate transfer of ownership by bartering, swapping, gifting, buying second-hand or through redistribution markets.

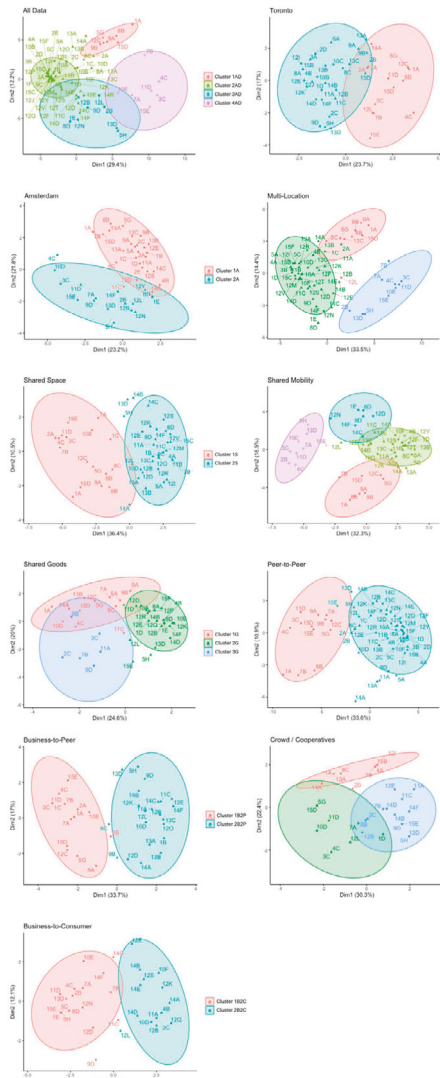


Fig. A1. Cluster plots.

References

- Abdelkafi, N., Makhotin, S., Posselt, T., 2013. Business model innovations for electric mobility – what can be learned from existing business model patterns? *Int. J. Innov. Manage.* 17, 1340003. doi:10.1142/S1363919613400033.
- Acquier, A., Daudigies, T., Pinksse, J., 2017. Promises and paradoxes of the sharing economy: an organizing framework. *Technol. Forecast. Soc. Change* 125, 1–10. doi:10.1016/j.techfore.2017.07.006.
- Ahmadi Zeleti, F., Ojo, A., Curry, E., 2016. Exploring the economic value of open government data. *Gov. Inf. Q.* 33, 535–551. doi:10.1016/j.giq.2016.01.008.
- Airbnb, 2021. What are Airbnb Service Fees?. Airbnb Help Center [WWW Document]. Airbnb. <https://www.airbnb.com/help/article/1857/what-is-the-airbnb-service-fee>.
- Alexander, C., 1999. The origins of pattern theory: the future of the theory, and the generation of a living world. *IEEE Softw.* 16, 71–82. doi:10.1109/52.795104.
- Alexander, C., 1977. A pattern language: Towns, Buildings, Construction. Oxford university press.
- Amit, R., Zott, C., 2015. Crafting business architecture: the antecedents of business model design. *Strateg. Entrep. J.* 9, 331–350.
- Amit, R., Zott, C., 2012. Creating Value Through Business Model Innovation 2012.
- Amshoff, B., Dülme, C., Echterfeld, J., Gausemeier, J., 2015. Business model patterns for disruptive technologies. *Int. J. Innov. Manage.* 19. doi:10.1142/S1363919615400022.
- Andreasen, T.W., Lovvik-Olsen, L., Snyder, H., Van Riel, A.C.R., Sweeney, J.C., Van Vaerenbergh, Y., 2018. Business model innovation and value-creation: the triadic way. *J. Serv. Manage.* 29, 883–906. doi:10.1108/JOSM-05-2018-0125.
- Baldassarre, B., Konietzko, J., Brown, P., Calabretta, G., Bocken, N., Karpen, I.O., Hultink, E.J., 2020. Addressing the design-implementation gap of sustainable business models by prototyping: a tool for planning and executing small-scale pilots. *J. Cleaner Prod.* 255, 120295. doi:10.1016/j.jclepro.2020.120295.
- Belk, R., 2014. You are what you can access: sharing and collaborative consumption online. *J. Bus. Res.* 67, 1595–1600. doi:10.1016/j.jbusres.2013.10.001.
- Bocken, N.M.P., Pauw, L.de, Bakker, C., Grinten, B.van der, 2016. Product design and business model strategies for a circular economy. *J. Ind. Prod. Eng.* 33, 308–320. doi:10.1080/21681015.2016.1172124.
- Breuer, H., Fichter, K., Freund, F.L., Tiemann, I., 2018. Sustainability-oriented business model development: principles, criteria and tools. *Int. J. Entrep. Ventur.* 10, 256. doi:10.1504/IJEV.2018.092715.
- Bridges, J., Vásquez, C., 2018. If nearly all Airbnb reviews are positive, does that make them meaningless? *Curr. Issues Tour.* 21, 2065–2083. doi:10.1080/13683500.2016.1267113.
- Camisón, C., Villar-López, A., 2010. Business models in Spanish industry: a taxonomy-based efficacy analysis. *M@nagement* 13, 298–317.
- Casademas-Masanell, R., Ricart, J.E., 2011. How to Design A Winning Business Model 9.
- Chasin, F., von Hoffen, M., Cramer, M., Matzner, M., 2018. Peer-to-peer sharing and collaborative consumption platforms: a taxonomy and a reproducible analysis. *Inf. Syst. e-Bus. Manage.* 16, 293–325. doi:10.1007/s10257-017-0357-8.
- Chesbrough, H., 2010. Business model innovation: opportunities and barriers. *Long Range Plan. Bus. Models* 43, 354–363. doi:10.1016/j.lrp.2009.07.010.
- Creswell, J.W., 2014. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage Publications.
- Curtis, S.K., Lehner, M., 2019. Defining the sharing economy for sustainability. *Sustainability* 11, 567. doi:10.3390/su11030567.
- Curtis, S.K., Mont, O., 2020. Sharing economy business models for sustainability. *J. Cleaner Prod.* 266, 121519. doi:10.1016/j.jclepro.2020.121519.
- Curtis, S.K., Singh, J., Mont, O., Kessler, A., 2020. Systematic framework to assess social impacts of sharing platforms: synthesising literature and stakeholder perspectives to arrive at a framework and practice-oriented tool. *PLoS One* 15, e0240373. doi:10.1371/journal.pone.0240373.
- Davies, A.R., Donald, B., Gray, M., Knox-Hayes, J., 2017. Sharing economies: moving beyond binaries in a digital age. *Camb. J. Reg. Econ. Soc.* 10, 209–230. doi:10.1093/cjres/rsx005.
- De Stefano, V., 2015. The rise of the just-in-time workforce: on-demand work, crowdwork, and labor protection in the gig-economy. *Comp. Labor Law Policy J.* 37, 471–504.
- Doganova, L., Liliana, Eyquem-Renault, Marie, 2009. What do business models do?: Innovation devices in technology entrepreneurship. *Res. Policy* 38 (10), 1559–1570.
- Echterfeld, J., Amshoff, B., Gausemeier, J., 2015. How to use business model patterns for exploiting disruptive technologies. In: *IAMOT 2015 - 24th International Association for Management of Technology Conference: Technology, Innovation and Management for Sustainable Growth, Proceedings*, pp. 2294–2313.
- Facchinetti, E., Sulzer, S., 2016. General business model patterns for local energy management concepts. *Front. Energy Res.* 4. doi:10.3389/fenrg.2016.00007.
- Fitzmaurice, C.J., Ladegaard, I., Attwood-Charles, W., Cansoy, M., Carfagna, L.B., Schor, J.B., Wengronowitz, R., 2020. Domesticating the market: moral exchange and the sharing economy. *Soc.-Econ. Rev.* 18, 81–102.
- Fleisch, E., Weinberger, M., Wortmann, F., 2015. Business Models and the Internet of Things (Extended abstract) doi:10.1007/978-3-319-16546-2_2.
- Floercke, S., Lehner, F., 2019. Dominant Business Model Patterns of Regional IaaS Providers – An Exploratory Multiple-Case Study doi:10.1007/978-3-030-36027-6_12.
- Foss, N.J., Saebi, T., 2017. Fifteen years of research on business model innovation: how far have we come, and where should we go? *J. Manag.* 43, 200–227. doi:10.1177/0149206316675927.
- Frankenberger, K., Weiblen, T., Gassmann, O., 2014. The antecedents of open business models: an exploratory study of incumbent firms. *R D Manage.* 44, 173–188. doi:10.1111/rdm.12040.
- Frenken, K., Schor, J., 2017. Putting the sharing economy into perspective. *Environmental Innovation and Societal Transitions. Sustain. Perspect. Shar. Econ.* 23, 3–10. doi:10.1016/j.eist.2017.01.003.
- Gassmann, O., Frankenberger, K., Csik, M., 2014. *The Business Model Navigator: 55 Models that will Revolutionise Your Business*. Pearson UK.
- Geissdoerfer, M., Vladimirova, D., Evans, S., 2018. Sustainable business model innovation: a review. *J. Cleaner Prod.* 198, 401–416. doi:10.1016/j.jclepro.2018.06.240.
- Griffith, E., 2014. Why Startups Fail, According to Their Founders

- [WWW Document]. Fortune. <https://fortune.com/2014/09/25/why-startups-fail-according-to-their-founders/>.
- Gronum, S., Steen, J., Verreyne, M.-L., 2016. Business model design and innovation: Unlocking the performance benefits of innovation. *Aust. J. Manage.* 41, 585–605. doi:10.1177/0312896215587315.
- Gupta, P., Chauhan, S., 2021. Mapping intellectual structure and sustainability claims of sharing economy research – a literature review. *Sustain. Prod. Consum.* 25, 347–362. doi:10.1016/j.spc.2020.09.006.
- Harmaala, M.-M., 2015. The sharing city as a platform for a more sustainable city environment? *Int. J. Environ. Health* 7, 309–328. doi:10.1504/IJENVH.2015.077116.
- Holzmann, P., Breitenacker, R.J., Schwarz, E.J., 2019. Business model patterns for 3D printer manufacturers. *J. Manuf. Technol. Manage.* doi:10.1108/JMTM-09-2018-0313.
- Hunke, F., Schüritz, R., Kuehl, N., 2017. Towards a Unified Approach to Identify Business Model Patterns: a Case of e-Mobility Services doi:10.1007/978-3-319-56925-3_15.
- Johnson, M.W., Christensen, C.M., Kagermann, H., 2008. Reinventing your business model. *Harv. Bus. Rev.* 86 (12), 57–68.
- Johnson, M.W., Lafley, A.G., 2010. Seizing the White Space: Business Model Innovation for Growth And Renewal. Harvard Business Press.
- Kassambara, A., 2017. Practical Guide to Cluster Analysis in R: Unsupervised Machine Learning. STHDA.
- Kathan, W., Matzler, K., Veider, V., 2016. The sharing economy: your business model's friend or foe? *Bus. Horiz.* 59, 663–672. doi:10.1016/j.bushor.2016.06.006.
- Kralowski, D., 2016. Business Models of Internet of Things doi:10.1007/978-3-319-46642-2_6.
- Kwon, M., Lee, J., Hong, Y.S., 2019. Product-service system business modelling methodology using morphological analysis. *Sustainability* 11, 1376. doi:10.3390/s11051376.
- Laamanen, M., Wahlen, S., Campana, M., 2015. Mobilising collaborative consumption lifestyles: a comparative frame analysis of time banking. *Int. J. Consum. Stud.* 39, 459–467. doi:10.1111/ijcs.12190.
- Laukkanen, M., Tura, N., 2020. The potential of sharing economy business models for sustainable value creation. *J. Cleaner Prod.* 253, 120004. doi:10.1016/j.clepro.2020.120004.
- Laurischkat, K., Viertelhausen, A., Jandt, D., 2016. Business models for electric mobility. *Procedia CIRP* 483–488. doi:10.1016/j.procir.2016.03.042.
- Leih, S., Linden, G., Teece, D.J., 2015. Business model innovation and organizational design. In: Foss, N.J., Saebi, T. (Eds.), *Business Model Innovation*. Oxford University Press, pp. 24–42. doi:10.1093/acprof:oso/9780198701873.003.0002.
- Lüdeke-Freund, F., Carroux, S., Joyce, A., Massa, L., Breuer, H., 2018. The sustainable business model pattern taxonomy—45 patterns to support sustainability-oriented business model innovation. *Sustain. Prod. Consum.* 15, 145–162. doi:10.1016/j.spc.2018.06.004.
- Lüdeke-Freund, F., Gold, S., Bocken, N., 2019. A review and typology of circular economy business model patterns. *J. Ind. Ecol.* 23, 36–61. doi:10.1111/ijec.12763.
- McLaren, D., Agyeman, J., 2015. Sharing Cities: A Case for Truly Smart and Sustainable Cities. MIT Press.
- Mikusz, M., Schafer, T., Taraba, T., Jud, C., 2017. Transforming the connected car into a business model innovation. In: 2017 IEEE 19th Conference on Business Informatics (CBI). Presented at the 2017 IEEE 19th Conference on Business Informatics (CBI). IEEE, Thessaloniki, Greece, pp. 247–256. doi:10.1109/CBI.2017.64.
- Miles, M.B., Huberman, A.M., Saldana, J., 2013. *Qualitative Data Analysis*. SAGE.
- Mont, O., 2002. Clarifying the concept of product-service system. *J. Cleaner Prod.* 10, 237–245. doi:10.1016/S0959-6526(01)00039-7.
- Morris, M.H., Shirokova, G., Shtalov, A., 2013. The business model and firm performance: the case of Russian food service ventures. *J. Small Bus. Manage.* 51, 46–65. doi:10.1111/j.1540-627X.2012.00377.x.
- Mosig, T., Grafmüller, L.K., Lehmann, C., 2017. Business model patterns of B2B mass customizers: the case of German Textile SMEs. *Int. J. Ind. Eng. Manage.* 8, 99–110.
- Müller, S.C., Welpel, I.M., 2018. Sharing electricity storage at the community level: an empirical analysis of potential business models and barriers. *Energy Policy* 118, 492–503. doi:10.1016/j.enpol.2018.03.064.
- Muñoz, P., Cohen, B., 2018. A compass for navigating sharing economy business models. *Calif. Manage. Rev.* 61, 114–147. doi:10.1177/0008125618795490.
- Ng, H.Y., 2018. Categorization of business model patterns and mapping of their relations with business model building blocks. In: IEEE International Conference on Industrial Engineering and Engineering Management, pp. 1767–1771. doi:10.1109/IEEM.2017.8290195.
- Osterwalder, A., 2004. The business model ontology: a proposition in a design science approach. *Faculté des hautes études commerciales, Université de Lausanne*.
- Osterwalder, A., Pigneur, Y., 2010. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. John Wiley & Sons.
- Patel, N., 2015. 90% of Startups Fail: Here's What You Need To Know About The 10%. *Forbes* [WWW Document]. <https://www.forbes.com/sites/neilpatel/2015/01/16/90-of-startups-will-fail-heres-what-you-need-to-know-about-the-10/> (accessed 6.24.20).
- Peerby, 2021. Is Peerby Gratis [Is Peerby Free] [WWW Document]. <https://peerby.force.com/support/article/Is-Peerby-Gratis>.
- Peters, C., Blohm, I., Leimeister, J.M., 2015. Anatomy of successful business models for complex services: insights from the telemedicine field. *J. Manage. Inf. Syst.* 32, 75–104. doi:10.1080/07421222.2015.1095304.
- Pieroni, M.P., McAloone, T.C., Pigoso, D.C., 2021. Circular Economy business model innovation: sectoral patterns within manufacturing companies. *J. Cleaner Prod.* 286, 124921.
- Plepyś, A., Steinhilber, J., 2019. Evaluating the sustainability impacts of the sharing economy using input-output analysis. In: *A Research Agenda for Sustainable Consumption*. Edward Elgar Publishing, pp. 66–84. doi:10.4337/9781788117814.00013.
- Plewnia, F., Guenther, E., 2018. Mapping the sharing economy for sustainability research. *Manage. Decis.* 56, 570–583. doi:10.1108/MD-11-2016-0766.
- Pope, G., 2018. How to setup your own BikeSurf Project [WWW Document]. Google Docs. https://docs.google.com/presentation/d/1vtC-5rjzC5oRcYqFF0DXiBE0lp3AGj6jX4APlP-w/edit?usp=sharing&usp=embed_facebook (accessed 12.21.20).
- Pouri, M.J., Hilty, L.M., 2020. A Typology of digital sharing business models: a design science research approach. In: *International Conference on Design Science Research in Information Systems and Technology*. Springer, pp. 297–308.
- Remane, G., Hanelt, A., Tesch, J.F., Kolbe, L.M., 2017. The business model pattern database – a tool for systematic business model innovation. *Int. J. Innov. Manage.* 21, 1750004. doi:10.1142/S1363919617500049.
- Ritter, M., Schanz, H., 2019. The sharing economy: a comprehensive business model framework. *J. Cleaner Prod.* 213, 320–331. doi:10.1016/j.jclepro.2018.12.154.
- Romero, M.C., Sanchez, M., Villalobos, J., 2017. Business model pattern execution: a system dynamics application. In: *ICEIS 2017 - Proceedings of the 19th International Conference on Enterprise Information Systems*, pp. 440–447.
- Romero, M.C., Sánchez, M., Villalobos, J., 2016. Weaving business model patterns: Understanding business models. In: *ICEIS 2016 - Proceedings of the 18th International Conference on Enterprise Information Systems*, pp. 496–505.
- Rudtsch, V., Gausemeier, J., Gesing, J., Mittag, T., Peter, S., 2014. Pattern-based business model development for cyber-physical production systems. *Procedia CIRP* 313–319. doi:10.1016/j.procir.2014.10.044.
- Ruseva, R., 2015. Patterns for startup business models. *ACM International Conference Proceeding Series* doi:10.1145/2855321.2855328.
- SailTime, 2021. Start Your Own SailTime Sailing or Boating Business -Go Sailing with SailTime. SailTime.
- Sánchez, M., Moral, M.L.P., Ramoscelli, G., 2020. Activity-based costing in smart and connected products production enterprises. *Accounting* 6, 33–50. doi:10.5267/j.ac.2019.6.002.
- Schieff, M., Pussep, A., Buxmann, P., 2012. Performance of business models: empirical insights from the software industry. In: *Proceedings - Pacific Asia Conference on Information Systems PACIS 2012*.
- Schirmer, J., Eber, R., Bourdon, I., 2021. 32 ways to innovate business models through data: emerging data-driven solution business model patterns from a study of 471 late stage data-driven startups. Presented at the Hawaii International Conference on System Sciences doi:10.24251/HICSS.2021.608.
- Schneider, S., Spieth, P., 2013. Business model innovation: towards an integrated future research agenda. *Int. J. Innov. Manage.* 17, 1340001.
- Schor, J., 2016. Debating the sharing economy. *J. Self-Gov. Manage. Econ.* 4, 7–22.
- Schor, J., Fitzmaurice, C., Carfagna, L.B., Attwood-Charles, W., Poter, E.D., 2016. Paradoxes of openness and distinction in the sharing economy. *Poetics* 54, 66–81. doi:10.1016/j.poetic.2015.11.001.
- SnappCar, 2021. Why Do Both Owner and Renter Pay the Service and Insurance Fee? SnappCar [WWW Document]. <https://support.snappcar.nl/hc/en-us/articles/360002402298-Why-do-both-owner-and-renter-pay-the-service-and-insurance-fee->
- Spieth, P., Schneckenberg, D., Ricart, J.E., 2014. Business model innovation—state of the art and future challenges for the field. *R&D Manage.* 44, 237–247.
- Tangour, C., Gebauer, M., Fischer, L., Winkler, H.H., 2019. Digital Business Model Patterns of Big Pharmaceutical Companies - A Cluster Analysis doi:10.1007/978-3-030-30874-2_31.
- Tauscher, K., Luidien, S.M., 2018. Understanding platform business models: a mixed methods study of marketplaces. *Eur. Manage. J.* 36, 319–329. doi:10.1016/j.emj.2017.06.005.
- Tavory, I., Timmermans, S., 2014. *Abductive Analysis: Theorizing Qualitative Research*. University of Chicago Press.
- Teece, D.J., 2010. Business models, business strategy and innovation. *Long Range Plann.* 43, 172–194. doi:10.1016/j.lrp.2009.07.003.
- Trabucchi, D., Muzellec, L., Ronteau, S., 2019. Sharing economy: seeing through the fog. *Internet Res.* 29, 996–1013. doi:10.1108/INTR-03-2018-0113.
- Tukker, A., 2004. Eight types of product-service system: eight ways to sustainability? *Experiences from SusProNet*. *Bus. Strategy Environ.* 13, 246–260. doi:10.1002/bse.414.
- Turo, 2020a. Setting Your Vehicle Price [WWW Document]. Turo Support. <https://support.turo.com/hc/en-us/articles/203991990-Setting-your-vehicle-price->
- Turo, 2020b. Fees & Fines [WWW Document]. Turo Support. <https://support.turo.com/hc/en-us/articles/203990780-Fees-fines>.
- Turo, 2020c. Detailed Explanation of Host Protection Plans | US [WWW Document]. Turo Support. <https://support.turo.com/hc/en-us/articles/217043898-Detailed-explanation-of-host-protection-plans-US>.
- Verchuren, P., Doorewaard, H., 2010. Designing a Research Project. Eleven International Publishing.
- Voytenko Palgan, Y., Zvoltska, L., Mont, O., 2016. Sustainability Framings of Accommodation Sharing. *Environmental Innovation and Societal Transitions* doi:10.1016/j.eist.2016.12.002.
- Weill, P., Malone, T.W., D'Urso, V.T., Herman, G., Woerner, S., 2005. In: *Do Some Business Models Perform Better Than Others? A Study of the 1000 Largest US Firms*, 226, pp. 1–39 MIT Center for Coordination Science Working Paper.

- Weinberger, M., Bilgeri, D., Fleisch, E., 2016. IoT business models in an industrial context. *At-Automatisierungstechnik* 64, 699–706. doi:[10.1515/auto-2016-0054](https://doi.org/10.1515/auto-2016-0054).
- Weking, J., Hein, A., Böhm, M., Krčmar, H., 2018. A hierarchical taxonomy of business model patterns. *Electron. Mark.* doi:[10.1007/s12525-018-0322-5](https://doi.org/10.1007/s12525-018-0322-5).
- Weking, J., Stöcker, M., Kowalkiewicz, M., Böhm, M., Krčmar, H., 2019. Leveraging industry 4.0 – a business model pattern framework. *Int. J. Prod. Econ.* doi:[10.1016/j.ijpe.2019.107588](https://doi.org/10.1016/j.ijpe.2019.107588).
- Wu, X., Shen, J., 2018. A study on Airbnb's trust mechanism and the effects of cultural values - based on a survey of Chinese consumers. *Sustainability (Switzerland)* 10. doi:[10.3390/su10093041](https://doi.org/10.3390/su10093041).
- Zott, C., Amit, R., Massa, L., 2011. The business model: recent developments and future research. *J. Manag.* 37, 1019–1042. doi:[10.1177/0149206311406265](https://doi.org/10.1177/0149206311406265).

Article IV



RESEARCH ARTICLE

Systematic framework to assess social impacts of sharing platforms: Synthesising literature and stakeholder perspectives to arrive at a framework and practice-oriented tool

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OPEN ACCESS

Citation: Curtis SK, Singh J, Mont O, Kessler A (2020) Systematic framework to assess social impacts of sharing platforms: Synthesising literature and stakeholder perspectives to arrive at a framework and practice-oriented tool. *PLoS ONE* 15(10): e0240373. <https://doi.org/10.1371/journal.pone.0240373>

Editor: Dejan Dragan, Univerza v Mariboru, SLOVENIA

Received: June 11, 2020

Accepted: September 25, 2020

Published: October 8, 2020

Peer Review History: PLOS recognizes the benefits of transparency in the peer review process; therefore, we enable the publication of all of the content of peer review and author responses alongside final, published articles. The editorial history of this article is available here: <https://doi.org/10.1371/journal.pone.0240373>

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Data Availability Statement: All relevant data are within the manuscript and its Supporting Information files.

Abstract

(1) Background

Research and user experience suggests both positive and negative social impacts resulting from practices in the sharing economy: social cohesion vs. gentrification; inclusiveness vs. discrimination; flexible employment vs. exploitation. However, as yet, there is no framework for understanding or assessing these social impacts holistically.

(2) Objective

We aim to improve understanding of the social impacts of sharing platforms and develop a systematic framework to assess these impacts.

(3) Methods

We conduct a narrative literature review and stakeholder workshop, integrating insights to produce a systematic social impact assessment framework and a practice-oriented tool.

(4) Results

We identify four social aspects—trust, empowerment, social justice, and inclusivity—and eighteen indicators that make up the framework. We describe each indicator and its relevance to the sharing economy as well as suggest measurable variables in the form of a practice-oriented tool.

(5) Conclusions

The framework and tool are the first holistic method for assessing social impact in the sharing economy, which may inform researchers, sharing platforms, regulators, investors, and

Funding: This research has received funding (OM) from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 771872). This research was also funded by the German Federal Ministry for Education and Research (BMBF) (Grant Agreement No. 01UU1701C) in the context of the project Urban Up – Upscaling Strategies for an Urban Sharing Society. No commercial companies funded this research, nor did any authors receive salary or other funding from commercial companies. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. <https://erc.europa.eu/> <https://www.bmbf.de/en>

Competing interests: The authors have declared that no competing interests exist.

citizens to mitigate adverse social impacts while enhancing the overall net social value of the sharing economy.

Introduction

The sharing economy is said to embody values of openness, trust, empowerment, and a sense of collectivism. Proponents claim that the sharing economy empowers people, creates trust among strangers, builds social capital, and promotes social cohesion [1]. However, there is a spectrum of consumption practices ascribed to the sharing economy that generate conflicting social impacts, e.g. “true sharing” vs. pseudo-sharing [2, 3]. “True sharing” refers to “. . . distributing what is ours to others for their use and/or the act and process of receiving or taking something from others for our use” [4]. Consumption practices most resembling “true sharing” are better suited to facilitating communal links and socialisation [3], but most practices attributed to the sharing economy are not considered sharing at all [5]. Instead, other consumption practices are often conflated under the term “sharing economy”, such as renting, leasing, borrowing, lending, bartering, swapping, trading, exchanging, gifting, buying second-hand, and even buying new goods [6]. In addition, practices such as time banking [7], collaborative production (e.g. makerspaces) [8], and the gig economy [9] are also often included under the banner of the sharing economy.

Research and popular media promote practices attributed to the sharing economy, claiming these consumption practices have the potential to facilitate more open, inclusive, and democratic modes of production and consumption [10]. However, the promise of the sharing economy contrasts with the practices of sharing platforms, which lead to varying experiences among users and society: inclusiveness vs. discrimination, democratisation vs. social exclusion, flexible employment vs. exploitation, social cohesion vs. gentrification. Growing empirical evidence and user experiences suggest negative social impacts as a result of the activities of sharing platforms, e.g. Airbnb [11–13], Uber [14–16], and other shared mobility platforms [17]. There is concern that sharing platforms are simply exploiting time and resources of their users to their detriment [18].

While these paradoxes have been explored by others [8], there is recognition of the growing need to assess the social impacts of sharing platforms [10]. However, knowledge about social impacts in the sharing economy remains scarce and fragmented [19]. Most studies tend to advocate specific perspectives, for example, trust [20, 21] and discrimination [22, 23], while other studies focus on discussing a range of social impacts emanating from a single sharing platform such as Airbnb [11] and Uber [14]. This narrow focus results in relatively limited conceptual transferability across the diversity of sharing economy business models and related consumption practices. A more holistic framework to assess social impacts of sharing platforms would advance research on the sharing economy, support sharing platforms to understand/prioritise their social impacts, and inform policymakers interested in safeguarding consumer safety, while promoting the potential societal benefits of the sharing economy.

Assessing social impacts from sharing platforms is difficult. Methods, conceptual frameworks, or practical tools are lacking [24]; assessing perceived social impacts is often qualitative and requires value judgements or prioritisation that may be uncomfortable [25]; and, sharing platforms may be unwilling to collect or share data or may even lack the data (e.g. limited resources or access to users).

The aim of this research is three-fold: 1) to improve understanding of the social impacts of sharing platforms; 2) to develop a systematic framework to assess the social impact of sharing platforms; and 3) to operationalise the framework by proposing a practice-oriented tool that will allow sharing platforms to self-assess their social impact, as well as inform other interested stakeholders. We do so by building our framework around four broad social aspects: trust, empowerment, inclusivity, and social justice.

The article proceeds by offering background literature introducing the sharing economy, discussing social impacts of sharing platforms, and providing an overview of existing tools to assess social impacts. Then, we describe methods employed in this study, including literature review, stakeholder workshop, and development of our framework. We review the findings from a stakeholder workshop in Sweden, and consolidate these findings with literature to develop a systematic framework. A preliminary tool is proposed before we discuss key findings, contributions, and conclusions as well as outline possibilities for future research.

Background literature

The potential of the sharing economy to contribute towards social sustainability has been the focus of much debate [8, 26, 27]. However, it is difficult to assess social impacts, which advance or hinder social sustainability. Furthermore, understanding of these concepts in academia remains contested. Stakeholders—including sharing platforms, managers, regulators, investors, and citizens—are interested in understanding the social impacts of sharing platforms, and need clear methods and tools, which overcomes the fuzziness of concepts presented in academic literature. Therefore, we strive to strike this balance and elaborate on our understanding of the sharing economy, the social impacts resulting from its diverse consumption practices, and its contribution to social sustainability.

The sharing economy

Broadly, the sharing economy is said to facilitate access over ownership by making use of the idling capacity of goods and services, often leveraging technology to improve the economic efficiency of sharing [28]. It's growth in the last decade is described as a response to the 2008 financial crisis and a malfunctioning global financial system [29], where the sharing economy enables citizens to maintain a decent standard of living [30] through greater access to goods and services [31]. At the same time, advancements in information and communication technology (ICT) have reduced transaction costs associated with sharing among strangers, leading to increased levels of supply and demand and platforms benefiting from economies of scale. Transaction costs are understood by economists as the total costs (monetary and non-monetary) associated with making any economic transaction, including time and resources needed to access the market, to facilitate suitable offers, and to organise contracts or transactions [32]. Platforms in the sharing economy rely on technology and algorithms to match users, facilitate ratings and reviews, process payments, among other activities, thereby increasing the extent and ease of information exchange between the involved parties [33].

On the basis of a systematic literature review [28], we define the sharing economy as “. . . a socio-economic system that leverages technology to mediate two-sided markets, which facilitate temporary access to goods that are under-utilised, tangible, and rivalrous” [6]. We consider the system of actors involved in the sharing economy to include sharing platforms, their users, and society. We use the term user to include the actors involved in the two-sided market. The actor on the supply-side of the market, we call the resource owner; the actor on the demand-side of the market, we call the resource user [6]. We define society to include citizens

broadly as well as municipal representatives, media, academia, civil society, business associations, and other interested actors.

We focus our attention on sharing platforms as the mediator of the consumption practice, which facilitates social value creation. Sharing platforms connect a resource owner (the platform user providing access to a good they own) to a resource user (the platform user accessing a good that someone else owns) in order to facilitate access to under-utilised goods [6]. This emphasises sharing as a practice, with various impacts (both positive and negative) for the platform, its users, and society.

Yet, Belk [2, 4, 34] suggests that sharing is different from other consumption practices that extend product lifetime (gifting, second-hand, commodity exchange) because there is not necessarily the need for reciprocity or compensation. As such, depending on the user's motivation, interactions may range from transactional (e.g. renting) to prosocial (e.g. sharing), indicating that the motivation among users affects the outcome (i.e. social impact) of sharing via a platform. Bucher, Fieseler & Lutz [35] demonstrate that non-commercial users are more likely to hold moral and social-hedonic motives, unlike commercial users. Sharing platforms that operate as cooperatives, i.e. platforms owned and operated by its users, are more likely to realise positive social impact [36, 37]. Therefore, the design of the sharing platforms, user motivations, and subsequent consumption practices are important when considering the social impacts resulting from sharing [38]. It is from this point of departure that we develop a framework and practice-oriented tool to assess the social impact of sharing platforms.

Social impacts of sharing platforms

The social impacts of sharing platforms are diverse and complex, subject to differing understandings and priorities based on the actors involved in sharing [38]. For example, platforms may advantage some users while disadvantaging others. Meanwhile, the actions of users also impact each other as well as the platform and its ability to continue to provide services for others and broader societal impact. Finally, society at large is impacted when some groups are included or excluded, exploited for their labour or resources, or gentrified. We seek to capture this complexity in developing our work around four social aspects—trust, empowerment, inclusivity, and social justice (Table 1)—which capture many of the positive and negative social impacts discussed in literature already attributed to the sharing economy.

In relation to these aspects, sharing platforms are said to facilitate positive impacts such as enhancing social cohesion, increasing trust in communities, empowering individuals, and increasing social ties among strangers [8]. Trust has been identified as one of the most critical issues that serves as a “lubricant” in the sharing economy [39, 40]. Participation in sharing platforms may increase trust in peers [41, 42], in platforms [43], and in technology [44, 45].

Table 1. Definitions of the social aspects considered in this study.

Social Aspect	Definition	Relevant Literature
Trust	Trust is the assured reliance on the character, ability, strength, or honesty of someone or something.	Hawlitcshek et al. (2016, 2018); Huurne et al. (2017); Mazzella et al. 2016); Parigi & Cook (2015)
Empowerment	Empowerment is the action of enabling someone or something, by granting power, privilege, or authority as well as providing the necessary support, communication, or resources to motivate and inspire.	Füller et al. (2009); Mäkinen (2016); Pires, Stanton & Rita (2006)
Inclusivity	Inclusivity is the quality of trying to involve many different groups of people in decision-making and governance, emphasising the need for broader consultation and engagement of diverse communities, particularly those vulnerable or marginalised.	Ferrari (2016); George, McGahan & Prabhu (2012); Oxoby (2009)
Social Justice	Social justice is the quality of being equitable, impartial, or fair, including the <i>distribution</i> of benefits, the <i>representation</i> of diverse groups, and the <i>participation</i> of those groups.	Cribb & Gewirt (2003); Eubanks (2012); Gardner, Holmes & Leitch (2009)

<https://doi.org/10.1371/journal.pone.0240373.t001>

Studies have examined the role of platforms and their practices to foster trust online [46], and others have focused on the dichotomy between social inclusion and exclusion [47–49]. Research suggests that sharing platforms provide access to goods and services for people who could otherwise not afford them, as well as the possibility to generate extra income from one's own goods or skills, which has been framed as increasing inclusion, empowerment, and justice [49–51]. By connecting with strangers, sharing platforms are argued to increase social interaction between people, fostering social cohesion within local and global communities [52]. This may also lead to empowerment of marginalised social groups, e.g. women [49]. Some studies identify improvement of urban space through sharing, such as revitalisation of space, reduced pollution, better connectivity [53–55], as well as cultivating conscious tourists and communities due to alternative forms of consumption [56, 57].

Recent attention is also turning to the negative impacts of sharing platforms, for example, discrimination [22, 23], gentrification [58], casualisation of labour [59], and commodification of relationships [60]. The latest studies on accommodation sharing draw attention to over-tourism, touristification, and tourism-phobia in cities where conflicts are growing between tourists and the local population [61–65]. More specifically, the following negative impacts have been identified for Airbnb: non-civic behaviour, such as noise, vandalism, and violence [66, 67]; crowding-out of the long-term rental market, resulting in conflicts between resident Airbnb hosts and non-hosts [11]; increasing housing prices driven by short-term rentals [19, 68]; and overcrowding of cities with mass tourists [62]. As such, gentrification has been identified as a negative impact of accommodation sharing [58].

Other negative impacts include the exclusion of social groups, e.g. the poor or elderly, who may not possess the requisite technology or skills to participate [49]. Studies demonstrate that increased social interaction between strangers may also result in various forms of discrimination [22, 69–71]. Concern is also growing over data protection and personal privacy among users of sharing platforms [72]. This is to say nothing about the gig economy, occasionally included under the banner of the sharing economy, where work is often unstable, informal in nature, and lacking access to organised labour unions. This often leads to precarious work situations, without typical work-related securities, benefits, or similar [73, 74].

Whether positive or negative impacts, the distribution of these impacts is not experienced equally. Early adopters of sharing platforms tend to be younger, educated, more affluent, and more socially-connected [57, 75, 76]. Sharing platforms can theoretically support lower layers of society, e.g. democratising consumption and providing greater access to resources otherwise unattainable. However, there is not yet sufficient evidence that this happens widely, due to inequities of time, resources, and access to the internet. Additionally, research demonstrates that sharing platforms adversely affect incumbents [77] and municipalities [78], specifically around issues including competition, consumer safety, casualisation of labour, and tax avoidance [79, 80].

Social sustainability and social impact assessments

Much like the sharing economy, social sustainability is a concept taken for granted by numerous disciplines [81]. Social sustainability is described as a multi-dimensional concept focusing on the shared social goals of sustainable development [81, 82]. These goals often relate to personal well-being as well as meaningful interactions with others [83]. While there is no consensus on specific outcomes, literature does provide overlapping concepts relevant to social sustainability, for example, social capital, social cohesion, social inclusion, and social justice [81]. Due to the fluidity of concepts and the challenges associated with prioritising outcomes

contributing to social sustainability, we take inspiration from social impact assessments (SIAs), as elaborated by Assefa & Frostell et al. [83].

SIA is “. . . the processes of analysing, monitoring, and managing intended and unintended social consequences”, which includes both positive and negative impacts resulting from a focal intervention [81]. Within the field of SIA, these social impacts describe changes to a person or people’s way of life, culture, community, political system, environment, health and wellbeing, personal and private property rights, as well as fear and aspirations [83, 84]. In this study, we depart from this understanding to assess the social impacts of sharing platforms as a proxy for contributing to social sustainability.

A number of tools have been developed to assess social impact broadly. For example, the International Guidelines and Principles for Social Impact Assessment describe processes for evaluation of the intended and unintended social consequences of policies, programmes, plans, and projects [84]. The International Standards Organization (ISO) has developed the standard ISO 26000 that provides guidance on social responsibility [85]. The standard classifies social aspects into seven themes—human rights, labour practices, the environment, fair operating practices, consumer issues, community involvement, and development [85]. In recent decades, increased effort has focused on processes to develop social indicators [86] and procedures to measure social impact [87]. Social impact is becoming an integral part of sustainability assessments among global organisations such as the ISO [85], United Nations Global Compact [88], Global Reporting Initiative [89], and the Organisation for Economic Co-operation and Development [90].

Across these approaches, there are numerous ways to classify social impacts among a range of categories, comprising qualitative indicators, classifications, and assessment criteria as well as some quantitative indicators. They have usually been developed for organisations or activities with relatively formal structures, while sharing platforms also comprise informal initiatives, activities, and networks. In contrast, research on assessing the social impacts of sharing platforms tends to focus on specific social impacts, e.g. trust [20, 21] and discrimination [22, 23], or may address social impact from one particular practice, e.g. food sharing [24]. However, this often results in a limited number of considered social impacts and relevant indicators, leaving many social impacts unaccounted for, so are less beyond food sharing.

To date, there is no systematic framework to assess the social impact suitable for the wide diversity of sharing platforms and practices, with the exception of a recent study by Laukkanen & Tura [91]. They developed a general framework that classifies social aspects of sharing economy business models into five categories: safeguarding health and safety; respecting laws, regulations, and rights; respecting employee, stakeholder and individual rights; ethical principles; and no harmful social impacts and increasing social well-being [91]. The framework is rather general, which could be improved by: 1) increasing the level of granularity and decomposition of social impacts; and 2) taking into account the perspective of the main actors involved in the practice of sharing—platforms, resource owners, resource users, and society. While some studies have explored stakeholders’ views on social sustainability of sharing [11], assessment of social impact from their perspective has rarely been addressed.

While there is a large body of extant knowledge on assessing social impacts, this has not been tailored to sharing platforms, resulting in varied understandings of their impact as well as fractured approaches to assessing their social impact. It is clear that their social impacts vary across shared practices (e.g. space, mobility, goods, consumables, resources) as well as platform types (e.g. peer-to-peer, business-to-business, business-to-peer, and crowd/cooperative) [6]. There is a need to develop a systematic framework as well as tools for assessing social impacts of sharing platforms. There is also a need to elaborate specific measurable variables for each stakeholder group participating in and/or impacted by sharing platforms. Such a framework

must be context-specific to the sharing economy, while adaptable to shared practices, platform types, and the broad range of stakeholders involved in and affected by the sharing economy.

Methodology

We draw on both literature and empirical data to develop the systematic framework and subsequent tool, applying a multi-step methodology (Fig 1). We conducted a preliminary literature review in order to understand the current discourse on social impacts of sharing platforms and business models more broadly (Step 1). A stakeholder workshop was then held, to gain an impression of the broad perspectives on social impact in the sharing economy (Step 2). The data from the stakeholder workshop was analysed and refined in a series of workshops by the authors, complemented by a subsequent narrative literature review of social sustainability impacts of sharing platforms (Step 3). Based on the analysed data, a social sustainability assessment framework was developed (Step 4) and operationalised in the form of a practice-oriented tool (Step 5).

Step one: Preliminary literature review

The purpose of the preliminary literature review was to get a broad overview of the social impacts of sharing platforms, which informed a discussion on social sustainability aspects and indicators during a stakeholder workshop. We describe *aspects* as social values that can be influenced by the sharing platforms and *indicators* as measurable criteria to approximate social

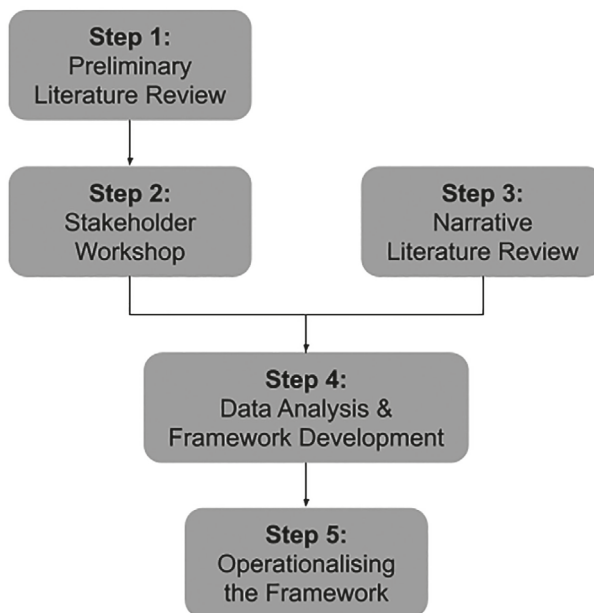


Fig 1. Multi-step methodology to develop and operationalise framework.

<https://doi.org/10.1371/journal.pone.0240373.g001>

impact. Our preliminary review began in the autumn of 2018 with 36 relevant articles from the database of sharing economy literature, collated by Laurenti et al. [92]. The abstracts and keywords of these articles were analysed to identify common terms used to indicate, describe, or measure social impacts. Twenty-five keywords were identified and used in a subsequent online database search using Scopus, in combination with "sharing economy" OR "collaborative economy" search strings. This search resulted in 42 additional articles, and the same process of keyword identification was repeated. An additional 25 keywords were identified, resulting in a total of 50 keywords used to indicate, describe, or measure social impacts of the sharing economy (S1 Appendix).

These 50 keywords were structured thematically based on patterns in the data, resulting in several broad social sustainability aspects (S2 Appendix). However, some of these aspects were found to be interrelated and overlapping, i.e. the same social impact could be related to multiple social aspects. We merged overlapping concepts to arrive at four social aspects—empowerment, trust, inclusivity, and social justice. Based on the literature, we defined these aspects in order to (1) clarify their relevance for assessing social impacts of sharing platforms, and (2) identify the distinct and least overlapping social impacts. The results from our preliminary literature review informed our preparation for the stakeholder workshop.

Step two: Stakeholder workshop

The stakeholder workshop took place at the Swedish National Laboratory on Sustainable Lifestyles in November 2018 in Kalmar, Sweden. The purpose of the workshop was to obtain feedback on the social aspects identified in the literature review and to co-create measurable indicators to assess social impacts in relation to each aspect. Thirty-five participants attended the workshop voluntarily during parallel sessions, based on interest. Previously, we had determined that our study did not meet the standard set by the Swedish Ethical Review Act (SFS 2008:192)—namely, Section 3 and Section 4, pertaining to applicability—requiring prior ethical approval of research involving humans. We did not collect or store any sensitive personal data, nor did we subject research participants to any physical intervention or risk of physical or mental injury. Data has been anonymised and aggregated, to avoid the identification of research participants.

Workshop participants were divided into 9 groups, based on their respective stakeholder categories. Five stakeholder categories were represented—companies, special interests, cities, public authorities, and academia. We broadly defined these stakeholder categories: 'companies' include sharing platforms, incumbents, and other formal or informal organisations; 'special interests' were industry associations, consumer organisations, and non-governmental organisations; 'cities' were individuals associated with any municipal government; 'public authorities' were national or regional agencies; and 'academia' was researchers or students. Participants were asked to consider both their role corresponding to their stakeholder category as well as a private citizen and/or user of sharing platforms.

The definitions of the four social aspects identified during the preliminary literature review were introduced to the participants and contextualised in relation to the sharing economy (S3 Appendix). An introductory explanation was given about what is an indicator and how it may be operationalised to measure social impact of sharing platforms. This brief introduction sought to clarify the aim of the workshop and stimulate discussions among the groups. Participants were then asked to collaborate within their groups on the following tasks:

1. Define these social aspects from the perspectives of their stakeholder group;
2. Suggest measurable indicators for each of the respective aspects.

Three workshop facilitators answered questions from participants regarding the tasks, but did not actively engage in the discussions. At the end of the workshop, participants were asked to rank the aspects by importance, balancing their stakeholder perspective and their perceived ease in measuring them. Then, participants were asked to record their final group responses in a worksheet that they submitted at the end of the workshop. Finally, the data was structured to summarise stakeholder insights relevant to the framework.

Step three: Narrative literature review

Triangulated with the structured data from the stakeholder workshop, a subsequent narrative literature review [93, 94] supported our efforts to identify, describe, and operationalise social indicators. This approach is exploratory and less rigorous than a systematic literature review, but appropriate in this case when researchers had pre-existing knowledge in the subject area and literature on the subject was insufficient [94]. Our review also builds upon the preliminary literature review and the work by co-authors Kessler and Singh et al. [92].

The review was conducted in March 2020. Using the Scopus database, an initial search ["sharing economy" AND "social impacts"] was limited to title, abstract, and keywords, which resulted in 22 documents, comprising articles, conference papers, and book chapters. The abstracts were analysed, but none of the articles were found to be particularly relevant to developing a framework to assess social sustainability of sharing platforms. A second search ["sharing economy" AND "social impacts"] was expanded to consider the entire content of each document, resulting in 133 documents. The title, abstract, and keywords were reviewed and 41 documents were found relevant.

A complementary search identified literature that described or performed social sustainability assessment in the sharing economy using the query: TITLE-ABS-KEY ("sharing economy") AND ALL ("social sustainability") AND ALL (assessment OR evaluation OR tool OR framework OR indicators). This resulted in 35 documents that were reviewed, which added a further six documents to our final sample.

A final search used the query: ALL ("sharing economy") AND ALL ("social impact assessment") OR ALL ("social impacts") OR ALL ("social sustainability"). This produced 240 documents that were reviewed, resulting in 15 documents added to our final sample. Of those additional documents, only two suggested indicators or tools for measuring social impacts of the sharing economy: Laukkanen and Tura [91] and Mackenzie and Davies [24]. In total, 62 articles (41, 6, and 15 documents, from each search respectively) comprised the final sample from the database search.

Step four: Data analysis and framework development

To develop our framework, we created a series of prototypes, which abductively incorporated literature and stakeholder feedback. The first prototype was informed by the preliminary literature review, which focused on four aspects of social sustainability. These four aspects were presented at the stakeholder workshop, from which the input was collected as data. This data was analysed using a constructivist grounded theory approach, which considers how and why participants construct meaning [95, 96]. This approach was chosen to consider the various stakeholder perspectives, which we mirror in our preliminary tool considering the sharing platform, resource owners, resource users, and society. Following the approach described by Kenny & Fourie [96], one researcher prepared the initial coding, seeking to develop relevant indicators and measurable variables. Two researchers then engaged in refocused coding in a series of three workshops, where the coding was refined and operationalised.

During these workshops, insights from literature also informed our coding. NVivo was used to support the subsequent coding of literature into categories, combined with data from stakeholders. Literature also informed our description of each indicator in relation to the sharing economy. The resulting analysis arrived at a final prototype of the framework to assess social sustainability of sharing platforms, considering a stakeholder perspective.

Step five: Operationalising the framework

To operationalise our framework, we sought to validate and test the framework, resulting in a practice-oriented tool. First, we presented early prototypes of the framework to researchers and practitioners at the 6th International Workshop on the Sharing Economy (27–29 June, 2019) and the Nordic Sharing Cities Summit (10–11 October, 2019). Solicited feedback at these events informed the final prototype of the framework. We also collaborated with a sharing platform called FLOOW2, based in the Netherlands, to test and adapt our framework to their context. FLOOW2 works with clients to design and implement a sharing platform within a business or industry, for example, within hospitals, schools, and construction companies. We interviewed representatives from the platform and co-developed a user and citizen survey. Based on our collaboration and the exercise of adapting our framework to their context, we found that a more specific tool with measurable variables would be needed to support the assessment of social impacts.

Based on stakeholder perspectives, literature, feedback, and experience, we developed a practice-oriented tool to assess the social impact of sharing platforms. The tool provides potential measurable variables and sources of data for each indicator and all actors involved in or impacted by the sharing practice, e.g. sharing platform, resource owner, resource user, and society.

Stakeholder insights

Data collected at the stakeholder workshop provides insights into the divergent perspectives among stakeholders regarding importance or priority of the various social aspects of sustainability. Five stakeholder categories—companies, special interests, cities, public authorities, and academia—were divided into nine groups during the workshop (Table 2). Their tasks were to define and/or expand the social aspects presented for discussion, propose measurable indicators, and rank the aspects based on their perceived level of importance.

First, the groups elaborated the descriptions for each social sustainability aspect—trust, empowerment, inclusivity, and social justice—based on their own experiences and perspectives. The mode of data collection allowed us to analyse the descriptions according to

Table 2. Workshop groups and corresponding stakeholder categories.

Group	Stakeholder Category
Group 1	Companies
Group 2	Special Interests
Group 3	Special Interests
Group 4	Cities
Group 5	Cities
Group 6	Cities
Group 7	Public Authorities
Group 8	Public Authorities
Group 9	Academia

<https://doi.org/10.1371/journal.pone.0240373.t002>

stakeholder category. Stakeholders suggest *trust* is something that must be earned and maintained, and that can be lost quickly in the face of scandal or lack of transparency (*Cities*). Transparency is an important factor in building trust (*Cities*), through compliance with standards and certifications (*Public Authorities*) and available data regarding positive and negative impacts (*Special Interests*). Trust is based on mutual integrity between users and the platform (*Company; Public Authorities*). Mutual trust is best achieved without direct interventions by the platform (*Special Interests*) and may lead to more robust levels of economic stability (*Public Authorities*) and improved trust in society, technology, and digital platforms (*Cities*).

Stakeholders described *empowerment* as a feeling of being a part of something bigger than oneself (*Company*), users feel they have a voice and sense of ownership (*Special Interest*) as well as the ability to influence the governance of the platform (*Special Interest; Cities; Academia*). Participation in processes of governance is an important aspect of empowerment (*Cities; Academia*), and platforms must be willing to share knowledge and skills (*Special Interest*). On a broader level, inclusive participation in a sharing platform can empower people to feel that they can shape the city and shift power from public and commercial interests to civil society (*Cities*). In this way, users, platforms, and society have changing roles and responsibilities for investment, maintenance, and disposal of shared resources (*Special Interests*).

Stakeholders described *social justice* as acknowledging the unfairness and inequitable structures in society by creating a safe space for different groups to participate in the platform based on their needs (*Cities*). Processes that prevent judgement, bias, and discrimination and respect privacy and personal data must be made fairer (*Companies; Special Interests; Public Authorities*). With greater availability, sharing should and can be part of creating a more equal society (*Public Authorities*).

Stakeholders related *inclusivity* to social justice. The groups described inclusivity as equal participation in decision-making (*Companies*), where everyone can join and share in the benefits of the platform (*Special Interests; Public Authority*). This requires platforms to actively reach out to all groups, regardless of whether they are using the service (*Cities*) including marginalised groups who do not normally feel included or involved (*Special Interests*). Accessibility is important, to foster inclusivity as well as friendliness and welcoming communication (*Cities*). Ideally, all people regardless of race, ethnicity, gender identity, sexual orientation, disability, religion, or age (*Cities*) should be welcome (*Public Authorities*), visible, and included in the activities of the platform (*Companies*).

Next, the workshop groups suggested measurable indicators based on their experience and priorities. The nine groups proposed 37 indicators across the four aspects presented and discussed at the workshop ([Table 3](#)). Stakeholders reported difficulty in proposing indicators due to the perceived challenges of measuring data or accessing data from platforms, their users, and society. While the indicators were suggested for specific social aspects, we see potential overlap that must be considered in the development of our assessment framework and tool. Trust had by far the highest number of proposed indicators (18), and social justice the lowest (4).

The number of indicators proposed by the workshop groups reflects the overall rank of social sustainability aspects. As a final task, workshop groups were asked to rank the aspects based on their experience and priorities as stakeholders ([Table 4](#)). Groups provided the same ranking for aspects when there was no clear priority among the members of the group. Due to time constraints, the final ranking was only received from 6 of the 9 groups. Trust was ranked highest (and had the highest number of proposed indicators) followed closely by empowerment. Social justice was ranked third with inclusivity being the lowest ranked social sustainability aspect. The task of ranking exemplifies how different stakeholders prioritise different

Table 3. Proposed indicators by stakeholders.

Social Aspect	Proposed Indicators / Measurable Variables
Trust	<ul style="list-style-type: none"> • Presence of a review system • Evaluation of the review systems by third party • Number of reviews in relation to number of transactions • Availability of users' information • Transparency of platform communication (contact us, problem solving) • Transparency in access to information (governance) • Transparency about environmental, social, and economic impacts • Measure extent to which rules are followed by users; codes of conduct • Number of users/times resource is shared (as a proxy) • Extent to which experiences/resources match the provided information • Number of resources that are lost, disappeared, or broken • Perceived safety over the platform • Returning customers, platform reviews/reputation/complaints • Presence of auditing system (national/international) • Sharing data with local, regional, national governments • Concrete measures that address problems seriously • Degree of profit motive • Customer satisfaction
Empowerment	<ul style="list-style-type: none"> • Amount of additional earnings • Number of people using the service (as a proxy) • Extent of participation/engagement in the platform (as a proxy) • Acquired knowledge/skills • Access to new forums and resources • Perceived access/control/influence of platform, sense of ownership • Number of platform initiatives fostering empowerment • Demonstrable examples of how users contribute/are heard • Type and extent of participation in governance • Level of active participation in governance
Social Justice	<ul style="list-style-type: none"> • Reduced reliance on social support • Representation of different socio-economic groups and under-represented groups in decision-making • Mechanisms for sharing profit/benefits among the users • Accessibility (e.g. language, contact us, flexible opening hours)
Inclusivity	<ul style="list-style-type: none"> • Inclusion of different socio-economic and under-represented groups of people in decision-making • Possibility of citizens (i.e. non-users) to make suggestions or participate in dialogue • Number of loans by e.g. age, race, gender, proportional to society • Propensity to lend things to friends, neighbours, acquaintances • Criteria/targets by platforms in how to include groups (e.g. targeted communication)

<https://doi.org/10.1371/journal.pone.0240373.t003>

aspects, and does not inform the significance or weight of any aspects or indicators presented in our framework.

Social sustainability framework

Integrating literature and stakeholder perspectives collected in the workshop, we developed a framework to assess the social impact of sharing platforms (Fig 2). The framework presents eighteen indicators across four social aspects: trust, empowerment, social justice, and

Table 4. Rank of social sustainability aspects by workshop groups.

Group #	Trust	Empowerment	Social Justice	Inclusivity
G1	1	3	2	2
G2	2	1	3	3
G3	2	1	4	3
G5	3	2	1	4
G8	1	4	2	3
G9	2	1	3	3
Average	1.8	2	2.5	3
Final Rank*	1	2	3	4

* Final rank was based on the average, not the frequency, of ranks.

<https://doi.org/10.1371/journal.pone.0240373.t004>

inclusivity. Each indicator seeks to assess the perceived experience from all stakeholders impacted by sharing as a practice including sharing platform, resource owner, resource user, and society.

In developing the framework, the indicators needed to remain abstract enough to be adapted to the context of the sharing platform and its particular sharing practice, but specific enough to be operationalised. We present the framework and describe each indicator, and

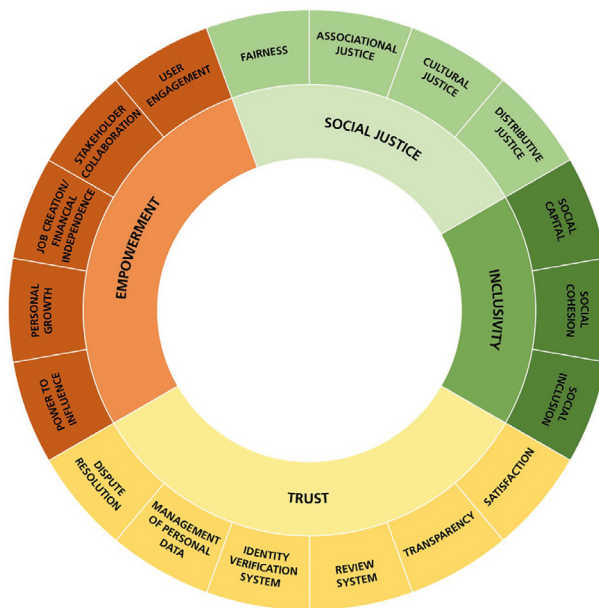


Fig 2. Systematic framework to assess social sustainability of sharing platforms.

<https://doi.org/10.1371/journal.pone.0240373.g002>

then provide a practice-oriented tool in which we propose measurable variables and corresponding sources of data to assess each indicator.

Trust

We define trust as the belief in something or someone based on its characteristics (e.g. person-ability, ability, performance, integrity, transparency, achievements, or history). Trust, a scarce resource, is identified as a key driver of the sharing economy [97, 98] and a key enabler of transactions in ICT-mediated business models [39, 40]. Trust is particularly important in two-sided markets [20, 99] in the sharing economy, where the platform facilitates an exchange between a resource owner and resource user. The sharing economy has been shown to increase trust between peers [46, 49]. Research distinguishes three types of trust: peer, platform, and product [20].

In their work on trust in the sharing economy, Hawlitschek et al. [20] explore trust in peers among a supplying-peer and a consuming-peer in peer-to-peer markets. We expand the definition of the sharing economy to include any two-sided market, e.g. peer-to-peer, business-to-business, business-to-peer, and crowd/cooperative [6, 28]. Here, we describe trust among platform users—a resource owner and a resource user. This trust among users is maintained as long as each has the *ability* to execute their key activity in co-creating value on the platform with high *integrity* and *benevolence* [20, 100]. These three dimensions—ability, integrity, and benevolence—are well established for gauging trust online [41, 101]. Ability describes the skills and competencies of users; integrity is perceived among users by honouring and upholding their responsibilities and commitments; benevolence considers the actions of users with each other's needs in mind. These dimensions are particularly important in facilitating trust among users, as together they share risks traditionally held by the business in business-to-consumer transactions [39], including economic loss, damage, theft, legal restrictions, and personal safety.

Trust in a platform is also established by these three dimensions, which can increase the likelihood of users continuing patronage on the platform [20, 102]. And, platforms can manifest ability, integrity, and benevolence, depending on their business model choices, e.g. pricing mechanism, review system, revenue streams, see Curtis & Mont [6]. For example, trust in Airbnb as a platform is fostered only when the platform has transparent booking and payment processes, functioning identity verification systems, and adequate data and privacy standards. Thus, the platform itself takes the pivotal role in establishing and maintaining trust among users [45]. Finally, trust in a product describes the belief that the product or service will satisfy the need of the user [20, 103]. As the product is an inanimate object, trust is only fostered through its ability to fulfil its function in terms of quality, durability, and ease of operation.

Based on the three types of trust and the corresponding dimensions of ability, integrity, and transparency, we identify several indicators to measure trust of sharing platforms and their practices: satisfaction, transparency, meaningfulness of a review system and an identity verification system, management of personal data, and dispute resolution.

Satisfaction. Satisfaction describes how users perceive matching or fulfilling of offers and demands [104], reflecting the *ability* of users and products to do so. In the sharing economy, this describes the needs of both the resource owner and resource user being fulfilled with minimum effort. In considering peer-to-peer accommodation sharing, Tussyadiah [105] has identified four significant determinants of satisfaction—enjoyment, economic benefits, amenities, and sustainability—but acknowledges that determinants of satisfaction are likely to differ between service offerings and users. Interestingly, Tussyadiah [105] found that improved sustainability outcomes actually detracted from the user's perception of satisfaction, suggesting

that the majority of users are not motivated by sustainability when engaged in peer-to-peer accommodation sharing. Möhlmann [106] has also shown that cost savings, trust, familiarity, service quality, and utility most significantly influence user satisfaction in the sharing economy. Users also report satisfaction in new social networks developed via platforms like TaskRabbit and Couchsurfing [107–109]. Satisfaction is therefore perceived by the user, relating to their needs and experiences associated with convenience, cost savings, utility, environmental impact, and/or social interactions, among others.

Transparency. Navigating the sharing economy, users and municipal actors are hampered by a lack of transparency among sharing platforms like Airbnb [110, 111]. This challenge is exacerbated by the use of digital platforms to facilitate sharing, which may lead to depersonalisation, anonymity, and less transparency among users [23]. Transparency measures are closely tied to trust-generating mechanisms like review systems and identity verification systems [112]. Transparency describes the level of openness in how sharing platforms govern, interact with users, and communicate about how they store or process personal sensitive data. Without platform and user transparency, user safety is jeopardised [112] and the social or environmental claims made by sharing platforms are meaningless [110]. Therefore, transparency is something that sharing platforms must practice (e.g. open reporting, data sharing, communication campaigns) and facilitate among users (e.g. review and identity verification systems).

Review system. A review or rating system supports transparency and facilitates trust in users, platforms, and products [36, 112]. Review systems are said to reduce the perceived risk of receiving inferior service quality or social interaction [113]. These systems seek to incentivise both resource owners and resource users to “create a respectful and accommodating demeanour during exchanges” [106, 114] and “decrease the interpersonal trust necessary between [users]” [115]. Review systems also reduce transaction costs normally associated with seeking recommendations and assessing service quality [116].

While they may facilitate trust, user reviews are largely positive and do little to distinguish between service quality or social interaction [117, 118]. Positive reviews may reflect perceived social or cultural capital by some excluding others, for example, based on race, religion, or economic status, which may undermine feelings of empowerment and social justice among users excluded from such interactions [113, 119]. Review systems may also aid discrimination and racial tension [22]. It is necessary to assess the perceived effectiveness of the review system among users as well as known or perceived issues regarding its abuse.

Identity verification system. Platforms rely on identity verification to facilitate trust and ensure safety in the social interactions and exchanges taking place on their platforms [120]. Verification varies across platforms, for example, using pictures, uploading official identification documents (e.g. driver’s license, passport), verifying email or telephone numbers, or relying on existing users to verify the identity of new users. While intended to foster trust and safety, information about individuals revealed through the verification process—gender, sexual, ethnic, or racial identity—may also lead to issues with safety and discrimination [23]. Furthermore, transparency and management of personal data are essential to ensure this practice is meaningful for facilitating trust [121].

Management of personal data. One of the latest additions to the literature on social impacts of the sharing economy is the impacts associated with protection of privacy [72]. A paradox emerges when personal data is necessary for identity verification to facilitate trust [120] while, at the same time, commercial sharing platforms extract, store, and monetise personal data as a source of revenue [10, 30]. Therefore, platforms serve as data controllers and data processors, and it is solely the responsibility of platforms to manage personal data and avoid “data spills” from users sharing personal data in reviews or among each other [122].

Effectively managing the protection of personal data is also a matter of legal responsibility [122]. Assessing management of personal data requires examining the policies and practices of platforms as well as understanding the perception among users regarding its efficacy and transparency.

Dispute resolution. The presence, effectiveness, and fairness of dispute resolution mechanisms may facilitate trust among users. These mechanisms consider problems with compliance, complaints, and user satisfaction [23, 116]. However, sharing platforms commonly rely on “within-platform” resolution mechanisms, which are often not transparent and lead to uneven treatment [23]. We expect to see robust and transparent dispute resolution mechanisms to prevent such behaviour.

Empowerment

Empowerment generally describes the users’ perceived power to influence the service offering and/or decision-making and governance of the platform [123]. In this way, governance refers to the approach by the platform to involve users in decision-making as well as the exchange of benefits among them [6, 124], which influences feelings of empowerment. It is also described as the “. . . enhanced ability to access, understand and share information” [125]. Sharing platforms are said to have an ideological orientation towards empowering their users [8]. Platforms facilitate empowerment by decentralising modes of consumption [10], generating additional income [114], and providing greater access to goods and services otherwise unattainable via ownership. Technology enhances this ability by providing better networking, communication, and opportunities for collaboration [126]. This is an example of digital empowerment [126], which may also increase self-efficacy and the opportunity to learn new skills [123]. Therefore, empowerment is an important aspect when evaluating sharing platforms [127].

In the sharing economy, resource owners may earn additional or primary income, while resource users are empowered by accessing goods and services they otherwise could not afford via ownership. Empowerment has an enabling aspect, offering control to users traditionally ceded to businesses and suppliers [125].

Empowerment is closely associated with other social aspects such as trust, where users that feel a sense of empowerment are likely to have more trust in the platform [123, 128]. Empowerment is also seen as both a process and an outcome; the former may be influenced by the practices of the sharing platform and the latter based on the subjective experience of the users [125]. We propose several indicators to assess empowerment: power to influence, personal growth, job creation or financial independence, stakeholder collaboration, and user engagement.

Power to influence. Power to influence describes the users’ perceived ability to affect the operations of the platform as well as the exchanges and interactions taking place. A more cooperative or collaborative governance model may empower users to exert influence in the day-to-day decision-making of sharing platforms [6]. Reviews or ratings are another mechanism by which users may influence exchanges and interactions on the platform [12]. While specific business model choices may empower users to influence operations and exchanges, any assessment requires measuring the users’ perceived power.

Similarly, we extend the power to influence more broadly to society, where stakeholders outside the platform ecosystem (e.g. neighbourhoods, community groups, city councils) may also exert power to influence operations and exchanges. Increasing the social sustainability of sharing platforms must also provide space for societal groups to respond to challenges arising from their activities (e.g. gentrification, housing affordability, discrimination, casualisation of

labour, taxes). The openness of sharing platforms to listen and respond to the concerns or wishes of societal actors is also an important indication of empowerment.

Personal growth. Personal growth reflects opportunity to learn new skills through training, experience, and social interactions [129]. Interaction among users via sharing platforms can develop new social and cultural skills [113]. However, sharing platforms can be more intentional, providing training in the use of the technology, e.g. smartphones, needed before users can take advantage of the platform and its offerings [130], which increases social justice and inclusivity. Workshops and experience sharing among users may also provide the opportunity to learn how to use specific products [131], for example, tools or professional photography equipment.

Job creation / financial independence. The sharing economy is said to foster economic empowerment [55, 132] through job creation, greater income, and increased financial independence [49, 133]. Resource owners can earn money by providing access to goods and services [114, 134]. Studies are emerging that demonstrate how sharing platforms provide real-time flexibility to earnings and potentially lead to higher hourly wages [135]. The sharing economy probably creates more opportunities for employment than it eliminates [116], with users valuing the flexibility in hours and effort they may choose to engage in the platform [14]. Users can earn money by providing access to shared resources or save money by accessing shared resources more cheaply than buying new, leading to financial independence and a sense of empowerment.

However, the perceived job creation and financial independence does not come without challenges. Because of rebound effects and our complex systems of production and consumption, it is difficult to determine net jobs created or the impact of secondary consumption as a result of savings in the sharing economy [25, 36, 51, 110]. In times of economic crisis, users that rely on revenues generated from the sharing economy lack legal protections and employment contracts compared to traditional employment [14]. Many authors warn that the lack of regulation and labour unions can also lead to precarious employment and poor working conditions [73, 74]. Any assessment of perceived economic empowerment in the good times must also be balanced with the potentially devastating personal and societal economic consequences in the bad times.

Stakeholder collaboration. Stakeholder collaboration is closely tied to other modes of empowerment such as power to influence, and other social aspects like trust and inclusivity. We describe stakeholder collaboration as the willingness or openness of sharing platforms to involve others in the design and implementation of their offering, which can be an important motivating factor for resource owners, resource users, and societal actors to feel a sense of empowerment. Collaboration is also an important mechanism to build and maintain reputation [136]. This is a platform-level indicator, but assessing this indicator can be triangulated with stakeholders' perception of their ability to collaborate with sharing platforms.

User engagement. We propose that high levels of user activity and engagement demonstrate a sense of empowerment in those using the platform. User activity and engagement may be measured by, for example, the number of transactions, the length of use or membership, and involvement in governance. This indicator may be related to satisfaction, since users whose needs are fulfilled are likely to continue to engage with the platform.

Social justice

Some authors argue that the sharing economy contributes to social justice [55, 98, 137], but more research is needed to operationalise the concept in the context of the sharing economy and to describe the specific mechanisms that may enhance social justice. The term relates to

issues of equity, defined by Young [138] as “. . . the morally proper distribution of social benefits and burdens among society’s members”. However, this “distributive paradigm” over-emphasises access, ignoring the existing institutional and social structures that lead to inequitable distribution in the first place [138, 139]. Building on the work by Fraser [140] and Young [138], Cribb and Gerwen [141] propose the dimensions of social justice—distributive, cultural, and associational justice—which we complement with the additional indicator of fairness.

Distributive justice. Distributive social justice includes material goods—wealth, income, resources—and nonmaterial goods—rights, opportunity, power, and dignity [138, 139]. This indicator is closely associated with other indicators, including personal growth and social inclusion. To strive for distributive justice, efforts to minimise or completely eliminate exploitation, marginalisation, or deprivation are necessary [140, 141]. Sharing platforms may be assessed based on their practices to remedy existing inequitable distribution as well as to mitigate reinforcing inequitable structures. For example, access to technology ensures users have the opportunity to access resources on the platform. Business model choices involving governance (e.g. cooperative) and value orientation (e.g. economic, environmental, social, societal) also open up for more equitable sharing of economic and noneconomic benefits [6]. However, evidence and experience show that this is an area in which the sharing economy can improve. Findings presented by Piracha [23] show that “sharing platforms align with neoliberal impulses, to roll-back laws and regulations that provide safeguards for sections of society from economic exploitation and discrimination”.

Cultural justice. Cultural justice promotes the recognition, representation, and tolerance of different cultures and communities, not limited to ethnic or racial cultures [142]. Fraser [140] says cultural justice must preclude domination, non-recognition, or disrespect by any other social or cultural group, often in the majority. Cultural justice is achieved in parallel with other indicators promoting personal growth and social inclusion. While recognition supports users from vulnerable or marginalised groups, their representation can also reward organisations that include these groups in governance, by learning new practices, accessing new markets, and enhancing the diversity of social interaction among users [141].

In the pursuit of cultural justice, it is important to include representation from groups when decisions are made in relation to those groups [142]. Cultural awareness is important when operating in new communities. For example, Boateng et al. [114] states that “. . . the sharing economy, in general, can impact negatively on collective and hospitable societies such as Ghana. That is, although Uber and the sharing economy, in general, have some social benefits, they also have some negative social-cultural effects”. The criticism made by Boateng et al. [114] and Haerewa et al. [143], among others, is that the practice of sharing platforms must not undermine the cultural practices of the communities in which they operate.

Associational justice. Associational justice—also referred to as participatory justice—seeks to include marginalised groups in the decision-making processes that impact their experiences [142]. Associational justice is a prerequisite to achieving distributive and cultural justice, as this requires representation and participation [141]. However, assessing associational justice is difficult; the presence of participation pathways is not sufficient to overcome the distributive and cultural injustices entrenched in society [141]. This indicator is closely associated with power to influence, stakeholder collaboration, and social inclusion, but describes the equity and fairness in participation on the platform.

Fairness. Common to these three indicators is the perceived fairness of material and non-material distribution (distributive justice), representation (cultural justice), and participation (associational justice) among users of the sharing platform. Fairness is a somewhat vague term and is perceived by the group which is acting or being acted upon. However, it is described as a social value of sharing platforms that must be achieved to ensure a socially sustainable

sharing system [144]. The perception of fairness is also important, to influence public acceptability of sharing platforms and their activities [145].

Many of the platforms in the sharing economy promote some degree of access, democratisation, openness, inclusivity, and/or equality. However, Schor et al. [8] find significant evidence of “distinguishing practices” based on class and power, which subvert the values of fairness prescribed by platforms. Therefore, assessing fairness must be balanced between the stated values of the platform and the perceived fairness among users. One area where this is most relevant is dispute resolution, when users may perceive the experience as more or less fair if the mechanism is transparent or just.

Inclusivity

In literature, inclusivity is a vague concept that captures many different social activities such as inclusion, connectedness, and the quality of interaction. To place this term in context, the sharing economy is said to foster “inclusive growth” [36, 130, 146], a nebulous term to describe both the outcome and process that seeks to enfranchise individuals and communities during economic opportunities [147]. As a process, mechanisms that enable participation, e.g. governance, ownership, employment, consumption, risk/reward, are important when considering inclusivity [147]. Inclusion is also interconnected with the other indicators and aspects: transparency, stakeholder collaboration, and associational justice.

Oxoby [148] provides the most convincing description of inclusion and its related concepts, defining inclusion as a process that provides “equal access to rights and resources” as well as the elimination of barriers to participation [148]. We propose three broad indicators to assess inclusivity: social inclusion, social cohesion, and social capital. Again, Oxoby [148] describes their interconnectedness: social capital describes an individual’s resources (e.g. time, effort, assets) invested during interaction; social cohesion is the accumulated social capital, a characteristic of the group/economy/society; and social inclusion is the mechanism that increases the opportunity and desire to invest social capital. In other words, social capital is the flow, social cohesion is the stock, and social inclusion is the process as well as the outcome. If all these three elements come together, we can speak of an inclusive sharing economy that can integrate all its diverse members.

Social capital. According to Portes [149], the first systematic definition of social capital was provided by Bourdieu [150], who describes social capital as “. . . the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition”. More recently, social capital was expanded by Berger-Schmitt [151] to include the interaction and engagement within social group(s), the quality of social interaction, and the quality of the supported/supporting societal institutions. Components such as willingness to participate, willingness to cooperate, and sense of belonging are also characteristics of social capital [152–154]. However, the definition of social capital is said to have been “independently invented at least six times” during the 20th century [155]. Therefore, similar to Bourdieu [150] and later Oxoby [148], we define social capital as the stock of an individual’s resources (e.g. time, effort, assets) invested during interaction, where the accumulation informs the quality of interaction and related institutions. Investment of social capital requires adequate trust; therefore, trust is also an important factor in building social capital [148].

By meeting new people, engaging with others, and increasing social interactions, the sharing economy is said to build social capital [51, 106, 156], so interactions between people are needed [157]. However, beyond stating that the sharing economy may foster social capital, this is under-examined in literature [120]. Nonetheless, the accumulation of social capital is said to

provide benefits, including civic engagement, economic prosperity, and improved outcomes for individuals—e.g. health, happiness, well-being—and society—e.g. institutions, safety, community [155, 157].

Social cohesion. Social cohesion is a characteristic of a group, economy, or society, generated by accumulated social capital [148, 158]. The concept describes the cumulative effect of establishing social ties among people who take part in the practice of sharing. Several studies identify a strong positive contribution to social capital and social cohesion [105, 108, 115, 120, 159–161]. However, in the case of Airbnb, these ties are only built if the host and guest interact, e.g. if single rooms are rented out instead of the whole apartment [105]. In addition, the level of technical involvement has an influence on social interaction, as the effect decreases as technology becomes more developed [115]. Studies find a relationship between the monetisation of sharing practices and the development of social ties—the likelihood of building new ties is greater when the consumption practice is non-profit and local [145, 159]. Similarly, social belonging has been described in studies on ride-sharing, land-sharing, and peer-to-peer insurance platforms [143, 162–164]. Closely associated with cultural justice, social cohesion can also describe the accumulation of cultural learning and cosmopolitan capital [120, 161].

However, these positive impacts are not always observed. Several studies also highlight the missing or negative impact of sharing on social cohesion. Users of Airbnb and Uber often have little to no interest in social interaction [105, 114, 159, 165]. Accommodation sharing can also reduce the sense of community within cities [53, 56].

Social inclusion. Social inclusion describes “. . . the extent that individuals, families, and communities are able to fully participate in society and control their own destinies, taking into account a variety of factors related to economic resources, employment, health, education, housing, recreation, culture, and civic engagement” [166]. While literature suggests the sharing economy may foster social inclusion as an outcome [7, 98, 167], the processes by which this takes place are underexplored.

Research has highlighted the experiences of social *exclusion* among users in the form of discrimination or bias based on race, ethnicity, gender identity, sexual orientation, religion, class, or digital literacy, among others [15, 22, 23, 27, 120]. Studies reveal cases of racial discrimination [22, 71], digital discrimination [69], and ethnic discrimination [70]. For example, one study explored the correlation between socio-demographic parameters of tenants and geographical location of Airbnb listings [111], while another connected the location of free-floating carsharing vehicles to certain demographic groups [168]. Research indicates that advantaged populations, i.e. white, young, well-educated, and employed, disproportionately reap the benefits facilitated by sharing platforms [168]. Therefore, while social inclusion is promoted as an outcome of the sharing economy, empirical evidence and individual experience say otherwise.

Sharing platforms have responded by asserting that users may not decline service to any other user on the basis of protected class; however, this has been criticised as outsourcing responsibility to users—instead of the sharing platform—to ensure social inclusion [120]. In any assessment, we suggest the need to identify the specific mechanisms or practices used by sharing platforms to promote social inclusion. These likely vary according to business model and cultural or geographical context. However, Ladegaard [120] suggests making it more difficult to determine the race, location, or socioeconomic status of users, suggesting that pictures are not necessary if substituted with a meaningful review system. Platforms have implemented anti-discrimination training programmes for users and dispute resolution mechanisms to respond to complaints of discrimination [23]. Any effort to foster a sense of inclusivity must be balanced with mechanisms to foster trust, empowerment, and user safety on the platform; more intimate exchanges may require greater information available to users to ensure safety.

Operationalising the framework

Through the process of testing and validating the framework, we identified the need to operationalise the framework in the form of a tool. The framework provides a structure to classify, categorise, and assess the social impacts of sharing platforms. However, to increase relevance for sharing platforms and other interested actors, we propose a practice-oriented tool that provides measurable variables for each of the four aspects across the eighteen indicators (Table 5). We developed the tool based on the above framework, synthesising inputs from literature and the stakeholder workshop as well as our own contributions. The measurable variables should be seen as suggested data points to help inform the social sustainability assessment of sharing platforms.

Prior to using the tool, we suggest defining the purpose for assessing the social sustainability of a sharing platform. Aspect(s) or indicator(s) could be chosen for prioritisation on the basis of the purpose or stated values of those using the tool. Then, the sources of data are varied, often affording the opportunity for triangulation. When using the tool, the level of ambition in data collection should be matched with the purpose for using the tool. Furthermore, we suggest triangulating data in relation to other social aspects because of overlapping concepts and cause-effect relationships (Table 6).

Finally, the tool is practice-oriented, intended for use by researchers and practitioners assessing the social impact of sharing platforms. We suggest the tool may be useful to structure data, to illuminate hotspots for sharing platforms to focus their activities, to inform regulation in safeguarding users and society, and to advise investment decisions. However, depending on the purpose, we suggest that the greater the amount of effort, data, variables, and triangulation, the more representative the assessment of the social performance of a sharing platform.

We also recommend caution be applied regarding the process of collecting, storing, or communicating data on the social impact of a sharing platform: 1) collecting data may risk exclusion; and 2) storing and communicating data may lead to data protection issues. Therefore, those using the tool must ensure inclusion of all actors impacted by the activities of the platform (a form of cultural justice in itself) and protect data from improper use.

Discussion and conclusions

Our society is facing numerous social challenges stemming from increased inequality [169], a growing sense of social distance as a result of technology [170], and yet-unknown impacts from COVID-19. We must respond as individuals, organisations, institutions, and society. In view of the growing concern about adverse effects of sharing platforms, there is a need to mitigate negative social impacts caused by sharing platforms and the practices of their users.

Combining literature and stakeholder perspectives, we develop a systematic framework and practice-oriented tool assessing social impacts of sharing platforms. The proposed framework provides an overview of potential social impacts of sharing platforms and their users. It comprises four main aspects—trust, empowerment, social justice, and inclusivity—and eighteen indicators described in detail in relation to the sharing economy. The framework is then expanded into a practice-oriented tool for researchers and practitioners as a method to assess social impact of sharing platforms.

Key insights and contributions

Literature and empirical insights suggest numerous adverse social impacts resulting from practices among sharing platforms and their users. We highlight both the potential positive and negative social impacts, recognising that any judgement requires an evidence-based assessment. The aim of our research was: 1) to improve understanding of the social impacts of

Table 5. Practice-oriented social impact tool with measurable variables.

Aspect / Indicator	Measuring Variables			
	Platform	Resource Owner	Resource User	Society
Trust				
Satisfaction	<ul style="list-style-type: none"> Mechanism to measure user satisfaction (IwSP) Number of users or frequency of use (as a proxy) (SPD) Number of resources that are lost, disappeared, or broken (SPD) 	<ul style="list-style-type: none"> Degree of satisfaction with the service provided by the platform (US) Degree of satisfaction of the returned resource (US) 	<ul style="list-style-type: none"> Degree of satisfaction with the service provided by the platform (US) Degree of satisfaction of the provided resource (US) 	N/A
Transparency	<ul style="list-style-type: none"> Certification by an accredited body (e.g. GRI, B Corp) (IwSP) Open data practices, several examples (IwSP) Communication about open data practices reaching at least 50% of users (SPD) Transparency of platform communication (contact us, dispute resolution) Transparency in access to information (governance) Transparency about environmental, social, and economic impacts Sharing data with local, regional, national governments 	<ul style="list-style-type: none"> Knowledge of open data practices by platform (Yes/No) (US) Perceived level of transparency by sharing platform (US) Perceived level of transparency by resource user (US) 	<ul style="list-style-type: none"> Knowledge of open data practices by platform (Yes/No) (US) Perceived level of transparency by sharing platform (US) Perceived level of transparency by resource user (US) 	<ul style="list-style-type: none"> Knowledge of open data practices by platform (Yes/No) (CS, Iw3) Access to data (and environmental, social, and economic impacts) (Iw3)
Review System	<ul style="list-style-type: none"> Presence of a review system (IwSP) Evaluation of perceived effectiveness of review system by third party (IwSP) Number of reviews compared to number of transactions (SPD) 	<ul style="list-style-type: none"> Perceived meaningfulness of review system to illustrate: <ol style="list-style-type: none"> platform service interaction (IwRO, US) 	<ul style="list-style-type: none"> Perceived meaningfulness of review system to illustrate: <ol style="list-style-type: none"> platform service interaction resource quality (IwRU, US) 	<ul style="list-style-type: none"> Perceived meaningfulness of review system for: <ol style="list-style-type: none"> using supporting investing regulating (CS, Iw3)
Identity Verification System	<ul style="list-style-type: none"> Presence of an identity verification system <ol style="list-style-type: none"> pictures ID documents email phone number existing user verification (SPD, IwSP) 	<ul style="list-style-type: none"> Perceived meaningfulness of identity verification system (IwRO, US) 	<ul style="list-style-type: none"> Perceived meaningfulness of identity verification system (IwRU, US) 	<ul style="list-style-type: none"> Perceived meaningfulness of identity verification system to protect public safety (Iw3, CS)
Management of Personal Data	<ul style="list-style-type: none"> Mechanisms to protect personal data (IwSP) Communication about how personal data is collected, processed, stored, and used by the platform or other parties (SPD, IwSP) 	<ul style="list-style-type: none"> Perceived trust in platform to manage the following in RO's best interest: Personal Data; Personal Identity; Financial Data; Physical Safety (IwRO, US) 	<ul style="list-style-type: none"> Perceived trust in platform to manage the following in RU's best interest: Personal Data; Personal Identity; Financial Data; Physical Safety (IwRU, US) 	<ul style="list-style-type: none"> Perceived trust in platform to manage the following in society's best interest: Personal Data; Personal Identity; Financial Data; Physical Safety (CS)
Dispute Resolution	<ul style="list-style-type: none"> Presence of codes of conduct, or similar (SPD) Presence of mechanisms to facilitate efficient dispute resolution (SPD) Perceived extent rules are followed by users (IwSP) Number of disputes filed (SPD) 	<ul style="list-style-type: none"> Perceived fairness of dispute resolution, if applicable (US) 	<ul style="list-style-type: none"> Perceived fairness of dispute resolution, if applicable (US) 	N/A
Empowerment				
Power to Influence	<ul style="list-style-type: none"> Governance model (SPD, IwSP) Willingness to respond to the concerns of users and societal actors (IwSP) 	<ul style="list-style-type: none"> Perceived access/control/power to influence the operations of the platform (IwRO, US) Perceived sense of contribution, ownership (IwRO, US) 	<ul style="list-style-type: none"> Perceived access/control/power to influence the operations of the platform (IwRU, US) Perceived sense of contribution, ownership (IwRU, US) 	<ul style="list-style-type: none"> Perceived openness of platform to respond to the concerns or wishes of societal actors (Iw3, CS)

(Continued)

Table 5. (Continued)

Aspect / Indicator	Measuring Variables			
	Platform	Resource Owner	Resource User	Society
Trust				
Personal Growth	<ul style="list-style-type: none"> Presence of initiatives to foster personal growth (e.g. trainings, workshops, experience sharing) (SPD, IwSP) 	<ul style="list-style-type: none"> Perceived opportunity to learn new skills through training, experience, and social interactions (IwRO, US) Acquired knowledge and skills (e.g. managing finances, social media, communication, marketing, photography, using tools and software) (US) 	<ul style="list-style-type: none"> Perceived opportunity to learn new skills through training, experience, and social interactions (IwRU, US) Acquired knowledge and skills (e.g. managing finances, social media, communication, marketing, photography, using tools and software) (US) 	N/A
Job Creation / Financial Independence	<ul style="list-style-type: none"> Financial flows, jobs created (SPD) 	<ul style="list-style-type: none"> Amount of additional earnings (US) Perceived change in financial independence, if any (US) 	<ul style="list-style-type: none"> Amount of money saved (US) Perceived change in financial independence, if any (US) Perceived access to new resources (IwRU, US) 	<ul style="list-style-type: none"> Impact on incumbent industries (Iw3, PD) Net jobs created/lost in society (PD)
Stakeholder Collaboration	<ul style="list-style-type: none"> Willingness to involve others in the design and implementation of the platform (IwSP) 	<ul style="list-style-type: none"> Perceived openness of the platform to collaborate (IwRO, US) 	<ul style="list-style-type: none"> Perceived openness of the platform to collaborate (IwRU, US) 	<ul style="list-style-type: none"> Perceived openness of the platform to collaborate (Iw3, CS)
User Engagement	<ul style="list-style-type: none"> Extent of participation or engagement in governance of the platform (SPD, IwSP) Number of people using the service (as a proxy) (SPD) Length of use / membership (SPD) Presence of initiatives fostering empowerment (e.g. forums, trainings, events) (SPD) 	<ul style="list-style-type: none"> Perceived meaningfulness of platform initiatives fostering empowerment (e.g. forums, trainings, events) (IwRO, US) 	<ul style="list-style-type: none"> Perceived meaningfulness of platform initiatives fostering empowerment (e.g. forums, trainings, events) (IwRU, US) 	N/A
Social Justice				
Distributive Justice	<ul style="list-style-type: none"> Mechanisms for distribution of economic and noneconomic benefits among users, society (SPD, IwSP) Effort to reduce or eliminate exploitation, marginalisation, or deprivation (e.g. dispute resolution) (IwSP) Actions to remedy or mitigate inequitable distribution of material and nonmaterial goods (e.g. equal access to goods and services) (IwSP) 	<ul style="list-style-type: none"> Perceived effectiveness of mechanisms by the platform to enable a more equitable distribution of economic and noneconomic benefits (US) Perceived effectiveness of actions by the platform to enable a more equitable distribution of material and nonmaterial goods (US) 	<ul style="list-style-type: none"> Perceived effectiveness of mechanisms by the platform to enable a more equitable distribution of economic and noneconomic benefits (US) Perceived effectiveness of actions by the platform to enable a more equitable distribution of material and nonmaterial goods (US) 	<ul style="list-style-type: none"> Reduced reliance on social support (PD) Perceived effectiveness of mechanisms by the platform to enable a more equitable distribution of economic and noneconomic benefits (US) Perceived effort to reduce or eliminate exploitation, marginalisation, or deprivation (CS)
Cultural Justice	<ul style="list-style-type: none"> Representation of different socio-economic groups and under-represented groups in decision-making (IwSP) Measure the tolerance of different cultures & communities among users (IwSP, SPD) Mechanisms to reduce bias and discrimination among platform, its users (IwSP) Ensure cultural practices of the community where sharing occurs are not undermined (IwSP) 	<ul style="list-style-type: none"> Perceived tolerance, bias, or discrimination during the course of sharing (IwRO, US) Perceived effectiveness of the platform to protect cultural practices of the community where sharing occurs (US) 	<ul style="list-style-type: none"> Perceived tolerance, bias, or discrimination during the course of sharing (IwRU, US) Perceived effectiveness of the platform to protect cultural practices of the community where sharing occurs (US) 	<ul style="list-style-type: none"> Perceived representation of different socio-economic groups and under-represented groups (CS)
Associational Justice	<ul style="list-style-type: none"> Participation pathways that ensure representation and distribution of resources (IwSP) Accessibility (e.g. language, contact us, flexible opening hours) 	<ul style="list-style-type: none"> Perceived effectiveness of participation pathways, especially overcoming structural and cultural injustices (IwRO, US) 	<ul style="list-style-type: none"> Perceived effectiveness of participation pathways, especially overcoming structural and cultural injustices (IwRU, US) 	<ul style="list-style-type: none"> Perceived effectiveness of participation pathways, especially overcoming structural and cultural injustices (Iw3, CS, M)
Fairness	<ul style="list-style-type: none"> Perceived fairness of platform activities in distribution, representation, and participation based on social or cultural class (IwSP) 	<ul style="list-style-type: none"> Perceived fairness of platform activities in distribution, representation, and participation based on social or cultural class (IwRO, US) 	<ul style="list-style-type: none"> Perceived fairness of platform activities in distribution, representation, and participation based on social or cultural class (IwRU, US) 	<ul style="list-style-type: none"> Perceived fairness of platform activities in distribution, representation, and participation based on social or cultural class (Iw3, CS, M)

(Continued)

Table 5. (Continued)

Aspect / Indicator	Measuring Variables			
	Platform	Resource Owner	Resource User	Society
Inclusivity				
Social Inclusion	<ul style="list-style-type: none"> Measures to promote the opportunity to participate in the activities of the platform (IwSP) Mechanisms to safeguard review and identity verification system from bias or discrimination among users (IwSP) Anti-discrimination trainings (SPD) Dispute resolution mechanisms to deal with issues of exclusion (IwSP) Number of transactions by e.g. age, race, gender, proportional to society 	<ul style="list-style-type: none"> Perceived effectiveness of platform measures to promote the opportunity to participate in the activities of the platform (IwRO, US) 	<ul style="list-style-type: none"> Perceived effectiveness of platform measures to promote the opportunity to participate in the activities of the platform (IwRU, US) 	<ul style="list-style-type: none"> Perceived effectiveness of platform measures to promote the opportunity to participate in the activities of the platform (Iw3, CS) Possibility of citizens (i.e. non-users) to make suggestions or participate in dialogue
Social Cohesion	<ul style="list-style-type: none"> Practices to promote forming of new relationships (SPD, IwSP) Demonstrated awareness of platform impact on social ties among its users and community (IwSP) 	<ul style="list-style-type: none"> Perceived degree of interaction during the practice of sharing (US) Evidence of forming new relationships (IwRO, US) Perceived strength of social ties within sharing community (IwRO) 	<ul style="list-style-type: none"> Perceived degree of interaction during the practice of sharing (US) Evidence of forming new relationships (IwRU, US) Perceived strength of social ties within sharing community (IwRU) 	<ul style="list-style-type: none"> Perceived impact of platform activities on the sense of community (Iw3, CS, M)
Social Capital	<ul style="list-style-type: none"> Prioritises trust-building mechanisms to promote interaction (IwSP) 	<ul style="list-style-type: none"> Perceived time, effort, resources invested in sharing on the platform (IwRO) Perceived quality of interactions on the platform (IwRO, US) Improved personal outcomes (e.g. health, happiness, well-being) (IwRO, US) 	<ul style="list-style-type: none"> Perceived time, effort, resources invested in sharing on the platform (IwRU) Perceived quality of interactions on the platform (IwRU, US) Improved personal outcomes (e.g. health, happiness, well-being) (IwRU, US) 	<ul style="list-style-type: none"> Perceived impact of platform activities on civic engagement, economic prosperity, consumer safety, and societal institutions (e.g. public transport, media) (Iw3, PD, CS)

Proposed data sources: citizen survey (CS), interview with resource owner (IwRO), interview with resource user (IwRU), interview with sharing platform (IwSP), interview with society actors (e.g. citizens, investors, regulators, and municipal actors) (Iw3), media (e.g. newspapers, blog posts, social media) (M), public data (PD), sharing platform data (SPD), user survey (US).

<https://doi.org/10.1371/journal.pone.0240373.t005>

sharing platforms; 2) to develop a systematic social sustainability framework to structure assessment of sharing platforms; and 3) to operationalise the framework by proposing a tool to support assessment of the social impacts of sharing platforms.

Our work highlights the interrelationship and interconnectedness of platform and user practices, as well as their subsequent social impacts. The social aspects and indicators presented in the framework are closely interrelated through intricate cause-effect relationships. For instance, private earning or savings contribute to empowerment and issues of inclusivity and social justice. Transparency not only builds trust among stakeholders, but also frames conditions for increased inclusivity and social justice. We explicate these interrelationships in the framework and the practice-oriented tool. While increasing the complexity of assessing social impact, the interconnectedness allows for triangulation of data during assessment as well as the compounding of social benefits if sharing platforms introduce specific mechanisms to overcome adverse impacts.

We contribute to research on understanding and assessing the social impact of sharing platforms in several ways. Firstly, the framework and subsequent practice-oriented tool is holistic and comprehensive in its design and operationalisation. Instead of taking a single perspective, it integrates insights from other studies on trust [20], discrimination [22, 23], social inclusion [146], for example. By providing detailed descriptions for each indicator, the framework is more easily operationalised, facilitating assessment of the diverse social impacts systematically to describe the overall social performance of a sharing platform.

Table 6. Social indicator relationships for triangulation.

Aspect / Indicator	Relation to Other Social Aspects			
	Trust	Empowerment	Inclusivity	Social Justice
Trust				
Satisfaction		x		
Transparency			x	x
Review System		x	x	x
Identity Verification System		x		x
Management of Personal Data		x		x
Dispute Resolution			x	x
Empowerment				
Power to Influence	x			
Personal Growth			x	
Job Creation / Financial Independence				x
Stakeholder Collaboration	x			
User Engagement	x			
Inclusivity				
Social Inclusion		x		x
Social Cohesion	x			
Social Capital	x			x
Social Justice				
Distributive Justice		x	x	
Cultural Justice		x	x	
Associational Justice		x	x	
Fairness		x	x	

<https://doi.org/10.1371/journal.pone.0240373.t006>

Additionally, stakeholders participated in defining aspects and indicators of the framework, prioritising aspects based on their perspectives and experiences. The framework not only incorporates these views, we also develop a tool for use by many of these same stakeholders.

Finally, the framework provides increased granularity and decomposition of social impacts relevant to sharing platforms. This is addressed in two ways: the detailed resolution of the framework and the incorporation of actors' views in assessing social impact. Our framework provides detailed descriptions for each of the aspects and indicators, and discusses their relevance to the sharing economy. Our framework and practice-oriented tool also recognise that the relevance of social indicators varies according to the perspective and experiences of the actors involved or impacted by sharing platforms. This unique approach enables flexible use of the framework and tool, depending on the purpose, viewpoints, and priorities of those using the tool. This flexibility also allows for adaptation across sharing platforms, as there are considerable differences based on, for example, the shared practice (e.g. shared mobility, shared goods) or platform type (e.g. peer-to-peer).

Implications for research and practice

One of the struggles we faced in developing our framework was the vague concepts used in research to describe the various social impacts. While some concepts have more or less established definitions, e.g. gentrification and discrimination, others lack clear boundaries or are used interchangeably. Our framework seeks to provide clearer demarcations of these fuzzy concepts, for example, by describing social capital as the flow, social cohesion as the stock, and social inclusion as the process. Not only does our framework advance research on

understanding and assessing the social impacts of sharing platforms, we hope it also has implications for how others use these concepts. Our framework may primarily be used by researchers to improve understanding of the potential social impacts of sharing platforms and to structure future assessments. However, researchers will find they must collaborate with platforms, which maintain access to their data, prioritise their own impacts, and adapt their business model choices and offerings to enhance social value creation.

Our tool is also intended for use by practitioners—including sharing platforms, governments, investors, and other interested parties—to structure their assessment or understanding of the social impact of sharing platforms. However, while many tools have been created by academia and industry, there is little evidence to suggest these tools are put to use [171]. Research suggests that these tools are often not adapted to meet the specific needs and expectations of companies [172, 173], and tools may remain unused because they are too complex, too demanding of time and resources, or too context specific [172, 174]. Finally, tools that have not involved key stakeholders in their development may miss key insights detracting from their relevance [175].

We responded to these common shortcomings when developing the tool. First, we included stakeholders in the design and description of the aspects and indicators, with their perspectives represented in the tool. We suggest ways in which the tool can be adapted to the needs and purposes of those using it, particularly prioritising aspects and indicators. Finally, we sought to make the tool easier to use than the intricate framework by suggesting measurable variables and sources of data.

Limitations and future research

Our framework attempts to provide a holistic assessment framework, capturing the breadth of social impacts, experiences, and practices within the sharing economy. While we seek to balance granularity, flexibility, and level of detail, we wish to recognise some limitations of our work in doing so. We recognise that our own perspectives and experiences influence our interpretation of literature and data. By incorporating stakeholder perspectives, we sought to capture greater insights, but the stakeholder workshop involved primarily Swedish participants and captured viewpoints of only those able to attend a single event in person. While the stakeholders included companies, special interests, municipalities, public authorities, and academia, there was no specific representation of platform users or citizens in general. To address this, we encouraged participants at the workshop to consider their perspectives as users as well as citizens. However, we encourage additional testing of our framework and tool in additional national or cultural contexts with relevant stakeholders. Most likely, the range of social impacts and assessment techniques will differ drastically according to socio-cultural, economic, technological, and regulatory contexts. This includes prioritisation of certain social aspects and indicators over others, which is value-laden and requires explicit transparency when using the framework. While the framework and tool are intended to be flexible, based on priorities, purposes, and access to data, it is not yet known how this would impact the comparability of assessment results.

We propose that future research use the framework to compare social impact across these contexts or business models. For example, studies may compare the social impacts between shared practices (e.g. shared space, shared mobility, shared goods), platform type (e.g. peer-to-peer, business-to-consumer), geographical scope (e.g. existing community, local, regional, national, international) and value orientation (e.g. commercial, environmental, social). The extent to which, and how, these business model choices affect the type and scale of social

impacts should be empirically tested. In doing so, particular business model choices may be exemplified as creating, preserving, undermining, or destroying social value.

We suggest in-depth analyses of several sharing platforms to understand the potential interlinkages of impacts and their causalities. This is important, for example, to understand the subsequent impact pathways. In addition, we find that some practices increase social impacts, but diminish others. For example, review and identity verification systems can increase trust and safety, but also lead to discrimination based on race, gender, or disability. While the framework and tool are diagnostic, they are not necessarily prognostic; this could be improved by identifying interlinkages, causalities, and impact pathways.

Our framework seeks to fulfil a stated need by research and practitioners to assess the social impact of sharing platforms. If we do not systematically measure social impacts of sharing platforms, the positive impacts may be overlooked, as a result of increasing focus on the negative impacts, leading to reluctance or cynicism towards sharing in general [130, 132, 176]. In addition, sharing platforms have expressed both the interest and the need to be able to measure their sustainability impacts [24, 177], to communicate with their users, defend their activities among regulators, and secure funding from financiers. We hope this framework and practice-oriented tool may support future research and inspire improved practices to promote a more positive social impact of sharing platforms.

Supporting information

S1 Appendix. Keywords identified during preliminary literature review.
(DOCX)

S2 Appendix. Social aspects and impacts from preliminary literature review.
(DOCX)

S3 Appendix. Definitions of social aspects presented at workshop.
(DOCX)

S4 Appendix. Workshop data.
(DOCX)

Acknowledgments

We would like to thank Charlotte Liere and Kes McCormick, project leaders of Sharing Cities Sweden, which provided the opportunity to organise the stakeholder workshop. We would also like to thank participants of the stakeholder workshop and those that provided feedback on the framework at the 6th International Workshop on the Sharing Economy and the Nordic Sharing Cities Summit. We would like to thank Yuliya Voytenko Palgan for valuable support and feedback during the writing process.

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References

1. McLaren D, Agyeman J. *Sharing Cities: A Case for Truly Smart and Sustainable Cities*. Mit Press; 2015.
2. Belk R. Sharing versus pseudo-sharing in Web 2.0. *The Anthropologist*. 2014; 18: 7–23.
3. Habibi MR, Davidson A, Laroche M. What managers should know about the sharing economy. *Bus Horiz*. 2017; 60: 113–121. <https://doi.org/10.1016/j.bushor.2016.09.007>
4. Belk R. Why Not Share Rather Than Own? *Ann Am Acad Pol Soc Sci*. 2007; 611: 126–140. <https://doi.org/10.1177/0002716206298483>
5. Kennedy J. Conceptual boundaries of sharing. *Inf Commun Soc*. 2016; 19: 461–474. <https://doi.org/10.1080/1369118X.2015.1046894>
6. Curtis SK, Mont O. Sharing economy business models for sustainability. *J Clean Prod*. 2020; 121519. <https://doi.org/10.1016/j.jclepro.2020.121519> PMID: 32884181
7. Luckner N, Fitzpatrick G, Werner K, Subasi Ö. Setting up and running a sharing service: An organisational perspective. *Interact Des Archit*. 2015; 24: 63–80.
8. Schor J, Fitzmaurice C, Carfagna LB, Attwood-Charles W, Poteat ED. Paradoxes of openness and distinction in the sharing economy. *Poetics*. 2016; 54: 66–81. <https://doi.org/10.1016/j.poetic.2015.11.001>
9. Ravenelle AJ. Sharing economy workers: selling, not sharing. *Camb J Reg Econ Soc*. 2017; 10: 281–295. <https://doi.org/10.1093/cjres/rsw043>
10. Murillo D, Buckland H, Val E. When the sharing economy becomes neoliberalism on steroids: Unraveling the controversies. *Technol Forecast Soc Change*. 2017; 125: 66–76. <https://doi.org/10.1016/j.techfore.2017.05.024>
11. Caldicott RW, von der Heide T, Scherrer P, Muschter S, Canosa A. Airbnb—exploring triple bottom line impacts on community. *Int J Cult Tour Hosp Res*. 2020. <https://doi.org/10.1108/IJCTHR-07-2019-0134>
12. Edelman BG, Luca M. Digital Discrimination: The Case of Airbnb.com. Harvard Business School NOM Unit Working Paper No. 14–054; 2014.
13. Oskam JA. *The Future of Airbnb and the Sharing Economy: The Collaborative Consumption of our Cities*. Channel View Publications; 2019.
14. Malos S, Lester GV, Virick M. Uber Drivers and Employment Status in the Gig Economy Should Corporate Social Responsibility Tip the Scales? *Empl Responsib RIGHTS J*. 2018; 30: 239–251.
15. Rosenblat A, Levy KEC, Barocas S, Hwang T. Discriminating Tastes: Uber's Customer Ratings as Vehicles for Workplace Discrimination. *POLICY INTERNET*. 2017; 9: 256–279. <https://doi.org/10.1002/poi3.153>
16. Thelen K. Regulating Uber: The politics of the platform economy in Europe and the United States. *Perspect Polit*. 2018; 16: 938–953.
17. Geissinger A, Laurell C, Sandström C. Digital Disruption beyond Uber and Airbnb—Tracking the long tail of the sharing economy. *Technol Forecast Soc Change*. 2018.
18. Sundararajan A. *The Sharing Economy: The end of employment and the rise of crowd-based capitalism*. New York: MIT Press; 2016.
19. Sainaghi R, Baggio R. Clusters of topics and research designs in peer-to-peer accommodation platforms. *Int J Hosp Manag*. 2019. <https://doi.org/10.1016/j.ijhm.2019.102393>
20. Hawlitschek F, Teubner T, Weinhardt C. Trust in the sharing economy. *Unternehm*. 2016; 70: 26–44.

21. Huurne M, Ronteltap A, Corten R, Buskens V. Antecedents of trust in the sharing economy: A systematic review. *J Consum Behav*. 2017; 16: 485–498.
22. Edelman BG, Luca M, Svirsky D. Racial Discrimination in the Sharing Economy: Evidence from a Field Experiment. *American Economic Journal*. 2017; 9: 1–22.
23. Piracha A, Sharples R, Forrest J, Dunn K. Racism in the sharing economy: Regulatory challenges in a neo-liberal cyber world. *Geoforum*. 2019; 98: 144–152. <https://doi.org/10.1016/j.geoforum.2018.11.007>
24. Mackenzie SG, Davies AR. SHARE IT: Co-designing a sustainability impact assessment framework for urban food sharing initiatives. *Environ Impact Assess Rev*. 2019; 79: 106300. <https://doi.org/10.1016/j.eiar.2019.106300> PMID: 31787793
25. Plepys A, Singh J. Evaluating the sustainability impacts of the sharing economy using input-output analysis. In: Mont O, editor. *A research agenda for sustainable consumption governance*. Edward Elgar; 2019. p. Forthcoming.
26. Nica E, Potcovaru A-M. The social sustainability of the sharing economy. *Econ Manag Financ Mark*. 2015; 10: 69.
27. Schor J, Attwood-Charles W. The “sharing” economy: labor, inequality, and social connection on for-profit platforms. *Social Compass*. 2017; 11: e12493. <https://doi.org/10.1111/soc4.12493>
28. Curtis SK, Lehner M. Defining the Sharing Economy for Sustainability. *Sustainability*. 2019; 11: 567. <https://doi.org/10.3390/su11030567>
29. Cockayne DG. Sharing and neoliberal discourse: The economic function of sharing in the digital on-demand economy. *Geoforum*. 2016; 77: 73–82. <https://doi.org/10.1016/j.geoforum.2016.10.005>
30. Srnicek N. *Platform capitalism*. John Wiley & Sons; 2017.
31. Rahman KS. The shape of things to come: The On-Demand Economy and the Normative Stakes of Regulating 21st-Century Capitalism. *Eur J Risk Regul*. 2016; 7: 652–663.
32. Williamson OE. The economics of organization: The transaction cost approach. *Am J Sociol*. 1981; 87: 548–577.
33. Benkler Y. Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production. *Yale Law J*. 2004; 114: 273–358.
34. Belk R. Sharing. *J Consum Res*. 2010; 36: 715–734.
35. Bucher E, Fieseler C, Lutz C. What’s mine is yours (for a nominal fee)—Exploring the spectrum of utilitarian to altruistic motives for Internet-mediated sharing. *Comput Hum Behav*. 2016; 62: 316–326. <https://doi.org/10.1016/j.chb.2016.04.002>
36. Frenken K. Political economies and environmental futures for the sharing economy. *Philos Trans R Soc Math Phys Eng Sci*. 2017; 375: 20160367. <https://doi.org/10.1098/rsta.2016.0367> PMID: 28461431
37. Scholz T. *Platform cooperativism. Challenging the Corporate Sharing Economy*. New York, NY: Rosa Luxemburg Foundation; 2016 Jan p. 32.
38. Hassanli N, Small J, Darcy S. The representation of Airbnb in newspapers: a critical discourse analysis. *Curr Issues Tour*. 2019. <https://doi.org/10.1080/13683500.2019.1669540>
39. Ert E, Fleischer A, Magen N. Trust and reputation in the sharing economy: The role of personal photos in Airbnb. *Tour Manag*. 2016; 55: 62–73.
40. Tussyadiah IP, Park S. When guests trust hosts for their words: Host description and trust in sharing economy. *Tour Manag*. 2018; 67: 261–272.
41. Deng C, Ravichandran T. How consumers perceive trustworthiness of providers in sharing economy: effects of photos and comments on demand at Airbnb. 2017.
42. Wagner N, Strulak-Wójcikiewicz R, Landowska A. Trust in Sharing Economy Business Models from the Perspective of Customers in Szczecin, Poland. *Sustainability*. 2019; 11: 6838.
43. Zamani ED, Choudrie J, Katechos G, Yin Y. Trust in the sharing economy: the AirBnB case. *Ind Manag Data Syst*. 2019; 119: 1947–1968. <https://doi.org/10.1108/IMDS-04-2019-0207>
44. Hawlitschek F, Notheisen B, Teubner T. A 2020 perspective on “The limits of trust-free systems: A literature review on blockchain technology and trust in the sharing economy.” *Electron Commer Res Appl*. 2020; 40: 100935.
45. Hawlitschek F, Notheisen B, Teubner T. The limits of trust-free systems: A literature review on blockchain technology and trust in the sharing economy. *Electron Commer Res Appl*. 2018; 29: 50–63. <https://doi.org/10.1016/j.elerap.2018.03.005>
46. Parigi P, Cook K. Trust and relationships in the sharing economy. *Contexts*. 2015; 14: 18–19.
47. Belk R. Sharing without caring. *Camb J Reg Econ Soc*. 2017; 10: 249–261.

48. Boxall K, Nyanjom J, Slaven J. Disability, hospitality and the new sharing economy. *Int J Contemp Hosp Manag*. 2018.
49. Malik F, Wahaj Z. Sharing economy digital platforms and social inclusion/exclusion: A research study of Uber and Careem in Pakistan. *International Conference on Social Implications of Computers in Developing Countries*. Springer; 2019. pp. 248–259.
50. Feng H, Sengbin Y, Ruichun H, Xiaoyao W. Research on optimization model of taxi-carpooling expenses based on the passengers' personalized demand. *2015 International Conference on Transportation Information and Safety (ICTIS)*. IEEE; 2015. pp. 246–249.
51. Schor J. Debating the Sharing Economy. *J Self-Gov Manag Econ*. 2016; 4: 7–22.
52. Carrigan M, Magrizos S, Lazell J, Kostopoulos I. Fostering sustainability through technology-mediated interactions. *Inf Technol People*. 2020.
53. Garau-Vadell JB, Gutierrez-Tano D, Diaz-Armas R. Residents' Support for P2P Accommodation in Mass Tourism Destinations. *J TRAVEL Res*. 2019; 58: 549–565. <https://doi.org/10.1177/0047287518767067>
54. Melo S, Macedo J, Baptista P. Capacity-sharing in logistics solutions: A new pathway towards sustainability. *Transp POLICY*. 2019; 73: 143–151. <https://doi.org/10.1016/j.tranpol.2018.07.003>
55. Winslow J, Mont O. Bicycle sharing: Sustainable value creation and institutionalisation strategies in Barcelona. *Sustain Switz*. 2019;11. <https://doi.org/10.3390/su11030728>
56. Jordan EJ, Moore J. An in-depth exploration of residents' perceived impacts of transient vacation rentals. *J TRAVEL Tour Mark*. 2018; 35: 90–101. <https://doi.org/10.1080/10548408.2017.1315844>
57. Retamal M. Collaborative consumption practices in Southeast Asian cities: Prospects for growth and sustainability. *J Clean Prod*. 2019; 222: 143–152. <https://doi.org/10.1016/j.jclepro.2019.02.267>
58. Wachsmuth D, Weisler A. Airbnb and the rent gap: Gentrification through the sharing economy. *Environ Plan Econ Space*. 2018; 50: 1147–1170.
59. Collins B. Defining the Employee in the Gig Economy: Untangling the Web of Contract. *Conflict and Shifting Boundaries in the Gig Economy: An Interdisciplinary Analysis*. Emerald Publishing Limited; 2020.
60. Montalban M, Frigant V, Jullien B. Platform economy as a new form of capitalism: a Régulationist research programme. *Camb J Econ*. 2019; 43: 805.
61. Avdimiotis S, Poulaki I. Airbnb impact and regulation issues through destination life cycle concept. *Int J Cult Tour Hosp Res*. 2019.
62. Bertocchi D, Visentin F. "The Overwhelmed City": Physical and Social Over-Capacities of Global Tourism in Venice. *Sustainability*. 2019; 11: 6937.
63. Gurrán N. Global home-sharing, local communities and the Airbnb debate: a planning research agenda. *Plan Theory Pract*. 2018; 19: 298–304.
64. Gyódi K. Airbnb in European cities: Business as usual or true sharing economy? *J Clean Prod*. 2019; 221: 536–551.
65. Martín Martín JM, Guaita Martínez JM, Salinas Fernández JA. An Analysis of the Factors behind the Citizen's Attitude of Rejection towards Tourism in a Context of Overtourism and Economic Dependence on This Activity. *Sustainability*. 2018; 10: 2851. <https://doi.org/10.3390/su10082851>
66. Lambea Llop N. A policy approach to the impact of tourist dwellings in condominiums and neighbourhoods in Barcelona. *Urban Res Pract*. 2017; 10: 120–129. <https://doi.org/10.1080/17535069.2017.1250522>
67. O'Sullivan F. Barcelona Organizes Against 'Binge Tourism'—and Eyes a Street Protester for Mayor. In: *CityLab* [Internet]. 27 Aug 2014 [cited 15 May 2020]. <http://www.citylab.com/politics/2014/08/barcelona-organizes-against-binge-tourism-and-eyes-a-street-protester-for-mayor/379239/>
68. Boutsioukis G, Fasianos A, Petrohilos-Andrianos Y. The spatial distribution of short-term rental listings in Greece: a regional graphic. *Reg Stud Reg Sci*. 2019; 6: 455–459.
69. Cheng M, Foley C. The sharing economy and digital discrimination: The case of Airbnb. *Int J Hosp Manag*. 2018; 70: 95–98.
70. Tjaden JD, Schwemmer C, Khadivi M. Ride with me—Ethnic discrimination, social markets, and the sharing economy. *Eur Sociol Rev*. 2018; 34: 418–432.
71. Todisco M. Share and share alike: Considering racial discrimination in the nascent room-sharing economy. *Stan Rev Online*. 2014; 67: 121.
72. Lutz C, Hoffmann CP, Bucher E, Fieseler C. The role of privacy concerns in the sharing economy. *Inf Commun Soc*. 2018; 21: 1472–1492.

73. Dotterud Leiren M, Aarhaug J. Taxis and crowd-taxis: sharing as a private activity and public concern. *Internet Policy Rev.* 2016; 5: 1–17.
74. Fabo B, Hudáčková S, Nogacz A. Can Airbnb Provide Livable Incomes to Property Owners?: An Analysis on National, Regional and City District Level. 2017.
75. Liu X, Wayne Xu W. Adoption of ride-sharing apps by Chinese taxi drivers and its implication for the equality and wellbeing in the sharing economy. *Chin J Commun.* 2019; 12: 7–24. <https://doi.org/10.1080/17544750.2018.1524392>
76. Owyang J, Samuel A, Grenville A. Sharing is the new buying: How to win in the collaborative economy. *Vision Critical/Crowd Companies*; 2014.
77. Zervas G, Proserpio D, Byers JW. The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. *J Mark Res.* 2017; 54: 687–705.
78. Ganapati S, Reddick CG. Prospects and challenges of sharing economy for the public sector. *Gov Inf Q.* 2018; 35: 77–87.
79. Agyeiwaah E. Over-tourism and sustainable consumption of resources through sharing: the role of government. *Int J Tour Cities.* 2019; 6: 99–116. <https://doi.org/10.1108/IJTC-06-2019-0078>
80. Gurrán N, Phibbs P. When tourists move in: how should urban planners respond to Airbnb? *J Am Plann Assoc.* 2017; 83: 80–92.
81. Dempsey N, Bramley G, Power S, Brown C. The social dimension of sustainable development: Defining urban social sustainability. *Sustain Dev.* 2011; 19: 289–300. <https://doi.org/10.1002/sd.417>
82. Littig B, Griessler E. Social sustainability: a catchword between political pragmatism and social theory. *Int J Sustain Dev.* 2005; 8: 65–79.
83. Assefa G, Frostell B. Social sustainability and social acceptance in technology assessment: A case study of energy technologies. *Technol Soc.* 2007; 29: 63–78. <https://doi.org/10.1016/j.techsoc.2006.10.007>
84. Vanclay F. Conceptual and methodological advances in social impact assessment. *Int Handb Soc Impact Assess Concept Methodol Adv.* 2003; 1–9.
85. ISO. Social responsibility—Discovering ISO 26000. In: ISO [Internet]. 2010 [cited 9 Sep 2020]. <https://www.iso.org/cms/render/live/en/sites/isoorg/contents/data/publication/10/02/PUB100258.html>
86. Benoît C, Mazijn B. United Nations Environment Programme, CIRAI, Interuniversity Research Centre for the Life Cycle of Products P and S. Guidelines for social life cycle assessment of products. Paris, France: United Nations Environment Programme; 2009. <https://www.deslibris.ca/D/236529>
87. Barrow CJ. Social impact assessment: an introduction. Oxford University Press; 2000.
88. United Nations. The Ten Principles of the UN Global Compact. 2020 [cited 9 Sep 2020]. <https://www.unglobalcompact.org/what-is-gc/mission/principles>
89. GRI. GRI Standards Download Center. 2020 [cited 15 May 2020]. <https://www.globalreporting.org/standards/gri-standards-download-center/>
90. OECD. Society at a Glance 2019: OECD Social Indicators. OECD; 2019.
91. Laukkanen M, Tura N. The potential of sharing economy business models for sustainable value creation. *J Clean Prod.* 2020; 253: 120004. <https://doi.org/10.1016/j.jclepro.2020.120004>
92. Laurenti R, Singh J, Cotrim JM, Toni M, Sinha R. Characterizing the Sharing Economy State of the Research: A Systematic Map. *Sustainability.* 2019; 11: 5729. <https://doi.org/10.3390/su11205729>
93. Efron SE, Ravid R. Writing a Literature Review: A practical guide. United States of America: The Guilford Press; 2019.
94. Sovacool BK, Axsen J, Sorrell S. Promoting novelty, rigor, and style in energy social science: Towards codes of practice for appropriate methods and research design. *Energy Res Soc Sci.* 2018; 45: 12–42. <https://doi.org/10.1016/j.erss.2018.07.007>
95. Charmaz K. *Constructing Grounded Theory.* SAGE; 2014.
96. Kenny M, Fourie R. Tracing the history of grounded theory methodology: From formation to fragmentation. *Qual Rep.* 2014; 19: 1–9.
97. Owyang J, Samuel A. The new rules of the collaborative economy. *Vis Crit.* 2015; 28.
98. Sharp D. Sharing Cities for Urban Transformation: Narrative, Policy and Practice. *Urban Policy Res.* 2018; 36: 513–526. <https://doi.org/10.1080/08111146.2017.1421533>
99. Mazzella F, Sundararajan A, d’Espous VB, Möhlmann M. How digital trust powers the sharing economy. *IESE Bus Rev.* 2016; 26: 24–31.
100. Pavlou PA, Fygenson M. Understanding and predicting electronic commerce adoption: An extension of the theory of planned behavior. *MIS Q.* 2006; 115–143.

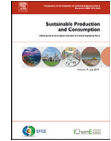
101. Gefen D, Benbasat I, Pavlou P. A research agenda for trust in online environments. *J Manag Inf Syst*. 2008; 24: 275–286.
102. Gefen D. Customer loyalty in e-commerce. *J Assoc Inf Syst*. 2002; 3: 2.
103. Comer JM, Plank RE, Reid DA, Pullins EB. Methods in sales research: perceived trust in business-to-business sales: a new measure. *J Pers Sell Sales Manag*. 1999; 19: 61–71.
104. Heylighen F. Towards an intelligent network for matching offer and demand: From the sharing economy to the global brain. *Technol Forecast Soc Change*. 2016 [cited 4 Nov 2016].
105. Tussyadiah IP. Factors of satisfaction and intention to use peer-to-peer accommodation. *Int J Hosp Manag*. 2016; 55: 70–80. <https://doi.org/10.1016/j.ijhm.2016.03.005>
106. Möhlmann M. Collaborative consumption: determinants of satisfaction and the likelihood of using a sharing economy option again. *J Consum Behav*. 2015; 14: 193–207. <https://doi.org/10.1002/cb.1512>
107. Fitzmaurice CJ, Ladegaard I, Attwood-Charles W, Cansoy M, Carfagna LB, Schor JB, et al. Domesticating the market: moral exchange and the sharing economy. *Socio-Econ Rev*. 2020; 18: 81–102.
108. Parigi P, State B, Dakhallah D, Corten R, Cook K. A Community of Strangers: The Dis-Embedding of Social Ties. *PLOS ONE*. 2013; 8: e67388. <https://doi.org/10.1371/journal.pone.0067388> PMID: [23861761](https://pubmed.ncbi.nlm.nih.gov/23861761/)
109. Schor J. Homo Varians: Diverse Economic Behaviors in New Sharing Markets. Unpubl Pap Boston Coll. 2015.
110. Hawlitschek F, Stofberg N, Teubner T, Tu P, Weinhardt C. How Corporate Sharewashing Practices Undermine Consumer Trust. *Sustainability*. 2018; 10: 2638. <https://doi.org/10.3390/su10082638>
111. Wegmann J, Jiao J. Taming Airbnb: Toward guiding principles for local regulation of urban vacation rentals based on empirical results from five US cities. *Land Use Policy*. 2017; 69: 494–501. <https://doi.org/10.1016/j.landusepol.2017.09.025>
112. Rai HB, Verlinda S, Merckx J, Macharis C. Crowd logistics: an opportunity for more sustainable urban freight transport? *Eur Transp Res Rev*. 2017; 9. <https://doi.org/10.1007/s12544-017-0256-6>
113. Whitham MM, Clarke H. Getting is Giving: Time Banking as Formalized Generalized Exchange. *Social Compass*. 2016; 10: 87–97. <https://doi.org/10.1111/soc4.12343>
114. Boateng H, Kosiba JPB, Okoe AF. Determinants of consumers' participation in the sharing economy A social exchange perspective within an emerging economy context. *Int J Contemp Hosp Manag*. 2019; 31: 718–733. <https://doi.org/10.1108/IJCHM-11-2017-0731>
115. Parigi P, State B. Disenchanted world: the impact of technology on relationships. *International Conference on Social Informatics*. Springer; 2014. pp. 166–182.
116. McGinnis J. The Sharing Economy as an Equalizing Economy. *SSRN Electron J*. 2018 [cited 7 Apr 2020]. <https://doi.org/10.2139/ssrn.3225868>
117. Bridges J, Vásquez C. If nearly all Airbnb reviews are positive, does that make them meaningless? *Curr Issues Tour*. 2018; 21: 2065–2083. <https://doi.org/10.1080/13683500.2016.1267113>
118. Wu X, Shen J. A study on Airbnb's trust mechanism and the effects of cultural values—Based on a survey of Chinese consumers. *Sustain Switz*. 2018; 10. <https://doi.org/10.3390/su10093041>
119. Dubois EA, Schor J, Carfagna L. New cultures of connection in a Boston time bank. *Sustain Lifestyles Quest Plentitude Case Stud New Econ*. 2014; 95–124.
120. Ladegaard I. Hosting the comfortably exotic: Cosmopolitan aspirations in the sharing economy. *Social Rev*. 2018; 66: 381–400. <https://doi.org/10.1177/0038026118758538>
121. Szetela B, Mentel G. May the sharing economy create a new wave of globalization? *Econ Ann-XXI*. 2016; 161: 31–34. <https://doi.org/10.21003/ea.V161-07>
122. Hatzopoulos V, Roma S. Caring for sharing? The collaborative economy under EU law. *Common Mark Law Rev*. 2017; 54: 81–127.
123. Füller J, Mühlbacher H, Matzler K, Jaweckki G. Consumer Empowerment Through Internet-Based Co-creation. *J Manag Inf Syst*. 2009; 26: 71–102. <https://doi.org/10.2753/MIS0742-1222260303>
124. Muñoz P, Cohen B. A Compass for Navigating Sharing Economy Business Models. *Calif Manage Rev*. 2018; 35.
125. Pires GD, Stanton J, Rita P. The internet, consumer empowerment and marketing strategies. Tiu Wright L, editor. *Eur J Mark*. 2006; 40: 936–949. <https://doi.org/10.1108/03090560610680943>
126. Mäkinen M. Digital Empowerment as a Process for Enhancing Citizens' Participation: E-Learn Digit Media. 2016 [cited 27 Apr 2020].
127. Kane GC. Crowd-based capitalism? Empowering entrepreneurs in the sharing economy. *MIT Sloan Manag Rev*. 2016; 57.

128. Conger JA, Kanungo RN. The empowerment process: Integrating theory and practice. *Acad Manage Rev.* 1988; 13: 471–482.
129. Decrop A, Del Chiappa G, Mallargé J, Zidda P. "Couchsurfing has made me a better person and the world a better place": the transformative power of collaborative tourism experiences. *J Travel Tour Mark.* 2018; 35: 57–72.
130. Dreyer B, Ludeke-Freund F, Hamann R, Faccor K. Upsides and downsides of the sharing economy: Collaborative consumption business models' stakeholder value impacts and their relationship to context. *Technol Forecast Soc CHANGE.* 2017; 125: 87–104.
131. Ameli N. Libraries of Things as a new form of sharing. *Pushing the Sharing Economy.* *Des J.* 2017; 20: S3294–S3304. <https://doi.org/10.1080/14606925.2017.1352833>
132. Martin CJ. The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism? *Ecol Econ.* 2016; 121: 149–159. <https://doi.org/10.1016/j.ecolecon.2015.11.027>
133. Fang B, Ye Q, Law R. Effect of sharing economy on tourism industry employment. *Ann Tour Res.* 2016; 57: 264–267. <https://doi.org/10.1016/j.annals.2015.11.018>
134. Snow S, Vyas D, Brereton M. Sharing, Saving, and Living Well on Less: Supporting Social Connectedness to Mitigate Financial Hardship. *Int J Hum-Comput Interact.* 2017; 33: 345–356. <https://doi.org/10.1080/10447318.2016.1243846>
135. Chen MK, Chevalier JA, Rossi PE, Oehlsen E. The Value of Flexible Work: Evidence from Uber Drivers. *J Polit Econ.* 2019; 127: 2735–2794. <https://doi.org/10.1086/702171>
136. Marthaller J. Beta Phase Communities: Open Source Software as Gift Economy. *Polit Theol.* 2017; 18: 5–21. <https://doi.org/10.1179/1462317X15Z.000000000146>
137. Harmaala M-M. The sharing city as a platform for a more sustainable city environment? *Int J Environ Health.* 2015; 7: 309–328. <https://doi.org/10.1504/IJENVH.2015.077116>
138. Young IM. *Justice and the Politics of Difference.* Princeton University Press; 2011.
139. Eubanks V. *Digital Dead End: Fighting for Social Justice in the Information Age.* MIT Press; 2012.
140. Fraser N. *Justice interruptus: Critical reflections on the "postsocialist" condition.* Routledge; 2014.
141. Cribb A, Gewirtz S. Towards a sociology of just practices. *Soc Justice Educ Identity.* 2003; 15.
142. Gardner J, Holmes B, Leitch R. *Assessment and social justice.* Futurelab Bristol, UK; 2009.
143. Haerewa N, Stephenson J, Hopkins D. Shared mobility in a Māori community. *Kōtuitui N Z J Soc Sci Online.* 2018; 13: 233–245. <https://doi.org/10.1080/1177083X.2018.1469516>
144. Polackova L, Poto M. Responses to Food Waste in a Sharing Economy- We have fully transitioned to a participatory culture, and digital technology is key driver of that transition. *Rev Direito Cid.* 2017; 9. <https://doi.org/10.12957/rdc.2017.26763>
145. Cherry CE, Pidgeon NF. Is sharing the solution? Exploring public acceptability of the sharing economy. *J Clean Prod.* 2018; 195: 939–948. <https://doi.org/10.1016/j.jclepro.2018.05.278>
146. Zhang Y, Chen KHT. How inclusive is the sharing economy? And what is the implication for neighbourhood design? *Proc Inst Civ Eng—Urban Des Plan.* 2018; 171: 247–257. <https://doi.org/10.1680/jurp.18.00036>
147. George G, McGahan AM, Prabhu J. Innovation for Inclusive Growth: Towards a Theoretical Framework and a Research Agenda. *J Manag Stud.* 2012; 49: 661–683. <https://doi.org/10.1111/j.1467-6486.2012.01048.x>
148. Oxoby R. Understanding social inclusion, social cohesion, and social capital. *Int J Soc Econ.* 2009; 36: 1133–1152. <https://doi.org/10.1108/03068290910996963>
149. Portes A. Social Capital: Its Origins and Applications in Modern Sociology. *Annu Rev Sociol.* 1998; 24: 1–24.
150. Bourdieu P. The forms of capital. In: Richardson J, editor. *Handbook of Theory and Research for the Sociology of Education.* New York: Greenwood; 1985.
151. Berger-Schmitt R. Considering social cohesion in quality of life assessments: Concept and measurement. *Soc Indic Res.* 2002; 58: 403–428.
152. Jensen J. Defining and measuring social cohesion. *Commonwealth Secretariat;* 2010.
153. Kawachi I, Berkman L. Social cohesion, social capital, and health. *Soc Epidemiol.* 2000; 174.
154. Phineo. Zusammen stark sein! 2019. <https://www.phineo.org/magazin/der-phineo-themenreport-zusammen-stark-sein>
155. Putnam RD. *Bowling alone: The collapse and revival of American community.* Simon and schuster; 2000.

156. Ferrari MZ. Beyond uncertainties in the sharing economy: Opportunities for social capital. *Eur J Risk Regul.* 2016; 7: 664–674.
157. Albinsson PA, Yasanthi Perera B. Alternative marketplaces in the 21st century: Building community through sharing events. *J Consum Behav.* 2012; 11: 303–315. <https://doi.org/10.1002/cb.1389>
158. Maloutas T, Pantelidou Malouta M. The glass menagerie of urban governance and social cohesion: concepts and stakes/concepts as stakes. *Int J Urban Reg Res.* 2004; 28: 449–465.
159. Gössling S, Michael Hall C. Sharing versus collaborative economy: how to align ICT developments and the SDGs in tourism? *J Sustain Tour.* 2019; 27: 74–96. <https://doi.org/10.1080/09669582.2018.1560455>
160. Yang S, Song Y, Chen S, Xia X. Why are customers loyal in sharing-economy services? A relational benefits perspective. *J Serv Mark.* 2017; 31: 48–62. <https://doi.org/10.1108/JSM-01-2016-0042>
161. Zhang T, Bufquin D, Lu C. A qualitative investigation of microentrepreneurship in the sharing economy. *Int J Hosp Manag.* 2019; 79: 148–157. <https://doi.org/10.1016/j.ijhm.2019.01.010>
162. Barnes SJ, Mattsson J. Understanding collaborative consumption: Test of a theoretical model. *Technol Forecast Soc Change.* 2017; 118: 281–292. <https://doi.org/10.1016/j.techfore.2017.02.029>
163. McArthur E. Many-to-many exchange without money: why people share their resources. *Consum Mark Cult.* 2015; 18: 239–256. <https://doi.org/10.1080/10253866.2014.987083>
164. Milanova V, Maas P. Sharing intangibles: Uncovering individual motives for engagement in a sharing service setting. *J Bus Res.* 2017; 75: 159–171. <https://doi.org/10.1016/j.jbusres.2017.02.002>
165. Stollery A, Jun SH. The antecedents of perceived value in the Airbnb context. *Asia Pac J Innov Entrep.* 2017; 11: 391–404. <https://doi.org/10.1108/APJIE-12-2017-040>
166. Warschauer M. *Technology and Social Inclusion: Rethinking the Digital Divide.* MIT Press; 2004.
167. Ambrosino G, Nelson JD, Boero M, Pettinelli I. Enabling intermodal urban transport through complementary services: From Flexible Mobility Services to the Shared Use Mobility Agency. Workshop 4. Developing inter-modal transport systems. 2016. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84992047598&partnerID=40&md5=1ce2a92399391a2afc892a6501559c32>
168. Tyndall J. Where no cars go: Free-floating carshare and inequality of access. *Int J Sustain Transp.* 2017; 11: 433–442. <https://doi.org/10.1080/15568318.2016.1266425>
169. Oxfam International. World's billionaires have more wealth than 4.6 billion people. In: Oxfam International [Internet]. 20 Jan 2020 [cited 8 May 2020]. <https://www.oxfam.org/en/press-releases/worlds-billionaires-have-more-wealth-46-billion-people>
170. Botsman R. *Who Can You Trust?: How Technology Brought Us Together and Why It Might Drive Us Apart.* Hachette UK; 2017.
171. Vallet F, Eynard B, Millet D, Mahut SG, Tyl B, Bertoluci G. Using eco-design tools: An overview of experts' practices. *Des Stud.* 2013; 34: 345–377. <https://doi.org/10.1016/j.destud.2012.10.001>
172. Bocken N, Strupeit L, Whalen K, Nußholz J. A Review and Evaluation of Circular Business Model Innovation Tools. *Sustainability.* 2019; 11: 2210. <https://doi.org/10.3390/su11082210>
173. Rossi M, Germani M, Zamagni A. Review of ecodesign methods and tools. Barriers and strategies for an effective implementation in industrial companies. *J Clean Prod.* 2016; 129: 361–373. <https://doi.org/10.1016/j.jclepro.2016.04.051>
174. Magretta J. Why Business Models Matter. *Harv Bus Rev.* 2002; 8.
175. Baumann H, Boons F, Bragd A. Mapping the green product development field: engineering, policy and business perspectives. *J Clean Prod.* 2002; 10: 409–425. [https://doi.org/10.1016/S0959-6526\(02\)00015-X](https://doi.org/10.1016/S0959-6526(02)00015-X)
176. Bardhi F, Eckhardt GM. Access-Based Consumption: The Case of Car Sharing. *J Consum Res.* 2012; 39: 881–898. <https://doi.org/10.1086/666376>
177. Mont O, Plepys A, Voytenko Palgan YV, Singh J, Curtis SK, Zvolaska L, et al. *Urban Sharing in Amsterdam.* Lund, Sweden: Lund University; 2019. Report No.: 978-91-7895-321–9

Article V





Organisational Response Strategies to COVID-19 in the Sharing Economy

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ARTICLE INFO

Article history:

Received 4 December 2020

Revised 20 March 2021

Accepted 20 March 2021

Available online 23 March 2021

Keywords:

Sharing platforms

Mobility sharing

Space sharing

Goods sharing

Resilience

Pandemic

ABSTRACT

The COVID-19 pandemic has impacted production and consumption patterns across the world and forced many organisations to respond. However, there is a lack of understanding as to how sharing platforms have been affected by the pandemic, how they responded to the crisis, and what kinds of long-term implications the pandemic may have on the sharing economy. This study combined systematic literature review and qualitative web analysis of 30 mobility, space, and goods sharing platforms of different business models and geographies. An empirically-driven framework of organisational responses to COVID-19 was developed that comprises eight overarching response strategies targeting the organisation, users, and society. It is a novel framework that structures organisational responses to a high-impact, low-probability crisis. This study also discusses the long-term implications of the COVID-19 pandemic on the sharing economy, and explores how this may impact future responses among sharing platforms in the society that seeks sustainability. The learnings of this study have real-world significance. Sharing platforms can learn from each other about how to continue to respond in the face of the ongoing pandemic, and consider actions for future preparedness to potential forthcoming crises. With this we hope to encourage perseverance, long-term viability, sustainability, and resilience in organisations that may offer more sustainable ways of consumption and production.

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1. Introduction

The world is facing an unprecedented public health crisis unknown in modern times, which is radically impacting our modes of production and consumption. The cause is the coronavirus (SARSCoV2), which began spreading globally, prompting the World Health Organization (WHO) to declare a worldwide global pandemic on 11 March 2020 (WHO, 2020). In a matter of months, nearly every country was affected, so governments have introduced national and regional lockdowns, restrictions on personal mobility, sanitary mask mandates, and physical distancing recommendations to help contain the spread of the virus (Cheng et al., 2020).

Undoubtedly, the COVID-19 pandemic and subsequent disruptions to our economic and social systems represent crises, which warrant empirical investigation. These crises have had a far greater impact on organisations than expected (Teng-Calleja et al., 2020). In response to this “low-chance, high-impact event” (Lloyd-Smith, 2020, p. 1) many businesses implemented work-from-home

programmes to abide by government-imposed lockdown orders. For some, this disrupted operations and prevented the payment of operational costs and employee salaries, leading to layoffs and permanent or temporary closures (ILO, 2020). Those that could continue their operations sought – and continue to seek – solutions to reimagine their business models, daily operations, and communication channels (Accenture, 2020).

Consequently, many organisations have responded to the pandemic by shifting to digital means of communicating and delivering their products and services (Accenture, 2020). For example, organisations introduced new technology-based solutions or promoted responsible behaviour through “...cashless payments, click and collect practices, physical distancing between customer and employee, [and] improved sanitation practices...” (Baum et al., 2020). Others had been forced into “imposed service innovation” – enforced actions to transform business models within resource and operational constraints in response to sudden and disruptive changes in the surrounding environment (Heinonen and Strandvik, 2020).

Previous research on crisis management offers understanding of how organisations respond to traditional threats, both stem-

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ming from internal (e.g., technical-error and human-error accidents) and external crises (e.g., natural disasters) (Coombs and Holladay, 2002). There is limited research on organisational responses during epidemics, with some exceptions being responses to, e.g., SARS (Chien and Law, 2003; Henderson and Ng, 2004; Johnson Tew et al., 2008, 2008) and Ebola (Shin et al., 2018). However, in our globalised and digital society, previous research does not always capture the magnitude of the global disruption to industries and individuals and, even more seldom, organisational responses to such prolonged disruptions as COVID-19. Mithani (2020, p. 511) suggests, "...limited attention to life-threatening events has impeded comparable advancements in understanding and responding to them." It is therefore important for crisis management research to draw from the concept of "resilience" in order to understand how organisations adapt to external threats (Mithani, 2020).

Resilience describes the ability of a system to withstand and absorb any change or disturbance, while maintaining itself and its relationships (Holling, 1973). Whether psychological, environmental, or organisational resilience, the focus shifts from the disturbance to the response in order to withstand any disruption (Cascio, 2009). As such, governments see their response to the pandemic as an opportunity to foster organisational and environmental resilience, for example, the "build back better" campaign (Bolton, 2020) and green recovery efforts (Government Offices of Sweden, 2020; OECD, 2020).

However, many previously-promoted practices to enhance sustainable production and consumption, including circular (Calisto Friant et al., 2021) and sharing economy initiatives (Miller, 2016), face hurdles. The focus of this article is on sharing platforms, operating within the sharing economy. These organisations seek to facilitate temporary access to under-utilised goods and services (Belk, 2014a) via sharing, renting, borrowing, lending, swapping, trading, bartering, and other similar consumption practices (Curtis and Mont, 2020). We focus on these platforms because of their potential to promote more sustainable modes of production and consumption (Frenken and Schor, 2017).

Like many organisations, sharing platforms have been greatly and adversely affected by the pandemic. For example, peer-to-peer sharing platforms had to respond suddenly to physical distancing measures and restrictions on international and regional travel. They have seen a decrease in revenue as a result of fewer people using their services (Oxford Economics, 2020). This is likely a result of limited economic activity generally, but the sharing economy also often necessitates proximity and connectedness between users, as they share access to goods and services. These organisations face many immediate and short-term challenges that threaten their long-term survival. If allowed to fail, the loss of momentum and burden on the champions behind these organisations will set back substantive progress towards more sustainable modes of production and consumption, threatening continued environmental and social resilience.

Therefore, the objective of this research is to support resilience among sharing platforms, by structuring organisational response strategies to the COVID-19 pandemic and to advance learning and scholarship. In doing so, the article aims: 1) to understand the short-term impacts of the pandemic on sharing platforms; 2) to identify and categorise response strategies of sharing platforms; and 3) to discuss the potential long-term effects of the pandemic on the sharing economy.

With this study, we seek to contribute to literature on the sharing economy and the broader field of study on the impacts of high-impact, low-probability crises on sustainable production and consumption. Identifying and classifying response strategies and developing an empirically-driven framework also contributes to emerging literature on crisis management in the face of COVID-19. Finally, this research supports learning among practitioners and

sharing platforms to encourage perseverance, long-term viability, sustainability, and resilience towards future crises.

In the following sections, we review background literature about the sharing economy, and short-term impacts of the COVID-19 pandemic on the sharing economy and organisational response strategies to crises (Section 2). We then present our research design, consisting of literature review and web analysis of responses to COVID-19 communicated by sharing platforms (Section 3). Next, we develop the empirical framework classifying organisational response strategies in the sharing economy, and describe examples across the investigated sharing platforms (Section 4). Finally, we summarise important learnings relevant for sharing platforms, discuss long-term implications of the pandemic on the sharing economy, and suggest additional responses likely in the coming months and years in the society that strives for sustainability (Section 5). We draw conclusions, outline our contributions, and suggest future research directions in Section 6.

2. Literature review

2.1. Sharing economy

The sharing economy is increasingly studied as an approach towards more sustainable production and consumption (Gupta and Chauhan, 2021). Specifically, the sharing economy is increasingly linked with the discourse surrounding the circular economy, and issues relating to sustainability, consumption, business models, and governance (Henry et al., 2021). Proponents of the sharing economy highlight the transition from an ownership-based economy to an access-based economy, leveraging idling assets of an existing stock of goods (Botsman and Rogers, 2010; Curtis and Mont, 2020). The sharing economy thereby slows resource loops by extending product lifetimes and increasing the intensity of use (Bocken et al., 2016). In this way, the need for unnecessary production of new products is reduced and environmental and social impacts associated with it are avoided (Novel, 2014). Activating and increasing the intensity of use of idling assets also results in waste minimisation. Some also posit that the presence of the sharing economy may even trigger producers to design more durable products (Razeghian and Weber, 2019).

In previous research, we defined the sharing economy as "... a socio-economic system that leverages technology to mediate two-sided markets, which facilitate temporary access to goods that are under-utilised, tangible, and rivalrous" (Curtis and Mont, 2020, p. 4). Our definition prioritises platforms that facilitate exchanges between two actors, e.g., peer-to-peer (P2P), business-to-peer (B2P), business-to-business (B2B), and cooperatives (Curtis and Lehner, 2019; Curtis and Mont, 2020). Exchanges are facilitated between the supply side and demand side of a market, actors we call the 'resource owner' and 'resource user'. However, other scholars include B2C companies that facilitate access to goods that they own, e.g. one-sided market (Plewnia and Guenther, 2018; Ritter and Schanz, 2018; Täuscher and Laudien, 2018). For the purpose of this study, we include all platform types in our analysis, to support all actors associated with the sharing economy in overcoming the impacts of the pandemic.

Various practices exist under the banner of the sharing economy (despite not always sharing) (Belk, 2014b), including accommodation (Prayag and Ozanne, 2018), co-working spaces (Bouncken and Reuschl, 2018), car-sharing (Münzel et al., 2020), bike-sharing (Ma et al., 2018), ride-hailing (Guo et al., 2019), food delivery (Ukolov et al., 2016), and sharing access to physical goods (Curtis and Lehner, 2019). To structure our analysis, we focus on various shared practices, including shared mobility (e.g., car-sharing, bike-sharing, ride-hailing), shared space (P2P accommo-

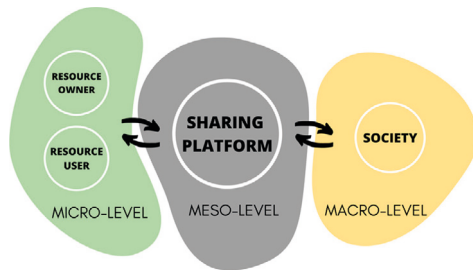


Fig. 1. The sharing economy as a socio-economic system, representing three target groups

ation, co-working spaces), and shared goods (e.g., books, clothes, tools, food¹) (Curtis and Mont, 2020).

2.2. Short-term impacts of COVID-19 on sharing platforms

Currently, there is a limited body of academic literature that describes, analyses, and discusses impacts from the pandemic on various aspects of our lives, including the sharing economy. Not surprisingly, the majority of literature regarding the sharing economy and the COVID-19 pandemic focuses on Uber and Airbnb, which correlates with existing trends in literature about the sharing economy (Muñoz and Cohen, 2018; Ritter and Schanz, 2018).² However, there is a gap in the literature describing the impacts of – and responses to – the COVID-19 pandemic among shared goods platforms, and what is more akin to “true sharing” (Belk, 2014b). Since the literature on the short-term effects of the pandemic on the sharing economy is preliminary and descriptive, we focus our review here on the short-term impacts, to avoid being too speculative. However, we present and discuss opinions and projections about long-term effects of the pandemic on the sharing economy in Section 5.

It is useful to classify short-term impacts of the pandemic into three levels: the macro- (e.g., societies, economies, governments), meso- (e.g., businesses, organisations, communities), and micro-levels (e.g., employees, individuals, consumers) (Baum et al., 2020). In this study, we examine the meso-level – focusing on sharing platforms – to illuminate response strategies to support learning among organisations (Fig. 1). However, understanding impacts at the macro- and micro-levels also helps understand responses by organisations. For example, responses to the pandemic at the macro-level – e.g., physical distancing requirements, quarantine and lockdown measures, increased hygiene standards, and restrictions on domestic and international travel – significantly affect the ability of sharing platforms to operate. Since their business models often operate a two-sided market (Curtis & Mont, 2020), where in-person exchange of goods or services is often necessary, restrictions on distances greatly affect people involved in exchange. Indeed, with individuals taking precautions to avoid contracting and spreading the virus – especially among the elderly and vulnerable

– there seems to be less willingness among users to engage in the same way with sharing platforms.

At the same time, information and communication technology (ICT) already utilised by many sharing platforms to mediate exchanges may potentially reduce the burden experienced by other organisations throughout society. Utilising smartphone applications, digital keys, and virtual communication tools reduces the need to meet in person, while still enabling the sharing of goods and services. The digital nature also increases the ability to adapt quickly to new realities and conditions, due to flexibility and diversity of opportunities for change at relatively low transaction costs (Kamal, 2020). It also has potential to strengthen the resilience of systems built using ICT, particularly in circumstances when social contacts need to be limited, as in the case of pandemics (Horgan et al., 2020). It is projected that sharing platforms may see an increase in demand, especially those that include options for contactless delivery (Hoffstaedter et al., 2020). However, as any other information-based and digital systems, sharing platforms must also practice caution concerning overreliance on technology and digital discrimination (Curtis et al., 2020).

Looking at the shared practices and COVID-19 impacts, it becomes clear that they have been impacted in different ways and to a different extent. Transportation practices have changed as a result of the pandemic, with mixed impacts on shared mobility. Literature indicates massive shifts from public transport to personal vehicles (Chandra, 2020). Car-sharing has also been affected, as companies reported up to 75% reductions of the total number of trips (Magder, 2020) and especially drastic reductions in international and interstate trips (Turo, 2020a). On the other hand, some car-sharing organisations witnessed a simultaneous increase in local trips, from 48% to 68% of all completed trips on their platform compared to 2019 (Turo, 2020a). Ride-hailing services have also been affected, as “the prospect of hailing ‘an Uber’ is fraught with life threatening risk” (Katta et al., 2020). Forbes Magazine reported that rides via Uber have decreased by 94% since early March 2020 (Chandler, 2020). Globally, Uber reported a loss of USD 2.9 billion for the first quarter of 2020 and reduced its workforce by 3700 due to reduced bookings (Ford Rojas, 2020). However, bike-sharing has not been impacted in the same way, as cities and retailers report a resurgence of cycling, thereby increasing demand for the services (Brignall, 2020). Such a resurgence has been seen across the world, but cities are dealing with these trends differently, including supporting bike-sharing platforms (Draaisma, 2020).

Shared space platforms have seen a dramatic reduction in bookings since March 2020. For example, Airbnb and Couchsurfing reservations in many countries were down by a reported 90% (Chadwick, 2020; Connolly, 2020). As a result, Airbnb’s valuation has dropped from USD 31 billion in early 2017 to USD 18 billion as of April 2020 (Evans, 2020). Its revenue for 2020 is projected to be just 50% of what the company earned in 2019 (Evans, 2020).

The pandemic has also impacted co-working spaces. A survey conducted in March 2020 found a 71% reduction in the use of co-working spaces (Konya, 2020). There has also been a dramatic impact on membership cancellations and new membership (Konya, 2020). This has led to the projection that the co-working marketplace will contract by 12.9% in 2020 (Business Wire, 2020a). Meanwhile, the demand has increased for collaborative virtual platforms and larger physical venues among knowledge workers – those with the ability to transition working from the office to home (Hu, 2020). While Zoom, Microsoft Teams, Slack and other communication and collaboration platforms have become ubiquitous, demand has also increased for the in-house collaborative virtual platforms at co-working spaces, like ImpactHub and Spaces, which has impacted their technological infrastructure and strategic work.

¹ In previous research, we have included food as part of a separate shared practice – called *shared consumables* – including products that are characterised by one-time use (e.g., food, paint, perfume, motor oil) (Curtis & Lehner, 2019; Curtis & Mont, 2020). For simplicity, we have included food as part of shared goods in this study.

² Of the 35 articles in the final sample of the literature review on COVID-19, 14 discussed or mentioned Uber 251 times and 21 articles mentioned Airbnb 669 times.

No academic literature has been found that explored how the pandemic has affected the sharing of physical goods, for example, tools, clothes, or toys.

2.3. Organisational response strategies to crises

Crisis management by organisations has been studied from many disciplinary perspectives, including psychological, social-political, and *technological-structural perspectives* (Pearson and Clair, 1998). What constitutes a crisis covers the entire range of events from minor issues such as employee illness to natural and human-induced incidents such as earthquakes, terror attacks and massive disruptions to everyday operations and lifestyles (Ritchie, 2004) that “require well-timed responses” from organisations (Reilly, 1993). Management research, considered to be part of the technological-structural perspective, defines *organisational crisis* as “a low-probability, high-impact event that threatens the viability of the organisation and is characterised by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly” (Pearson and Clair, 1998, p. 60). Shrivastava (1993) proposed 4Cs – *causes, caution, consequences* and *coping* – as aspects of crises that can be studied by management scholars. While *causes* are triggers of a crisis, and *caution* is measures to avoid or minimise impacts of a potential crisis, *consequences* include both short-term and long-term impacts, and *coping* comprises responses to a crisis that has already occurred.

The choice of coping mechanisms by organisations is affected by the extent of the organisational responsibility for causing a crisis, which ranges from the low level of responsibility in *victim crises* (e.g. natural disasters, and rumours), to the moderate responsibility for accidental crises (e.g. technical-error accidents), and to the highest level of responsibility for preventable crises (e.g. human-error accidents) (Coombs and Holladay, 2002). Coping responses also differ depending on stages of a crisis, including pre-crisis, crisis, post-crisis (or long-term recovery) (Frandsen and Johansen, 2016).

Due to the broad definition of what constitutes a crisis, research on specific organisational responses to crises – including strategic communication – spans studies on how organisations respond to crises such as terror attacks, war, and conflict (Bullough et al., 2014; Greenbaum et al., 2007; Hurley-Hanson, 2006), natural disasters (Hall et al., 2016; Runyan, 2006), health crises (Page et al., 2006; Rao and Greve, 2018), and cyber-attacks (Kim et al., 2017).

Organisational responses can be divided into two literature streams. The first one is *crises communication responses* (Sturges, 1994), especially important in the case of the preventable and accidental crises studied extensively by Coombs (1995) and Benoit (1995). The second one is literature on *crises management or coping strategies*, including activating emergency response teams and crisis management plans (Reilly, 1993). Coombs defined crisis response strategies as “what an organisation says and does after a crisis hits” (Coombs, 2006, p. 245) and identified four types of crisis response strategies – *denial, diminishment, rebuilding and bolstering* (Coombs, 2014) – more suitable for the preventable and accidental crises, where organisations communicate in order to minimise the threat to their own reputation.

Literature on crisis management or coping discusses response strategies that go beyond communication strategies. Although the first book on crisis management was published more than 35 years ago (Fink, 1986), it is still a fragmented body of literature (Pearson et al., 2007). Search for classifications of response strategies reveal several relatively similar and recent works on the nature of responses. One classification was developed based on key articles published in the journals of the Strategic Management Society (Wenzel et al., 2021). It included four types of responses: retrenchment, persevering, innovating, and exit. Another classification

draws the parallel with individual responses to threats of freeze, flight, fight, or fright from the human evolutionary theory, and suggests a framework of organisational responses to crises, comprising *dormancy, hypervigilance, growth* and *exit*. (Mithani and Kocoglu, 2020):

- *Dormancy* – A response by organisations to remain operationally inactive for the duration of the crisis, providing the opportunity to return to normal after the threat has passed.
- *Hypervigilance* – At the onset of any crisis, organisations respond by observing the situation, acquiring information about the threat, and assessing resources and potential impacts. This freeze response is primarily an information-gathering response, with strategic changes avoided.
- *Growth* – A crisis may present an opportunity for growth, including entry and efficiency routines. Entry routines seek to exploit the market weakness to deploy new resources and leverage new opportunities, including experimenting with new technologies and building new partnerships. Efficiency routines improve existing offerings, including communication, automation, digitalisation, or outsourcing.
- *Exit* – Depending on the context, this may require exiting from regions or markets, distributing resources differently, and entail partial or complete closing of their operations. At the same time, exit can also mean resource conservation and reallocation that can help organisations to reduce financial exposure and other risks.

In addition to the nature and stage of the crisis, the specific response of an organisation is also shaped by the institutional context that influences allocation of resources, culture, and actions (Zhou, 2020). Preparedness and the appropriate early responses to any crisis will also likely impact long-term organisational resilience (Zhou, 2020).

Due to the relative newness of the sharing economy, there is limited research on the responses of sharing platforms to crises. Even the framework by Mithani and Kocoglu (2020) classifies organisational responses in terms of their nature, but does not specify the response strategies *per se*. We therefore chose to apply an inductive research design in order to explore a question with two unknown Cs out of the 4Cs suggested by (Shrivastava, 1993): the short- and long-term impacts of the COVID-19 pandemic that is still unfolding, i.e., *consequences*, and responses of sharing economy organisations to the COVID-19 pandemic, i.e. *coping*.

3. Methodology

This study aims to explore organisational response strategies to the coronavirus pandemic in order to support learning among sharing platforms and advance our understanding of response strategies to the crisis in the sharing economy. However, because we are still reeling from the pandemic and responses will likely continue to evolve, our empirical study is a snapshot in time up until 30 October 2020. To explore response strategies, we conducted two related but separate research tasks: 1) a systematic literature review on the impact of the COVID-19 pandemic on the sharing economy and review of crisis management literature; 2) a web analysis of 30 sharing platforms, including web pages, blog posts, news, and social media posts by platforms, resulting in an empirical framework structuring response strategies of sharing platforms to COVID-19.

3.1. Literature review

We conducted two separate literature reviews of academic articles relevant to the impacts of the COVID-19 pandemic on the

sharing economy and organisational response strategies to crisis. The first, on the sharing economy, sought to capture observed impacts and response strategies already investigated. The database search was conducted on 9 September 2020, using the Scopus database. The search included [ALL "sharing economy" AND "pandemic OR covid"], and was limited to academic articles, reviews, notes, conference papers and books published in English, including publications in press. The search generated 68 documents. We reviewed the title, abstract, and keywords of these articles, excluding sources that merely mentioned the sharing economy in passing. The review resulted in 22 documents. We also reviewed the reference list of each document and included 12 additional sources, which also included grey literature. The sample included 34 documents. On 25 November we ran the same search [ALL "sharing economy" AND "pandemic OR covid"], to ensure that our sample of articles for the literature review was up to date. One article was added, making the final sample 35 articles (see Appendix A). We also ran an additional search, looking specifically for articles on how COVID-19 impacts car-sharing, with the search string ALL ("carsharing") AND ALL (covid OR pandemic). Although the search returned 24 articles, none of them meaningfully discussed the impacts of COVID-19 on car-sharing or car-pooling.

The final sample of 35 articles was analysed qualitatively using NVivo to categorise impacts and responses. The codes included the levels of impacts – micro-, meso- and macro-level – and coding for impacts on specific shared practices – shared mobility, shared space, shared goods. We also analysed the articles looking for responses to COVID-19, which provided an initial framework to categorise response strategies. For example, coding for responses from space included the following codes: quarantine time between bookings, financial support to hosts, cleaning standards, lowering rates for renting, and refunds to hosts. We also coded the sample of articles for long-term implications of COVID-19 per shared practice (Section 5.2).

The second literature review explored literature on organisational responses to crisis. Again, we used the Scopus database using the query (TITLE-ABS-KEY ("organisational responses" OR "response strategies") AND TITLE-ABS-KEY (crisis) AND (pandemic) AND (framework OR concept)). Again, we focused on academic articles, conference papers, and books published in English. The same limitations were applied to this sample as in the first literature review. The review resulted in 41 articles, 25 of which were deemed useful after reviewing their title, abstract, and keywords. The full texts of these articles were uploaded to NVivo and qualitatively analysed, coded for concepts, theories, and other conceptualisations and frameworks to structure organisational response strategies, especially in relation to different types of crises (e.g., scandal, terrorist attack, pandemic) or application areas (e.g., geography, sector, organisation). In addition, the reference lists of these articles were analysed, adding a further 18 articles to the sample, bringing the total number of articles on crisis management to 43 (see Appendix B).

Each literature review demonstrates a need to empirically study organisational response strategies of sharing platforms to the COVID-19 pandemic. While there is limited knowledge about the short-term effects of the pandemic on space and mobility sharing, even less is known about the sharing of goods. Furthermore, there is no known attempt to structure the responses by sharing platforms to promote resilience and ensure more sustainable production and consumption. In addition, we observed no crisis management knowledge or theory suitable for deductively analysing response strategies to such a crisis; therefore, we chose an empirical and inductive approach to study organisational response strategies.

3.2. Web analysis and framework development

Since the first widespread use of the Internet in the early 1990s, the web and website data have served as materials for data collection in research (Herring, 2009). Content analysis was among the first methodologies to be applied to qualitative web data (Herring, 2009). While traditional approaches to content analysis are still favoured (Herring, 2009), utilisation of software to support analysis and advancement in technology – such as machine learning and artificial intelligence – supports content analysis and other natural language processing (Bazeley and Jackson, 2013). We followed the five steps to web content analysis outlined by McMillan (2000) and Herring (2009):

- 1) Formulate a research objective and a guiding question.
- 2) Select a sample.
- 3) Code data qualitatively and develop explanatory categories.
- 4) Check the reliability of coded data between coders.
- 5) Analyse and interpret the data collected during the coding process.

In the first step, we formulated our research questions based on our research objective – to understand how sharing platforms responded to the COVID-19 pandemic to support learning among sharing platforms and to develop resilience to the pandemic and future crises.

This formulation dictated our sample – response strategies as communicated by sharing platforms. As part of the second step, we selected 30 sharing platforms across three shared practices – shared mobility, shared space, and shared goods (Table 1). The sharing platforms represented different platform types (e.g., P2P, B2C) and different geographical scales, but with a focus on North America and Europe. We collected relevant web data for each platform, including web pages, blog posts, news, and social media posts.

The third step sought to code the web data qualitatively. The data were coded inductively, using a constructivist grounded theory approach (Charmaz, 2014; Kenny and Fourie, 2015). Characterised by the constructivist philosophy, compared to traditional grounded theory, this approach acknowledges that previous knowledge and experience of the observer informs analysis, and describes a more flexible and creative coding procedure: 1) open coding; and 2) refocused coding (Charmaz, 2014; Kenny and Fourie, 2015). The output of such approach is an "interpretive understanding" of the phenomenon in question (Kenny and Fourie, 2015, p. 1279). Compared to thematic analysis, a grounded theory approach engages in simultaneous data collection and analysis using the process of theoretical sampling, e.g., to the point of saturation (Alhojailan, 2012).

Open coding was applied to the data, focusing on the action-verb responses of the sharing platforms, coding as gerunds as suggested by Charmaz (2014). This coding was not informed by previous research or theory; instead, the empirical data of organisational responses was inductively coded. Each of the three researchers coded data and developed a preliminary list of categories relevant to one of the three shared practices (shared mobility, shared space, shared goods). We did this to help identify patterns between shared practices, before merging the categories and performing subsequent analysis. As the data was coded inductively, data was coded to existing categories or new categories were created (Miles and Huberman, 1994). This was done iteratively, with new data being added from social media and blogs as interesting observations were made, until there was a fairly stable initial coding framework.

During the process of refocused coding, the authors reviewed the initial coding framework, checking the reliability and validity

Table 1
Three shared practices and 30 organisations.

Shared Practice	Sharing Platform	Platform Type	Geographical Scale
Shared Mobility	Communauto	B2C	Canada
	Facedrive	P2P	Canada
	HiRide	P2P	Canada
	Kangaride	P2P	North America
	Lyft	P2P	International
	Poparide	P2P	Canada
	Snappcar	P2P	Europe
	Bike Share Toronto	B2C	Toronto, Canada
	Turo	P2P	International
	Uber	P2P	International
Shared Space	Airbnb	P2P	International
	Vrbo	P2P	International
	WarmShowers	P2P	International
	FlipKey	P2P	International
	Couchsurfing	P2P	International
	LoveHomeSwap	P2P	International
	Home Exchange	P2P	International
	WeWork	B2C	International
	ImpactHub	Cooperative	International
	Spaces	B2C	International
Shared Goods	Toronto Tool Library	Cooperative	Toronto, Canada
	Rent Frock Repeat	B2C	Toronto, Canada
	SwapSity	P2P	Canada
	reheart	P2P	Canada
	Peerby	P2P	The Netherlands, Belgium
	LENA Library	B2C	The Netherlands
	HeelNederlandDeelt	P2P	The Netherlands
	BKSY	P2P	The Netherlands
	Bunz	P2P	International
	Karma	P2P	Europe

between researchers and shared practices. An initial workshop saw the authors discuss the coding frameworks, merging or creating new categories between the shared practices. The categories were designed to represent distinct responses by sharing platforms, and it was during this stage that we introduced the perspective of the target group of their responses to further distinguish between response strategies, as in Fig. 1. This highlighted several differences between the shared practices, but ultimately led to a unifying framework. One researcher then reviewed all of the coded material, scrutinised the categories, checked for reliability across the data, and further consolidated related categories. Finally, this coding framework was discussed among the three researchers to ensure completeness and clarity of categories. The output of the web analysis using this approach was a unifying empirical framework to categorise those observed response strategies communicated by sharing platforms, depicted in Fig. 2. Finally, these categories were used to structure various examples to illustrate each response strategy and compare between shared practices.

4. Results and analysis

We present the results of our literature review and web analysis. First, we introduce our empirically-derived framework and then we describe each response strategy by providing elaborate examples of various shared practices.

The observed responses by sharing platforms were categorised according to the target of the response: organisation-oriented responses, user-oriented responses, and society-oriented responses. This categorisation mirrors the micro-, meso-, and macro-level perspectives presented in Section 2.2 and inspired by Baum et al., (2020). While the sharing platform remained our unit of analysis, their actions were directed at or were in response to their users and society. For each category, we identified several general response strategies (Fig. 2) and, in the following sections, we elaborate specific examples across shared mobility, shared space, and shared goods practices. The complete results, includ-

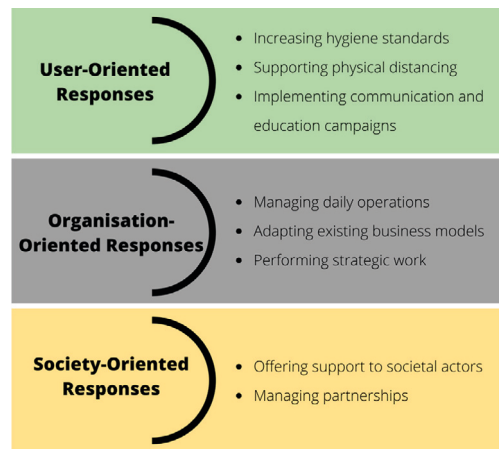


Fig. 2. The framework of organisational responses

ing the response strategies observed across platforms, are found in Appendix C. In Section 5.1, we present learnings, including across the shared practices.

4.1. Organisation-oriented response strategies

The response strategies observed across our sample were predominantly oriented at the activities of the sharing platforms themselves. As such, we categorised these responses as

organisation-oriented, which include seven response strategies described below.

4.1.1. Managing daily operations

The pandemic forced many sharing platforms to reassess their day-to-day routines. Some of them explicitly communicated about changes they had to make in their everyday operations during the pandemic. The changes reported represent a full spectrum of activities from:

- permanently or temporarily closing operations
- pausing operations
- reducing part(s) of operations
- implementing local response for local contexts
- remaining open at full capacity
- expanding or increasing operations

For example, mobility sharing Communauto continued its operations, arguing that it offered relatively safe ways for essential workers to commute to work (Magder, 2020). Similarly, Kangaride continued providing ride-sharing services for essential travel with its call centre operating on a reduced schedule (Vachon, 2020). In contrast, Facedrive is aiming to expand its operations to the USA and Europe despite the pandemic (Business Wire, 2020b) and it purchased ride-sharing and car-pooling app HiRide in March 2020 (Simpson, 2020). In June 2020, the municipal bike-sharing scheme Bike Share Toronto announced its expansion with 1850 new bicycles and adding 30 neighbourhoods to its map (Draaisma, 2020). In May, Uber announced that it would be permanently closing all 180 Greenlight Hubs and cutting 3700 jobs to offset the losses the company suffered due to pandemic (Gridwise, 2020). Lyft (2020a) paused, offering services where rides were shared between strangers.

From 18 March 2020, Airbnb paused in-person stays in most countries, while Couchsurfing (2020) reduced the size of its team and has “taken pay cuts, eliminated or renegotiated all contracts, eliminated ... physical office space (*becoming a ... 100% remote workforce*)”. Airbnb has also asked investors for a USD 1 billion investment to manage the drastic reductions in global travel (Wood, 2020). Similarly, Couchsurfing (2020) applied for COVID-19 relief funds provided by the United States Government through the CARES Act. Of the co-working spaces, Spaces (2020) remained accessible worldwide for tenants 24/7, except when deep cleaning forced closures.

Goods-sharing BKSy and reheart were forced to temporarily close their physical libraries, while Toronto Tool Library could reopen their flagship location after temporary closure once they have implemented health and safety protocols (Willison, 2020a). Of the platforms studied, only Rent Frock Repeat was forced to permanently close in autumn 2020 (Longwell, 2020).

4.1.2. Adapting existing business models

In contrast to managing daily operations, we suggest this response describes those undertaken by the organisation to adapt or modify their value proposition, in other words, the value provided to the user of the platform. The pandemic necessitated several business model adaptations that were communicated by the investigated platforms on their websites, such as:

- Enhancing existing services
- Changing or updating primary offerings
- Changing or updating additional offerings
- Implementing flexible contracts, cancellation, or return policies
- Transferring operations online

For example, Poparide refunds all trips cancelled before the ride and waives any penalties if either the driver or the passenger is feeling unwell. Similarly, SnappCar (2020a) permitted cancellations without extra cost for all bookings before 31 August

2020. To emphasise the importance of car cleanliness, Turo car renters are allowed to cancel their booking and receive a full refund, if they are not satisfied with the level of cleanliness of the car. They will also be provided with support to find another car (Haddad, 2020). Uber offered new ways to deliver consumables via Uber Eats app, beyond food and groceries, to provide last-mile solutions for businesses and individuals who were following lockdown rules (Scheepers and Bogie, 2020). The new service Uber Direct connected businesses that experienced high delivery demand with Uber drivers and other delivery partners who were looking for delivery jobs (Lomas, 2020).

Airbnb no longer collects any fees from cancelled reservations as a result of the pandemic. The company is also exploring the possibility of long-term home rental as a way for hosts to secure income from their idling properties (Toyama, 2020). HomeExchange and LoveHomeSwap introduced a policy for return of GuestPoints in the event of trips being cancelled in these ‘force majeure’ circumstances. Vrbo extended its COVID-19 emergency policy until 30 June 2020 (Vrbo, 2020a) and offered rewards to its property owners who offer guests at least a 50% refund on their bookings (Vrbo, 2020b). Co-working platform Spaces offers “ultimate flexibility” in its service contracts, including any length of terms, no capital expenditures, work now – pay later, among other measures to make it easier for their users to manage during the pandemic.

Toronto Tool Library had to make significant adaptations and now, instead of users browsing available tools, they have a service desk technician who collects requested tools for users. Returned tools are quarantined for at least 72 hours before returning to circulation (Willison, 2020b). The Library has also removed all late fees to accommodate users who were unable to travel safely to return borrowed items. Karma changed its app to introduce food delivery options from restaurants, allow restaurants to sell full-price meals, and encourage users to tip in the app; all in the effort to support local restaurants (Karma, 2020).

4.1.3. Performing strategic work

During the downtime that some platforms experienced due to closures and reduced user traffic, platforms and volunteers seek to make upgrades to their infrastructure. In some instances, they apply for government grants to fund their activities. However, only a few platforms communicated this strategic work, including:

- Updating/renovating physical infrastructure
- Updating/renovating digital infrastructure

Many of the platforms had to update their websites as their first response to the COVID-19 pandemic; however, we did not classify these actions as strategic and described them in other response strategies instead. However, the Toronto Tool Library stands out in communicating about its ongoing strategic work during the pandemic. While its physical locations were closed, volunteers and organisers worked to overhaul the online infrastructure and physical spaces, including “...moving to better hosting for [their] site, updating [their] mail server to address spam issues, introducing inventory for [their] consumables, vendor-management software...” (Willison, 2020). They also applied to multiple funding sources, but with no success as of September 2020.

4.2. User-oriented response strategies

In addition to organisation-oriented response strategies, we also identified three strategies that aim to support platform users: helping users increase hygiene standards, supporting physical distancing, and implementing communication and education campaigns.

4.2.1. Increasing hygiene standards

Many sharing platforms implemented some form of increased hygiene standards, including:

- Following international, national, and local restrictions and best practices
- Implementing health and safety guidelines
- Implementing enhanced cleaning protocols
- Requiring sanitary masks to be worn (along with other control measures)
- Introducing quarantine of assets between users
- Restricting access to the platform based on health status
- Reporting positive COVID-19 cases among the community

Many mobility sharing platforms developed a “cleaning and disinfection” policy requiring car owners to disinfect their vehicles before each trip and a car cleaning guide to help drivers with that task, e.g., Turo (Haddad, 2020), Lyft (2020b), Communauto (2020), Kangaride (Vachon, 2020), SnappCar (2020a), Poparide (2020) and Uber (2020a). Providers of shared bikes and e-scooters also pay extra attention to cleaning the shared vehicles and advise the users to clean them before use (Bike Share Toronto, 2020a; Lyft, 2020c). Uber also implemented the slogan “No mask. No ride” targeting both drivers and riders, and introduced a new safety check-up list in its app that asks the drivers to take a selfie verifying that they are wearing a mask (Uber, 2020b). All mobility sharing platforms discouraged any trips that are not essential, encouraged travelling alone for all essential trips, and advised choosing a car that has not been in operation for a long period (Magder, 2020). Uber (2020b) worked with health care authorities 24/7, which allowed them to “temporarily suspend the accounts of riders or drivers confirmed to have contracted or been exposed to COVID-19”. The same goes for restaurants on Uber Eats, which Uber may temporarily remove from the app if they “receive confirmation of contraction of or exposure to COVID-19.”

In May, to improve health safety, Airbnb (2020a) developed a cleaning protocol for hosts, including a detailed learning programme and certification. The protocol prescribed spacing out reservations with 24-72 hours intervals, stocking extra cleaning equipment and reducing the number of touchpoints, such as remote controls (Chadwick, 2020; Watson, 2020). Similarly, LoveHomeSwap (2020a) developed a comprehensive guide for its home exchanging members in three languages, which included a guide to cleaning homes, including a room-by-room checklist, and a letter that home swappers can leave for their guests about their cleaning practices. Vrbo (2020c) suggested that its property owners and managers review the safety features and manuals in their properties, and consider adding contacts to local hospitals and emergency numbers.

Co-working spaces, e.g., WeWork, Spaces, and ImpactHub, have enhanced their cleaning protocols and made hygiene products available for free to members (ImpactHub Stockholm, 2020; Spaces, 2020). WeWork retrofitted existing air systems with new filters for cleaner air. It also introduced temperature screening in some of its locations upon arrival for people wanting to work from their spaces (WeWork, 2020). WeWork and ImpactHub created mechanisms for reporting a positive COVID-19 case in the workplace, and for notifying members immediately. ImpactHub Stockholm asked members to keep a record of all visitors or guests to the co-working space for one month, to support contact tracing.

Goods sharing platforms – BKSy, HeelNederlandDeelt, Peerby, Karma, and SwapSity – also developed guidelines with suggestions to follow all local and national health advice, not to meet in person if sick, minimise the time of exchange, practice good hygiene, and consider other means of exchanging items, e.g., wrap item, leave on doorstep.

4.2.2. Supporting physical distancing

The studied platforms seek to support physical distancing in different ways, including:

- Limiting the number of people
- Implementing clear signage
- Providing digital alternatives
- Increasing opening hours
- Avoiding physical contact through other means

For example, SnappCar and Turo offer a keyless option to open the rented car with an app (Haddad, 2020; SnappCar, 2020b). Similarly, Bike Share Toronto encouraged its cyclists to use the CycleFinder app, the Bike Share website, or a member key to find and release a bike (Bike Share Toronto, 2020b). Turo also offered hosts lockboxes for key retrieval (Haddad, 2020). Uber Eats encourages its customers to use the “leave at the door” option to avoid physical contact (Uber, 2020a).

Many Airbnb hosts use a key lockbox, smart lock, or keypad for self-check-in (Airbnb, 2020b). Each investigated co-working space introduced signage throughout their spaces, closed workstations, reduced meeting room capacity, and increased safe kitchen etiquette. ImpactHub Stockholm made their spaces accessible 24/7 to enable their community to avoid peak traffic on public transport. They also enhanced their bicycle parking and shower facilities to promote safe modes of transportation to and from their location (ImpactHub Stockholm, 2020).

4.2.3. Implementing communication and education campaigns

In a time of crisis, communication between organisations and their users is essential. Apart from community guidelines and health and safety practices, we observed other communication practices by sharing platforms, including campaigns related to:

- Curating special resources for users (e.g., tutorials, webpages, checklists)
- Marketing activities based on the pandemic
- Providing accessible communication (e.g., audio, subtitles, multiple languages)
- Expressing solidarity with users

For example, the immediate response of Uber to the pandemic was to add a feature to its app with the latest information about the pandemics from official sources (Scheepers and Bogie, 2020). Support teams at Uber made approximately 2000 calls to their drivers asking about their concerns, in order to identify measures to assist them (Scheepers and Bogie, 2020). Lyft developed video tutorials on COVID-19 safety for drivers and riders (Lyft, 2020d), while Turo launched a training course for its drivers that builds on information from federal health authorities and the WHO (Turo, 2020b). Hosts who took the course have had badges on their Turo profiles since 31 July 2020 (Turo, 2020c).

Airbnb revamped the homepage to address the questions and concerns of its users (Airbnb, 2020c), which they updated daily. LoveHomeSwap prepared a downloadable audio guide of 11 phrases in 4 languages to help travellers communicate about the pandemics in different localities in what the company thought would be a post-COVID world in summer 2020 (LoveHomeSwap, 2020b). Spaces, through its parent company International Workplace Group, has created a comprehensive communication document titled *Preparing for a New World of Work*, which provided specific actions being implemented now to reduce the spread of the virus in their workspaces, and plans to support working remotely for the foreseeable future (IWG, 2020).

SwapSity organised online swap meets appealing to their users' nostalgia for in-person swap meets. In different ways, platforms such as Karma, LENA Library, SwapSity, and HeelNederlandDeelt

expressed empathy with their communities through their social media and website activity.

4.3. Society-oriented response strategies

Platform responses also targeted society more generally, including frontline workers, people in need, schools, and other actors. We identified two overarching strategies to capture these responses: offering support and managing new and existing partnerships.

4.3.1. Offering support

During the pandemic, many platforms have found ways to provide tangible or intangible support to a variety of stakeholders by:

- Offering financial or non-financial resources
- Producing or purchasing personal protective equipment
- Providing advertising services via the platform
- Providing tangible and intangible support to the frontline and essential workers
- Working towards solutions

For example, Uber offered “10 million free rides and deliveries of food for frontline healthcare workers, seniors, and people in need around the world” (Uber, 2020a). In the US and Canada, Uber Eats waived their delivery fee for 100,000 restaurants, and Uber Freight delivers essential items to healthcare facilities and food banks for free (Scheepers and Bogie, 2020). Uber also partnered with domestic violence organisations across the globe and provided 50,000 free trips to those who needed to escape from home and reach shelters (Scheepers and Bogie, 2020). It was also instrumental in helping many restaurants that lost their dine-in customers to go online and deliver food home instead. The company reduced sign-up and wait times for restaurants to register on Uber Eats. Uber also offered a possibility to receive daily rather than weekly pay-outs to the restaurants to help with cashflow during the pandemics (Scheepers and Bogie, 2020).

Together, the Bill & Melinda Gates Foundation and Uber delivered medicine to individuals suffering from chronic diseases who were unable to pick it up themselves. In March–April 2020, 40,000 parcels were delivered to Western Cape, South Africa (Scheepers and Bogie, 2020). In Kenya, Uber collaborated with the Gertrude’s Children’s Hospital and Nairobi Hospital to provide discounted trips to medical professionals. In support of the Kenyan Emergency Response Fund, Uber offered 5000 free rides and 2000 free deliveries via Uber Eats (Soko Directory Team, 2020). Facedrive collaborated with Middlesex-London Health Unit, Ontario, Canada to transport people to COVID-19 testing facilities at discounted prices. Drivers for such trips are “trained in COVID-19 travel related safety protocols” and equipped with essential safety equipment (Facedrive, 2020a). Facedrive and HiRide announced a global virtual hackathon for innovative ideas “... to mitigate the social and economic impacts of the COVID-19 pandemic”. The top five ideas will be offered fully paid internships at the companies (Facedrive, 2020b).

On 26 March 2020, Airbnb announced that it was developing strategies with hosts to accommodate 100,000 medical workers around the globe (Airbnb, 2020d). The company also created a dedicated support fund of USD 10 million to assist Airbnb users in mainland China. Airbnb also created a USD 10 million Superhost Relief Fund, providing grants of up to USD 5000 to top-rated Superhosts and some Experience hosts who rent their own homes and are in need of assistance to pay rent or mortgage (Smith, 2020). ImpactHub joined the “COVID Response Alliance for Social Entrepreneurs”, which has supplied at least USD 75 million to mitigate the impacts of the pandemic (Impact Hub, 2020).

Volunteers associated with the Toronto Tool Library used their tools and makerspaces to produce personal protective equipment,

including sneeze-guards, face shields, mask-comfort bands, and signage. This equipment is distributed to local hospitals and long-term care facilities.

4.3.2. Managing partnerships

The pandemic seems to have strained existing partnerships and provided opportunities for new relationships. Beyond the partnerships already mentioned relevant to previous response strategies, we provide examples of how goods sharing platforms are managing partnerships by:

- Nurturing new partnerships
- Ending existing partnerships

The volunteer community at the Toronto Tool Library has created new initiatives for the benefit of existing (e.g., Centre for Social Innovation) and new (e.g., local hospitals and long-term care facilities) partners (Willison, 2020a). Karma is working with food distributors and wholesalers to put together subscription boxes to sell excess supply to their users seeking to avoid shopping in stores (Karma, 2020). This is a new offering to users, based on new partnerships. Similarly, Bunz is partnering with small businesses to offer them free use of their platform to advertise their products and services more widely (Bunz, 2020).

In times of crises, organisations tend to consolidate their resources, so many non-core activities and partnerships are paused or ended. In the time of COVID-19, physical distancing causes partnerships to crumble. For example, the Toronto Tool Library had to cease its weekly workshops with the Alzheimer’s Society of Toronto and the Junior Workbuilders youth workshops (Willison, 2020a).

5. Discussion

Our research seeks to produce and structure knowledge about organisational responses to high-impact low-probability crises. We do this by studying impacts of the COVID-19 pandemic on sharing platforms, and their responses to the pandemics and to potential future crises to encourage perseverance, viability, sustainability, and resilience. We elaborate on response strategies – coping – among investigated platforms, which only represent a snapshot in time. Following the 4Cs model suggested by (Shrivastava, 1993), we also discuss the long-term implications – consequences – of the COVID-19 pandemic on the sharing economy, and explore how this may impact future responses among sharing platforms in the society that seeks sustainability.

5.1. Learning from observed response strategies

There is an extreme diversity of responses among the investigated platforms, based on shared practice (e.g., shared mobility, shared space, shared goods), platform type (e.g., P2P, B2C), geographical scale (e.g., international, national, regional, local) and value orientation (e.g., commercial, environmental, social, societal).

Firstly, responding to the nature of the pandemic and following international and national policies and prescriptions (WHO, 2020), most platforms implemented some form of community guidelines or policies to increase hygiene standards and manage user behaviour, similar to responses of many other types of organisations. However, unlike the traditional organisations, platforms have to manage both sides of the market, for example, by developing different sets of guidance for resource users and resource owners, e.g. (Airbnb, 2020c). They also sought to leverage technology to reduce the need for in-person interaction, or encouraged their users to find alternative ways to access and share goods and services.

However, the *shared practice* and context dictated response strategies across the platforms. For example, shared mobility platforms mostly continued their core operations, focusing on increased standards for hygiene and physical distancing and actively educating their users to follow related guidelines and protocols. Uber alone actively supported local communities by providing free rides and deliveries of consumables for those in need, particularly in Africa. Platforms for shared accommodation had to pause most of their operations. Some of them applied for funding support to survive the reduction in bookings, up to 90%. The co-working spaces did not stop operating, and instead opted for strategies that improved health and safety measures to allow for continuing operations, adapting to the local contexts in which they operate. With their business model threatened, co-working spaces expanded their digital platforms and collaboration tools to support working at a distance, while still providing value to their members.

The goods sharing platforms tended to be more niched than international mobility and space sharing platforms, which impacted their response strategies. For example, they operated closely with community organisations, which have also been significantly impacted by the pandemic. Their responses appeared to be more improvised and less formalised, often communicated through blog posts, social media, or newsletters, if at all, compared to dedicated space on the website and professional communication materials (e.g., guidebooks, videos, training), which we observed among more institutionalised space sharing and mobility sharing platforms. Lastly, goods sharing platforms had a more varied organisational response strategies; many platforms remained open at full capacity, while one platform had to close. The diversity of responses speaks to the local and embedded context of goods sharing platforms.

The *platform type*, because of the actors involved in the exchange, also dictated responses. Whether operating as a single (B2C) or two-sided (P2P) market, platforms had to tailor their communication to their users' needs and abilities. B2C platforms – like many car-sharing and bike-sharing companies – need to manage only one customer segment, together with the resources they own. However, B2C car-sharing companies own or lease their car fleet, and suffer losses when their cars sit idle, not generating revenue, but still have to pay loans to the bank. On the other hand, P2P platforms do not own any physical assets, but have to manage both the supply and demand side of the market, with each user segment having different needs and with resource owners having to shoulder the burden of idling resources during the pandemic.

The *value orientation* and *geographical scale* of the platform also influenced the types of responses from the platforms. Commercial platforms, often operating internationally, had more resources available to update their websites and business models, communicate with users, and provide financial and non-financial support. These platforms are also more exposed to risk, so there is a greater incentive to respond appropriately to manage their reputation and risk. This meant companies like Uber, Lyft, and Airbnb were working with international partners to provide services for frontline workers and those in need, and allocating funds to support those affected by the pandemic. Meanwhile, platforms that operated more locally, with interest in additional value creation beyond monetary value, were able to rely on their communities' civic capacity and social capital to help manage the response to the pandemic, even if they faced difficulties with cash flow and access to financial capital.

Finally, we found differences in the *nature of response strategies* the platforms employ depending on the response target, following the classification of organisational responses suggested by Mithani and Kocoglu (2020): hypervigilance, exiting, growth, or dormancy, as discussed in Section 2.3 and presented below (Table 2).

Across the eight responses identified, the majority demonstrated hypervigilance (5): platforms were cautious, communicative, and conscientious while implementing measures to ensure health and safety on their platform. We also observed strategies that demonstrated growth (4), with platforms adapting their business models to mitigate the impacts of the pandemic. Platforms undertook strategic work, such as revamping physical or digital infrastructure or applying for funding or other financial relief. One platform went out of business, and others had to end partnerships and reallocate resources elsewhere, responding by exiting (2) the market in some way. Finally, two sharing platforms paused their operations as a result of the pandemic, demonstrating how platforms managed daily operations by entering dormancy (1). The classification by nature of organisational responses helps demonstrate the prescriptive ability of our framework, and reflects the nature and efficacy of observed response strategies in relation to the crisis we currently face.

5.2. Long-term implications of the pandemic on the sharing economy

Long-term implications of the pandemic are widely discussed in society and literature, although in a more speculative manner. Some organisations are hopeful that the pandemic signals a need to restructure the global economic order by implementing green recovery mechanisms (Bakker and Elkington, 2020; Sneider and Singhal, 2020) and gearing production and consumption towards sustainability (Boons et al., 2020). Others warn that history teaches us that “business as usual” is typically very quickly restored after a crisis, e.g., as was in the case of the financial crisis of 2008–2009 and the SARS epidemic (Gössling et al., 2020).

However, the long-term implications are not yet known, as we are in the midst of the pandemic and vaccination efforts. Many commentators expect a slow and cautious opening of our societies and economies, with travel and physical distancing recommendations to remain in force for some time. Some speculate that consumers may focus more on local consumption, seeking to support small businesses, including restaurants, cafes, and bookshops (Hall et al., 2020) and local travel. This localisation will likely extend to leisure travel, where people may choose to vacation closer to home, leading to lower environmental impacts and in this way advancing more sustainable forms of consumption. At the same time, reduced international travel and changing consumer behaviour will likely shrink the demand for P2P accommodation across countries (Hall et al., 2020), but it may increase P2P accommodation and ride-hailing services locally and nationally. However, it remains to be seen whether this shift will meet the pre-pandemic demand for less-formal employment and income generation opportunities.

Nonetheless, we can learn from previous crises. During the financial crisis a decade ago, consumers altered their spending habits and re-evaluated their consumption in light of shifting values (Gerzema and D'Antonio, 2010). Seemingly, this will occur again, with consumers being more mindful of their expenses, so businesses that offer convenience and less expensive alternatives are likely to thrive. In addition, the example of the sharing economy demonstrates that businesses that are reliant on or that use ICT in their operations are more flexible and quicker to adapt to the new order where physical distancing is desired. This in turn helps to strengthen the resilience of our systems of production, consumption, and distribution. Below, we briefly focus on the long-term implications of the pandemic on shared mobility, shared space, and shared goods platforms.

5.2.1. Long-term implications for mobility sharing platforms

Mobility sharing platforms will continue to be impacted, as mobility is likely to be restricted or discouraged for some time, es-

Table 2
Response strategies and nature of organisational responses.

Response Target	Response Strategy	Nature of Organisational Responses
Organisation-oriented responses	Managing day-to-day operations	Hypervigilance, Exiting, Dormancy
	Adapting existing business models	Growth
	Performing strategic work	Growth
User-oriented responses	Increasing hygiene standards	Hypervigilance
	Supporting physical distancing	Hypervigilance
	Implementing communication and education campaigns	Hypervigilance
Society-oriented responses	Offering support to societal actors	Hypervigilance, Growth
	Managing partnerships	Growth, Exiting

pecially among the elderly and vulnerable populations (Hall et al., 2020). More broadly, both car-sharing and ride-hailing will continue to be promoted as solutions to improved sustainable transport systems. Car-sharing and bike-sharing may be preferred over ride-hailing services, as there is not the same need for interaction with drivers. However, during the pandemic, platforms have been implementing training, certifications, or review systems to promote improved hygiene and ventilation standards and vehicle cleanliness. While the increased use of bike-sharing has a positive implication for sustainable consumption on transport, the diversion of people from public transport towards car use through car-sharing or ride-hailing is a less beneficial trend from the sustainability perspective. In addition, there is a risk that more people will consider purchasing their own car after they have tried car-sharing or ride-hailing services.

Platforms like Uber and Lyft started supporting their gig workers to some extent, including improved systems for hygiene, health and safety, and paid sick leave. When the pandemic subsides, it may be difficult for these companies to withdraw some of these protections. Therefore, some suggest that the support and benefits experienced during the pandemic, which are long seen as necessary for drivers and other gig workers, need to be institutionalised (Katta et al., 2020).

Similarly, food and other delivery services are likely to remain popular as a consequence of the COVID-19 pandemic (Raj et al., 2020). Restaurants may also join or expand their food delivery services, as there are still risks to employees and increased costs for enhanced cleaning and physical distancing requirements.

Technology that supports physical distancing – and convenience – will continue to be leveraged and integrated into service offerings, such as QR codes, RFID scanners, digital locks, and location-based services. While the industry was already heading in this direction, we may see increased automation as a result of the pandemic in the form of self-driving cars and drone deliveries. These services do not require in-person interaction, although such a transition will destabilise an already precarious relationship between platforms and users.

5.2.2. Long-term implications for space sharing platforms

Due to the general state of the economy, P2P accommodation sharing will likely see greater demand for local, safer, and cheaper options (Chadwick, 2020), and an increased interest in more far-off destinations (Zenker and Kock, 2020). Some go even further and suggest that slow tourism will become the new more sustainable normal, with people choosing locations off the beaten track and valuing longer and more meaningful stays – quality over quantity of travel (Wen et al., 2020).

In response to the increased interest in local tourism, some hosts of short-term accommodation rental will rebrand their homes towards domestic travellers; others will shift towards long-term accommodation, which is less sensitive to the pandemic than short-term rentals, albeit not as profitable (Rubino et al., 2020). Hosts that hold multiple listings and most likely have a mortgage

for them³ will be likely to reduce the number of listings to stay afloat. Some commentators therefore suggest that there will be fewer commercial hosts with multiple listings and more hosts that rent out their own property as an additional source of income or for the sake of social interaction (Dolnicar and Zare, 2020). They go one step further and propose that there might even be no need to regulate these platforms anymore due to the reached upper limit in supply, and there might instead be a need to incentivise these platforms to spur local economic development (von Briel and Dolnicar, 2020).

Accommodation sharing will most likely have a competitive advantage over the hotel industry when travel restrictions wane. While the hotels and the mainstream tourism industry will have to go through a lengthy process of rehiring and potentially retraining its workforce, the accommodation sharing hosts will be offering their properties on the market immediately (Dolnicar and Zare, 2020). Nevertheless, some authors predict a reduction in the demand for P2P accommodation sharing due to the difficulty in securing proper safety and cleaning procedures (Naumov et al., 2020). On the other hand, digitalisation and self-service, e.g. check-in options via an app, entrance to properties via a key box and communication with a host via digital channels, will likely increase further (Chadwick, 2020). Furthermore, interesting fusions – *work-cation* – are already emerging where renting accommodation or sharing space for work and pleasure come in one package (ESR, 2020).

5.2.3. Long-term implications for goods sharing platforms

We are unaware of any literature on the potential long-term implications on goods sharing platforms. However, these platforms are facing challenges, which can be overcome. The temporary challenge of physical distancing prevents users from interacting with each other, forcing goods sharing platforms to reduce their operations or adapt their business model. While many platforms have sought to manage the health and safety of their users, many face financial challenges and the ability to continue operating and offering their service to users. However, goods sharing platforms that operate locally may leverage the goodwill of their communities by offering spaces of interaction and networking, which are important in developing mutual support among people, and in this way strengthen social resilience in the communities and neighbourhoods in which they are embedded (Sharifi and Khavarian-Garmsir, 2020). We observed high willingness among online communities to support local sharing initiatives. If goods sharing platforms can weather the pandemic, they will likely be well-positioned as economies adapt their modes of production and consumption and users adjust their consumption habits.

³ 81% of Airbnb's revenue in the USA comes from hosts with multiple listings according to CBRE (2017).

5.3. Future response strategies

As the prolonged effects of the pandemic on sharing platforms are still evolving, we briefly reflect on future response strategies among sharing platforms. As our results and analysis demonstrated, the majority of the observed responses represented *hypervigilance*. Such a response over a prolonged period reduces the capacity of an organisation to utilise available resources and execute additional responses (Mithani and Kocoglu, 2020). We expect further responses to emerge as the pandemic subsides.

Platforms may enter *dormancy*, having limited energy and resources. This does not mean they go out of business; rather, platforms may operate on an as-needed basis with the resources available, by maintaining their website and responding to direct requests. However, this is likely to be done with limited staff, limited investment in the platform or service, and no effort to grow their position in the market. Similarly, we may see increased *exiting* responses, with platforms leaving markets or geographies to focus on their core activities, or going out of business altogether. Again, this will likely be influenced by available resources, including the energy and motivation of the team behind the platform.

We expect to see additional *growth* responses, such as consolidation, acquisition, and reputation management. As platforms struggle with resources, acquisition represents an entry routine by expanding into new markets or acquiring new technology. Additionally, platforms may increasingly face backlash regarding their response – whether it was sufficient or adequate. Platforms will need to decide whether to allocate resources to respond or engage in deliberate actions to manage their reputation.

Finally, trends we see throughout society will likely affect sharing platforms in how they operate, including increased videoconferencing and teleworking. Changing mobility habits, whether biking or using autonomous electric vehicles, may upend car-sharing business models. We must also consider how platforms and specific response strategies contribute to improved environmental or social outcomes. As the pandemic subsides, all countries and communities will face economic hardship and political instability as we collectively wrestle with the best way to overcome these challenges and to build more sustainable societies. In doing so, the growth paradigm may need to be revisited and revised, considering whether responses “fit to the scale” for the local context and needs of the people and planet (Ibn-Mohammed et al., 2021).

6. Conclusions

Unfortunately, as one crisis subsides, another may be in the making. The long-term economic impacts of the COVID-19 pandemic are still unfolding, triggering unemployment and hardship across the globe. At the same time, spurred by misinformation on social media, partisanship threatens the stability of the global political system. Moreover, climate change and biodiversity loss challenge our societies and ecosystems. The sharing economy offers solutions to many of these challenges, with its potential to advance sustainable consumption and production by improving resource efficiency, reducing waste generation from the production of new assets, democratising consumption, and creating strong and resilient communities. However, as we look to rebuild our economies, this is only possible if sharing platforms can effectively and adequately respond to the COVID-19 pandemic. This research aimed to explore organisational response strategies, in order to support learning among sharing platforms and advance our understanding of response strategies of sharing platforms to the crisis.

This article makes important theoretical, empirical, and practical contributions. In terms of *theory*, it contributes to filling the gap identified in crises management literature about organisational responses to high-impact low-probability crises (Mithani and Kocoglu, 2020). Furthermore, since research on the sharing economy and responses to the pandemic, not impacts, is limited, this article makes important contribution to the sharing economy literature by identifying and classifying organisational responses of sharing platforms and developing a framework of organisational responses specific for the three response target groups: users, organisation, and society. We identified eight overarching response strategies and corresponding actions among the 30 sharing platforms. The strategies employed predominantly represent hypervigilance responses, especially those targeting users, and involve acquiring information about the threat, assessing resources, understanding potential impacts, and managing risks.

This study also provides *empirical contribution* to the sharing economy field by systematising extensive empirical data of organisational responses from 30 sharing platforms representing three sharing practices, shared mobility, space and goods, and diverse business models, e.g., P2P and B2C. The long-term implications of the pandemic are discussed per sector, offering insights about the complexity of potentially building resilient post-pandemic consumption and production systems.

The results of this study and learnings have *real-world significance*. The results of this article seek to advance organisational learning, including that of sharing economy platforms. Indeed, sharing platforms can learn from each other about how to continue to respond in the face of the ongoing pandemic, and consider actions for future preparedness to potential forthcoming crises. With this we hope to encourage perseverance, long-term viability, sustainability, and resilience in organisations, which may offer more sustainable ways of consumption and production.

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This study represents an initial investigation of organisational response strategies to the COVID-19 pandemic in the sharing economy, and several limitations and directions for future research can be outlined. First, conducted in the midst of the pandemic, our study represents a snapshot in time – with empirical data collected up until 30 October 2020. However, responses are dynamic and changing. Additionally, our web analysis evaluated responses communicated publicly by platforms via web pages, blog posts, news, and social media posts, and communication among employees was not considered. For these reasons, our empirically-derived framework only represents an initial structuring of knowledge for future research.

Research should continue to explore responses among sharing platforms representing different sharing practices. Additionally, research could explore the responses to the pandemic in the sharing economy at macro- and micro-levels. For example, future studies may explore how municipalities or users responded to the COVID-19 pandemic in relation to the sharing economy. The framework can be tested and applied in comparative studies that focus on understanding the differences in organisational responses depending on shared practice, platform type, geographical scale, value orientation, and response target. Finally, a more philosophical but critical question that needs to be addressed in future research is – can the COVID-19 pandemic trigger structural changes to our systems of production and consumption, and value creation more generally? And what can we learn from this crisis to make our societies more resilient in the face of other crises to come and more sustainable in the long run?

Author Contributions

Problem definition (OM, SC, YVP); research design (OM, SC); methodology (OM, SC); analysis (OM, SC, YVP); data curation (OM, SC, YVP); framework development (YVP, SC, OM); writing - original draft (OM, SC, YVP); writing - review and editing (OM, SC, YVP);

visualisations (SC); writing - revision (OM, SC, YVP); supervision (OM); funding acquisition (OM, YVP).

Funding

This research has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 771872) and the Swedish Research Council Formas (project "Sharing and the City").

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Final Document Sample from Literature Review on the impacts of the pandemic on sharing platforms

- Amore, Alberto, Cecilia de Bernardi, and Pavlos Arvanitis. "The Impacts of Airbnb in Athens, Lisbon and Milan: A Rent Gap Theory Perspective." *Current Issues in Tourism* (April 3, 2020): 1–14. <https://doi.org/10.1080/13683500.2020.1742674>.
- Baum, Tom, Shelagh K.K. Mooney, Richard N.S. Robinson, and David Solnet. "COVID-19's Impact on the Hospitality Workforce – New Crisis or Amplification of the Norm?" *International Journal of Contemporary Hospitality Management* 32, no. 9 (January 1, 2020): 2813–29. <https://doi.org/10.1108/IJCHM-04-2020-0314>.
- Carpenter, Amber. "Airbnb Demonstrates Lack of Strategic Thinking in Response to COVID-19." *VRM Intel* (blog), May 7, 2020. <https://vrmintel.com/airbnb-demonstrates-lack-of-strategic-thinking-in-response-to-covid-19/>.
- CBRE. "Insights and Implications of Covid-19 Pandemic." CBRE, 2020. <https://www.cbre.com/covid-19>.
- Chadwick, Lauren. "Hotels and Airbnb Plan 'fundamental Shift' after COVID-19 Lockdowns." *Euronews*, May 8, 2020. <https://www.euronews.com/2020/05/08/coronavirus-hotels-and-airbnb-plan-fundamental-shift-after-covid-19-lockdowns>.
- Chandra, Shailesh. "Speed, Space and Sustainability (3S) in Transportation Amid COVID-19 Crisis." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, May 11, 2020. <https://papers.ssrn.com/abstract=3598501>.
- Dolnicar, S., and S. Zare. "COVID19 and Airbnb – Disrupting the Disruptor." *Annals of Tourism Research* 83 (2020). <https://doi.org/10.1016/j.annals.2020.102961>.
- DuBois, Dillon. "Impact of the Coronavirus on Global Short-Term Rental Markets." *AirDNA - Short-Term Vacation Rental Data and Analytics*, March 11, 2020. <https://www.airdna.co/blog/coronavirus-impact-on-global-short-term-rental-markets>.
- Farmaki, Anna, Cristina Miguel, Maria Hadjielia Drotarova, Ana Aleksić, Anita Čeh Časni, and Fani Efthymiadou. "Impacts of Covid-19 on Peer-to-Peer Accommodation Platforms: Host Perceptions and Responses." *International Journal of Hospitality Management* 91 (October 1, 2020): 102663. <https://doi.org/10.1016/j.ijhm.2020.102663>.
- FHA. "What Hotels Can Learn from Airbnb's Response to the COVID-19 Crisis | FHA2020." *Food&HotelAsia* (blog), October 2, 2020. <https://www.foodnhotelasia.com/what-hotels-can-learn-from-airbnbs-response-to-the-covid-19-crisis/>.
- Gössling, S., and J. Higham. "The Low-Carbon Imperative: Destination Management under Urgent Climate Change." *Journal of Travel Research*, 2020. <https://doi.org/10.1177/0047287520933679>.
- Gössling, Stefan, Daniel Scott, and C. Michael Hall. "Pandemics, Tourism and Global Change: A Rapid Assessment of COVID-19." *Journal of Sustainable Tourism*, 2020, 1–20.
- Hall, C. Michael, Daniel Scott, and Stefan Gössling. "Pandemics, Transformations and Tourism: Be Careful What You Wish For." *Tourism Geographies*, 2020, 1–22.
- Hensher, David A. "What Might Covid-19 Mean for Mobility as a Service (MaaS)?" *Transport Reviews* 40, no. 5 (September 2, 2020): 551–56. <https://doi.org/10.1080/01441647.2020.1770487>.
- Hoffstaedter, Gerhard, Richard Robinson, and Tyler Riordan. "Delivery Workers Are Now Essential. They Deserve the Rights of Other Employees." *The Conversation*, 2020. <http://theconversation.com/delivery-workers-are-now-essential-they-deserve-the-rights-of-other-employees-134406>.
- Hu, R. "COVID-19, Smart Work, and Collaborative Space: A Crisis-Opportunity Perspective." *Journal of Urban Management*, 2020. <https://doi.org/10.1016/j.jum.2020.08.001>.
- Ibn-Mohammed, T., K. B. Mustapha, J. Godsell, Z. Adamu, K. A. Babatunde, D. D. Akintade, A. Acquaye, et al. "A Critical Analysis of the Impacts of COVID-19 on the Global Economy and Ecosystems and Opportunities for Circular Economy Strategies." *Resources, Conservation and Recycling* 164 (January 1, 2021): 105169. <https://doi.org/10.1016/j.resconrec.2020.105169>.
- Katta, Srujana, Adam Badger, Mark Graham, Kelle Howson, Funda Ustek-Spilda, and Alessio Bertolini. "(Dis)Embeddedness and (de)Commodification: COVID-19, Uber, and the Unravelling Logics of the Gig Economy." *Dialogues in Human Geography* 10, no. 2 (July 1, 2020): 203–7. <https://doi.org/10.1177/2043820620934942>.
- Kuhzady, Salar, Siamak Seyfi, and Luc Béal. "Peer-to-Peer (P2P) Accommodation in the Sharing Economy: A Review." *Current Issues in Tourism*, 2020, 1–16.
- Lang, Bodo, Rebecca Dolan, Joya Kemper, and Gavin Northey. "Prosumers in Times of Crisis: Definition, Archetypes and Implications." *Journal of Service Management* (January 1, 2020). <https://doi.org/10.1108/JOSM-05-2020-0155>.
- McKinsey & Company. "Consumer Sentiment and Behavior Continue to Reflect the Uncertainty of the COVID-19 Crisis." McKinsey & Company, 2020. <https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/a-global-view-of-how-consumer-behavior-is-changing-amid-covid-19#>.
- Naumov, Nikola, Desislava Varadzhakova, and Alexander Naydenov. "Sanitation and Hygiene as Factors for Choosing a Place to Stay: Perceptions of the Bulgarian Tourists." *Anatolia* 0, no. 0 (May 23, 2020): 1–4. <https://doi.org/10.1080/13032917.2020.1771742>.
- Raj, Manav, Arun Sundararajan, and Calum You. "COVID-19 and Digital Resilience: Evidence from Uber Eats." *ArXiv Preprint ArXiv:2006.07204*, 2020.
- Ratten, V. "Coronavirus (Covid-19) and Entrepreneurship: Changing Life and Work Landscape." *Journal of Small Business and Entrepreneurship*, 2020, 1–14. <https://doi.org/10.1080/08276331.2020.1790167>.
- Rubino, Irene, Cristina Coscia, and Rocco Curto. "Identifying Spatial Relationships between Built Heritage Resources and Short-Term Rentals before the Covid-19 Pandemic: Exploratory Perspectives on Sustainability Issues." *Sustainability* 12, no. 11 (2020): 4533.
- Scheepers, Caren Brenda, and Jill Bogie. "Uber Sub-Saharan Africa: Contextual Leadership for Sustainable Business Model Innovation during COVID-19." *Emerald Emerging Markets Case Studies* 10, no. 3 (January 1, 2020): 1–18. <https://doi.org/10.1108/EEMCS-05-2020-0165>.

27. Smith, Jen Rose. "Airbnb and Other Short-Term Rentals Are Caught in the Coronavirus Crossfire | CNN Travel." *CNN Travel*. CNN, March 31, 2020. <https://edition.cnn.com/travel/article/vacation-rentals-coronavirus/index.html>.
28. Spurk, Daniel, and Caroline Straub. "Flexible Employment Relationships and Careers in Times of the COVID-19 Pandemic." *Journal of Vocational Behavior* 119 (June 2020): 103435. <https://doi.org/10.1016/j.jvb.2020.103435>.
29. UNWTO. "International Tourist Numbers Could Fall 60–80% in 2020, UNWTO Reports | UNWTO." UNWTO, 2020. <https://www.unwto.org/news/covid-19-international-tourist-numbers-could-fall-60-80-in-2020>.
30. Watson, Meg. "Disrupting the Disruptors: How Covid-19 Will Shake up Airbnb." *The Guardian*, April 5, 2020. <http://www.theguardian.com/technology/2020/apr/06/disrupting-the-disruptors-how-covid-19-will-shake-up-airbnb>.
31. Wen, Jun, Metin Kozak, Shaohua Yang, and Fang Liu. "COVID-19: Potential Effects on Chinese Citizens' Lifestyle and Travel." *Tourism Review* (January 1, 2020). <https://doi.org/10.1108/TR-03-2020-0110>.
32. Williams, Colin Charles. "Impacts of the Coronavirus Pandemic on Europe's Tourism Industry: Addressing Tourism Enterprises and Workers in the Undeclared Economy." *International Journal of Tourism Research* (2020). <https://doi.org/10.1002/jtr.2395>.
33. Wood, Charlie. "Airbnb Is Establishing a New Cleaning Protocol for Hosts to Limit Spread of COVID-19." *Business Insider*, 2020. <https://www.businessinsider.com/airbnb-24-hours-between-rentals-limit-covid-spread-2020-4>.
34. Wyman, David, Chris Mothorpe, and Brumby McLeod. "Airbnb and VRBO: The Impact of Short-Term Tourist Rentals on Residential Property Pricing." *Current Issues in Tourism* (January 29, 2020): 1–12. <https://doi.org/10.1080/13683500.2019.1711027>.
35. Zenker, S., and F. Kock. "The Coronavirus Pandemic – A Critical Discussion of a Tourism Research Agenda." *Tourism Management* 81 (2020). <https://doi.org/10.1016/j.tourman.2020.104164>.
6. Bullough, Amanda, Maija Renko, and Tamara Myatt. "Danger Zone Entrepreneurs: The Importance of Resilience and Self-Efficacy for Entrepreneurial Intentions." *Entrepreneurship Theory and Practice* 38, no. 3 (2014): 473–99.
7. Burkle Jr, Frederick M., and Dan Hanfling. "Political Leadership in the Time of Crises: Primum Non Nocere." *PLoS Currents* 7 (2015).
8. Erdem, Orhan. "The Crisis and Aftermath-II: Society and Economics." In *After the Crash: Understanding the Social, Economic and Technological Consequences of the 2008 Crisis*, edited by Orhan Erdem, 77–109. Cham: Springer International Publishing, 2020. https://doi.org/10.1007/978-3-030-43343-7_5.
9. Faisal, Abrar, Julia N. Albrecht, and Willem J.L. Coetzee. "Renegotiating Organisational Crisis Management in Urban Tourism: Strategic Imperatives of Niche Construction." *International Journal of Tourism Cities* 6, no. 4 (January 1, 2020): 885–905. <https://doi.org/10.1108/IJTC-11-2019-0196>.
10. Finsterwalder, Jörg, and Volker G. Kuppelwieser. "Equilibrating Resources and Challenges during Crises: A Framework for Service Ecosystem Well-Being." *Journal of Service Management* 31, no. 6 (January 1, 2020): 1107–29. <https://doi.org/10.1108/JOSM-06-2020-0201>.
11. Gerken, Fynn, Sarah F. Van der Land, and Toni G. L. A. van der Meer. "Crisis in the Air: An Investigation of AirAsia's Crisis-Response Effectiveness Based on Frame Alignment." *Public Relations Review* 42, no. 5 (December 1, 2016): 879–92. <https://doi.org/10.1016/j.pubrev.2016.09.002>.
12. Ghaderi, Zahed, Ahmad Puad Mat Som, and Joan C. Henderson. "Tourism Crises and Island Destinations: Experiences in Penang, Malaysia." *Tourism Management Perspectives* 2–3 (April 1, 2012): 79–84. <https://doi.org/10.1016/j.tmp.2012.03.006>.
13. Gill, S. *Global Crises and the Crisis of Global Leadership*. Global Crises and the Crisis of Global Leadership, 2011. <https://doi.org/10.1017/CB09781139046596>.
14. Greenbaum, Robert T., Laura Dugan, and Gary LaFree. "The Impact of Terrorism on Italian Employment and Business Activity." *Urban Studies* 44, no. 5–6 (2007): 1093–1108.
15. Hall, C. Michael, Sanna Malinen, Rob Vosslander, and Russell Wordsworth. *Business and Post-Disaster Management: Business, Organisational and Consumer Resilience and the Christchurch Earthquakes*. Routledge, 2016.
16. Hällgren, Markus, Linda Rouleau, and Mark De Rond. "A Matter of Life or Death: How Extreme Context Research Matters for Management and Organization Studies." *Academy of Management Annals* 12, no. 1 (2018): 111–53.
17. Hayes, Rose, and Linda McCauley. "A Guide to Academic Crisis Response: Strategies for Nursing Schools During COVID-19 and Beyond." *Nurse Educator* 46, no. 1 (February 2021): 23–28. <https://doi.org/10.1097/NNE.0000000000000941>.
18. Heinonen, Kristina, and Tore Strandvik. "Reframing Service Innovation: COVID-19 as a Catalyst for Imposed Service Innovation." *Journal of Service Management* 32, no. 1 (January 1, 2020): 101–12. <https://doi.org/10.1108/JOSM-05-2020-0161>.
19. Hurley-Hanson, Amy E. "Organizational Responses and Adaptations after 9-11." *Management Research News* 29, no. 8 (January 1, 2006): 480–94. <https://doi.org/10.1108/01409170610692806>.
20. Johansen, Britt Foget, Winni Johansen, and Nina M. Weckesser. "Emotional Stakeholders as 'Crisis Communicators' in Social Media: The Case of the Telenor Customer Complaints Crisis." *Corporate Communications: An International Journal* 21, no. 3 (January 1, 2016): 289–308. <https://doi.org/10.1108/CCIJ-05-2015-0026>.

Appendix B. Final Document Sample from Literature Review on crisis management

1. Abdalla, Mohammed, Louai Alarabi, and Abdeltawab Hendawi. "Crisis Management Art from the Risks to the Control: A Review of Methods and Directions." *Information* 12, no. 1 (2021): 18.
2. Albers, Sascha, and Volker Rundshagen. "European Airlines' Strategic Responses to the COVID-19 Pandemic (January–May, 2020)." *Journal of Air Transport Management* 87 (August 1, 2020): 101863. <https://doi.org/10.1016/j.jairtraman.2020.101863>.
3. Batat, Wided. "How Michelin-Starred Chefs Are Being Transformed into Social Bricoleurs? An Online Qualitative Study of Luxury Foodservice during the Pandemic Crisis." *Journal of Service Management* 32, no. 1 (January 1, 2020): 87–99. <https://doi.org/10.1108/JOSM-05-2020-0142>.
4. Bhattacharyya, Som Sekhar, and Shreyash Thakre. "Coronavirus Pandemic and Economic Lockdown; Study of Strategic Initiatives and Tactical Responses of Firms." *International Journal of Organizational Analysis* (January 1, 2021). <https://doi.org/10.1108/IJOA-05-2020-2198>.
5. Bowen, Shannon A., and Yue Zheng. "Auto Recall Crisis, Framing, and Ethical Response: Toyota's Missteps." *Public Relations Review* 41, no. 1 (March 1, 2015): 40–49. <https://doi.org/10.1016/j.pubrev.2014.10.017>.

21. Kim, Bokyung, Kristine Johnson, and Sun-Young Park. "Lessons from the Five Data Breaches: Analyzing Framed Crisis Response Strategies and Crisis Severity." Edited by Shaofeng Liu. *Cogent Business & Management* 4, no. 1 (January 1, 2017): 1354525. <https://doi.org/10.1080/23311975.2017.1354525>.
22. Kim, Sora, and Brooke Fisher Liu. "Are All Crises Opportunities? A Comparison of How Corporate and Government Organizations Responded to the 2009 Flu Pandemic." *Journal of Public Relations Research* 24, no. 1 (2012): 69–85.
23. Kim, Sora, and Kang Hoon Sung. "Revisiting the Effectiveness of Base Crisis Response Strategies in Comparison of Reputation Management Crisis Responses." *Journal of Public Relations Research* 26, no. 1 (2014): 62–78.
24. Lai, A.Y.-H. "Emergence of Communication Capacity for a Resilient Society: Experience of the Taiwan Center for Disease Control in 2009 H1N1 Pandemic Control." In *Global Public Health Policy*, 279–88, 2013. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84895212935&partnerId=40&md5=2502564840233a4950dc597281f9fdae>.
25. Lloyd-Smith, McKenzie. "The COVID-19 Pandemic: Resilient Organisational Response to a Low-Chance, High-Impact Event." *BMJ Leader*, May 2020. <https://doi.org/10.1136/leader-2020-000245>.
26. Mithani, Murad A. "Adaptation in the Face of the New Normal." *Academy of Management Perspectives* 34, no. 4 (November 2020): 508–30. <https://doi.org/10.5465/amp.2019.0054>.
27. Mithani, Murad A., and Ipek Kocoglu. "Human and Organizational Responses to Extreme Threats: A Comparative Developmental Approach." *Management Decision* ahead-of-print, no. ahead-of-print (January 1, 2020). <https://doi.org/10.1108/MD-08-2020-1086>.
28. Muller, Alan, and Gail Whiteman. "Exploring the Geography of Corporate Philanthropic Disaster Response: A Study of Fortune Global 500 Firms." *Journal of Business Ethics* 84, no. 4 (2009): 589–603.
29. Page, S., I. Yeoman, C. Munro, J. Connell, and L. Walker. "A Case Study of Best Practice - Visit Scotland's Prepared Response to an Influenza Pandemic." *Tourism Management* 27, no. 3 (2006): 361–93. <https://doi.org/10.1016/j.tourman.2006.01.001>.
30. Paraskevas, Alexandros. "Crisis Management or Crisis Response System? A Complexity Science Approach to Organizational Crises." Edited by Richard Wilding. *Management Decision* 44, no. 7 (January 1, 2006): 892–907. <https://doi.org/10.1108/00251740610680587>.
31. Park, H. "Exploring Effective Crisis Response Strategies." *Public Relations Review* 43, no. 1 (2017): 190–92. <https://doi.org/10.1016/j.pubrev.2016.12.001>.
32. Preble, John F. "Integrating the Crisis Management Perspective into the Strategic Management Process." *Journal of Management Studies* 34, no. 5 (1997): 769–91. <https://doi.org/10.1111/1467-6486.00071>.
33. Rao, Hayagreeva, and Henrich R. Greve. "Disasters and Community Resilience: Spanish Flu and the Formation of Retail Cooperatives in Norway." *Academy of Management Journal* 61, no. 1 (2018): 5–25.
34. Rodríguez-Antón, José Miguel, and María del Mar Alonso-Almeida. "COVID-19 Impacts and Recovery Strategies: The Case of the Hospitality Industry in Spain." *Sustainability* 12, no. 20 (2020): 8599.
35. Romenti, Stefania, Grazia Murtarelli, and Chiara Valentini. "Organisations' Conversations in Social Media: Applying Dialogue Strategies in Times of Crises." Edited by Dr Michael Goodman. *Corporate Communications: An International Journal* 19, no. 1 (January 1, 2014): 10–33. <https://doi.org/10.1108/CCIJ-05-2012-0041>.
36. Roshan, Mina, Matthew Warren, and Rodney Carr. "Understanding the Use of Social Media by Organisations for Crisis Communication." *Computers in Human Behavior* 63 (October 1, 2016): 350–61. <https://doi.org/10.1016/j.chb.2016.05.016>.
37. Runyan, Rodney C. "Small Business in the Face of Crisis: Identifying Barriers to Recovery from a Natural Disaster1." *Journal of Contingencies and Crisis Management* 14, no. 1 (2006): 12–26. <https://doi.org/10.1111/j.1468-5973.2006.00477.x>.
38. Salvador-Carulla, Luis, Sebastian Rosenberg, John Mendoza, and Hossein Tabatabaei-Jafari. "Rapid Response to Crisis: Health System Lessons from the Active Period of COVID-19." *Health Policy and Technology*, The COVID-19 pandemic: Global health policy and technology responses in the making, 9, no. 4 (December 1, 2020): 578–86. <https://doi.org/10.1016/j.hlpt.2020.08.011>.
39. Teng-Calleja, Mendiola, Jaimee Felice Caringal-Go, Jason O. Manaois, Ma Queenie Y. Isidro, and Rae Mark S. Zantua. "Examining Organizational Response and Employee Coping Behaviors amid the COVID-19 Pandemic." *The Journal of Behavioral Science* 15, no. 3 (2020): 34–50.
40. Ye, Lan, and Eyun-Jung Ki. "Organizational Crisis Communication on Facebook: A Study of BP's Deepwater Horizon Oil Spill." *Corporate Communications: An International Journal* 22, no. 1 (January 1, 2017): 80–92. <https://doi.org/10.1108/CCIJ-07-2015-0045>.
41. Zhou, Xueguang. "Organizational Response to COVID-19 Crisis: Reflections on the Chinese Bureaucracy and Its Resilience." *Management and Organization Review* 16, no. 3 (2020): 473–84.

Appendix C. Observed Response Strategies Across Platforms

Response Strategy	Mobility Sharing	Space Sharing	Co-working	Communitarianism	Kangaroo/Yt	Papade Snappcar Bike Share Toronto	Turo Toronto	Uber	Airbnb	VRBO	FlipKey Vacation Rentals	Coairbnb	HomeExchange	WorkFromHome	WorkFromHomeSwap	ImpactHub Spaces	Toronto Tool Library	Rent Report	Swapcity	Peerby	LEW Library	Heel/Neel RKSY and/best	Bunz	Karma
Managing daily operations	X															X			X			X		X
Remaining open at full capacity		X				X			X							X		X			X			X
Expanding/increasing operations							X									X		X						X
Temporarily closing or pausing operations								X																
Reopening operations																								
Permanently closing																								
Implement local response for local markets																								
Adapting existing business model																								
Enhanced existing services								X	X							X								X
Changing or updating primary offering								X	X							X								X
Adding or updating additional offerings								X	X							X								X
Changing or updating additional offerings								X	X							X								X
Flexible contracts and terms of service								X	X							X								X
Transfer operations online																X								X
Performing strategic work																X								X
Investing in digital infrastructure																X								X
Upgrading/computer digital infrastructure																X								X
Applying for grants or other financial support																X								X
Implementing enhanced cleaning protocols	X					X	X	X	X							X								X
Implementing enhanced cleaning protocols	X					X	X	X	X							X								X
Improving HVAC, air filtration, and ventilation requirements																X								X
Requiring sanitary masks to be worn (along with other control measures)																X								X
Mechanisms for reporting positive feedback																X								X
Following international, national and local restrictions and best practices									X							X								X
Implementing community health and safety measures									X							X								X
Restricting access to platform based on health status									X							X								X
Providing increased hygiene products	X															X								X
Providing increased hygiene products	X															X								X
Supporting physical distancing																X								X
Limiting the number of people																X								X
Implementing clear signage																X								X
Increasing opening hours																X								X
Avoiding physical contacts through other means																X								X
Increasing community communication and education campaigns																X								X
Curating special resources for users (e.g. tutorials, webpages, checklists)	X								X	X						X								X
Providing accessible communication (e.g. audio, subtitles, language)									X	X						X								X
Offering financial support to social actors									X	X						X								X
Offering financial resources									X	X						X								X
Offering non-financial resources	X															X								X
Providing personal protective equipment																X								X
Provide advertising services																X								X
Expressing appreciation or providing support for frontline & essential workers																X								X
Working towards solutions																X								X
Managing partnerships	X															X								X
Working towards solutions	X															X								X
Ending existing partnerships (e.g. due to safety)																X								X

References

- Accenture, 2020. Outmaneuver uncertainty: Navigating the human and business impact of Covid-19. Accenture.
- Airbnb, 2020a. Exploring the enhanced cleaning process [WWW Document]. Airbnb URL <https://www.airbnb.com/resources/hosting-homes/g/exploring-the-enhanced-cleaning-process-8>.
- Airbnb, 2020b. What is self check-in? - Airbnb Help Center [WWW Document]. Airbnb URL <https://www.airbnb.com/help/article/1207/what-is-self-checkin>.
- Airbnb, 2020c. Home - Resource Center [WWW Document]. Airbnb URL <https://www.airbnb.com/resources/hosting-homes>.
- Airbnb, 2020d. Airbnb Hosts to Help Provide Housing to 100,000 COVID-19 Responders. Airbnb Newsroom URL <https://news.airbnb.com/en-uk/airbnb-hosts-to-help-provide-housing-to-100000-covid-19-responders/>.
- Alhojalila, M., 2012. Thematic analysis: A critical review of its process and evaluation. *West East Journal of Soc. Sci.* 1, 39–47.
- Bakker, P., Elkington, J., 2020. To build back better, we will have to reinvent capitalism [WWW Document]. World Econ. Forum. URL <https://www.weforum.org/agenda/2020/07/to-build-back-better-we-must-reinvent-capitalism-heres-how/>.
- Baum, T., Mooney, S.K.K., Robinson, R.N.S., Solnet, D., 2020. COVID-19's impact on the hospitality workforce - new crisis or amplification of the norm? *Int. J. Contemp. Hosp. Manag.* 32, 2813–2829. doi:10.1108/IJCHM-04-2020-0314.
- Bazeley, P., Jackson, K., 2013. *Qualitative Data Analysis with NVivo*. SAGE Publications Ltd.
- Belk, R., 2014a. You are what you can access: Sharing and collaborative consumption online. *J. Bus. Res.* 1595–1600.
- Belk, R., 2014b. Sharing versus pseudo-sharing in Web 2.0. *The Anthropologist* 18, 7–23.
- Benoit, W.L., 1995. *Accounts, Excuses, and Apologies: A Theory of Image Restoration Strategies*. Marcombo.
- Bike Share Toronto, 2020a. Bike Share Toronto Covid-19 Update [WWW Document]. Bike Share Tor. URL <https://bikesharetoronto.com/news/covid-19-update/>.
- Bike Share Toronto, 2020b. CycleFinder/PBSC App: Access Bikes on the Go - Bike Share Toronto | Bike Share Toronto [WWW Document]. Bike Share Tor. URL <https://bikesharetoronto.com/app/>.
- Bocken, N.M., de Pauw, I., Bakker, C., van der Grinten, B., 2016. Product design and business model strategies for a circular economy. *J. Ind. Prod. Eng.* 33, 308–320.
- Bolton, L., 2020. The Build Back Better Agenda and COVID-19.
- Boons, F., Browne, A., Burgess, M., Eghartner, U., Hirth, S., Hodson, M., Holmes, H., Hoolohan, C., MacGregor, S., McMeekin, A., 2020. Covid-19, changing social practices and the transition to sustainable production and consumption (No. Version 1.0). Sustainable Consumption Institute, Manchester.
- Botsman, R., Rogers, R., 2010. What's Mine Is Yours: The Rise of Collaborative Consumption. *Harv. Bus. Rev.* 88, 30–33.
- Bouncken, R.B., Reuschl, A.J., 2018. Coworking-spaces: how a phenomenon of the sharing economy builds a novel trend for the workplace and for entrepreneurship. *Rev. Manag. Sci.* 12, 317–334. doi:10.1007/s11846-016-0215-9.
- Brignall, M., 2020. Huge demand for bikes during lockdown set to grow further [WWW Document]. The Guardian URL <https://www.theguardian.com/business/2020/may/11/huge-demand-for-cycles-during-lockdown-set-to-rise-further>.
- Bullough, A., Renko, M., Myatt, T., 2014. Danger zone entrepreneurs: the importance of resilience and self-efficacy for entrepreneurial intentions. *Entrep. Theory Pract.* 38, 473–499.
- Bunz, 2020. Trade Notice to our Bunz Community re: Precautions during COVID-19 in Toronto [WWW Document]. Bunz.com. URL <https://bunz.com/item/toronto/clothingaccessorieswomen/notice-to-our-bunz-community-r/5e6d220b1843f311a890837>.
- Business Wire, 2020a. Impact of COVID-19 on the Global Coworking Spaces Market [WWW Document]. Bus. Wire. URL <https://www.businesswire.com/news/home/20200611005411/en/Impact-of-COVID-19-on-the-Global-Coworking-Spaces-Market-2020-2030-ResearchAndMarkets.com> (accessed 11.30.20).
- Business Wire, 2020b. Facedrive Focuses on Further Global Expansion Plans [WWW Document]. Financ. Post. URL <https://business.financialpost.com/pmn/press-releases-pmn/business-wire-news-releases-pmn/facedrive-focuses-on-further-global-expansion-plans>.
- Calisto Friant, M., Vermeulen, W.J.V., Salomone, R., 2021. Analysing European Union circular economy policies: words versus actions. *Sustain. Prod. Consum.* 27, 337–353. doi:10.1016/j.spc.2020.11.001.
- Cascio, J., 2009. Resilience. *Foreign Policy* 92.
- CBRE, 2017. Hosts with Multiple Units – A Key Driver of Airbnb Growth. CBRE Hotels Americas Research.
- Chadwick, L., 2020. Hotels and Airbnb plan “fundamental shift” after COVID-19 lockdowns [WWW Document]. euronews URL <https://www.euronews.com/2020/05/08/coronavirus-hotels-and-airbnb-plan-fundamental-shift-after-covid-19-lockdowns>.
- Chandler, S., 2020. Coronavirus Turns Uber Into Gig Platform For All Work [WWW Document]. Forbes URL <https://www.forbes.com/sites/simonchandler/2020/04/07/coronavirus-turns-uber-into-gig-platform-for-all-work/>.
- Chandra, S., 2020. Speed, Space and Sustainability (3S) in Transportation Amid COVID-19 Crisis (SSRN Scholarly Paper No. ID 3598501). Social Science Research Network, Rochester, NY.
- Charmaz, K., 2014. *Constructing Grounded Theory*. SAGE Publications.
- Cheng, C., Barceló, J., Hartnett, A.S., Kubinec, R., Messerschmidt, L., 2020. COVID-19 Government Response Event Dataset (CoronaNet v1.0). *Nat. Hum. Behav.* 4, 756–768. doi:10.1038/s41562-020-0909-7.
- Chien, G.C.L., Law, R., 2003. The impact of the Severe Acute Respiratory Syndrome on hotels: a case study of Hong Kong. *Int. J. Hosp. Manag.* 22, 327–332. doi:10.1016/S0278-4319(03)00041-0.
- Communauto, 2020. COVID-19: Our preventive measures and special offers. Communauto URL <https://blogue.communauto.com/en/covid-19-preventive-measures-special-offers/>.
- Connolly, K., 2020. “Cleaner and greener”: Covid-19 prompts world's cities to free public space of cars [WWW Document]. The Guardian URL <http://www.theguardian.com/world/2020/may/18/cleaner-and-greener-covid-19-prompts-worlds-cities-to-free-public-space-of-cars>.
- Coombes, W.T., 2014. Applied Crisis Communication and Crisis Management: Cases and Exercises. 55 City Road, London. 10.4135/9781544308331
- Coombes, W.T., 2006. The protective powers of crisis response strategies: Managing reputational assets during a crisis. *J. Promot. Manag.* 12, 241–260.
- Coombes, W.T., 1995. Choosing the right words: The development of guidelines for the selection of the “appropriate” crisis-response strategies. *Manag. Commun.* Q. 8, 447–476.
- Coombes, W.T., Holladay, S.J., 2002. Helping crisis managers protect reputational assets: Initial tests of the situational crisis communication theory. *Manag. Commun. Q.* 16, 165–186.
- Couchsurfing, 2020. Couchsurfing needs your help. Couchsurfing Blog URL <https://blog.couchsurfing.com/couchsurfing-needs-your-help/>.
- Curtis, S.K., Lehner, M., 2019. Defining the sharing economy for sustainability. *Sustain. Switz.* 11, doi:10.3390/su11030567.
- Curtis, S.K., Mont, O., 2020. Sharing economy business models for sustainability. *J. Clean. Prod.* 266, 121519. doi:10.1016/j.jclepro.2020.121519.
- Curtis, S.K., Singh, J., Mont, O., Kessler, A., 2020. Systematic Framework to Assess Social Impacts of Sharing Platforms. *PLoS One*.
- Dolnicar, S., Zare, S., 2020. COVID19 and Airbnb – Disrupting the Disruptor. *Ann. Tour. Res.* 83, doi:10.1016/j.annals.2020.102961.
- Draaisma, M., 2020. Toronto expands bike share program “into all corners” of city during pandemic | CBC News [WWW Document]. CBC URL <https://www.cbc.ca/news/canada/toronto/toronto-bike-share-program-expansion-pandemic-1.5605289>.
- ESR, 2020. Workcation - Work Remotely At Your Cabin Vacation Rental. Elk Springs Resort URL <https://www.elkspringsresort.com/workcation-work-remotely-at-your-cabin-vacation-rental/>.
- Evans, D., 2020. Airbnb's Future Is Uncertain as It Continues to Struggle Through Its Covid-19 Response [WWW Document]. CNBC URL <https://www.cnbc.com/2020/05/06/can-airbnb-survive-the-coronavirus-pandemic.html>.
- Facedrive, 2020a. Non-Emergency Medical Transportation [WWW Document]. <https://facedrive.com/>. URL <https://facedrive.com/non-emergency-medical-transportation/> (accessed 10.16.20).
- Facedrive, 2020b. Facedrive and HIRide Announce Global Virtual Hackathon to Counter the Impacts of Covid-19. <https://facedrive.com/>. URL <https://facedrive.com/press-release/facedrive-and-hiride-announce-global-virtual-hackathon-to-counter-the-impacts-of-covid-19/> (accessed 10.16.20).
- Fink, S., 1986. *Crisis management planning for the inevitable*. American Management Association, New York, NY.
- Ford Rojas, J.-P., 2020. Coronavirus: Uber plunges to \$2.9bn loss but “encouraged” as lockdowns ease [WWW Document]. Sky News URL <https://news.sky.com/story/coronavirus-uber-plunges-to-2-9bn-loss-but-encouraged-as-lockdowns-ease-11984992>.
- Frandsen, F., Johansen, W., 2016. *Organizational Crisis Communication: A Multivoical Approach*. SAGE.
- Frengen, K., Schor, J., 2017. Putting the sharing economy into perspective. *Environ. Innov. Soc. Transit., Sustainability Perspectives on the Sharing Economy* 23, 3–10. doi:10.1016/j.eist.2017.01.003.
- Gerzema, J., D'Antonio, M., 2010. Spend shift: How the post-crisis values revolution is changing the way we buy, sell, and live. John Wiley & Sons.
- Gössling, S., Scott, D., Hall, C.M., 2020. Pandemics, tourism and global change: a rapid assessment of COVID-19. *J. Sustain. Tour.* 1–20.
- Government Offices of Sweden, R. och, 2020. Green recovery will lift Sweden out of dual crisis [WWW Document]. Regeringskansliet URL <https://www.government.se/press-releases/2020/09/green-recovery-will-lift-sweden-out-of-dual-crisis/>.
- Greenbaum, R.T., Dugan, L., LaFree, G., 2007. The impact of terrorism on Italian employment and business activity. *Urban Stud* 44, 1093–1108.
- Guo, Y., Li, X., Zeng, X., 2019. Platform Competition in the Sharing Economy: Understanding How Ride-Hailing Services Influence New Car Purchases. *J. Manag. Inf. Syst.* 36, 1043–1070.
- Gupta, Dr.P., Chauhan, Prof.S., 2021. Mapping intellectual structure and sustainability claims of sharing economy research – A literature review. *Sustain. Prod. Consum.* 25, 347–362. doi:10.1016/j.spc.2020.09.006.
- Haddad, A., 2020. Practicing safe car sharing while navigating COVID-19. *Field Notes Turo Blog* URL <https://turo.com/blog/news/practicing-safe-car-sharing-while-navigating-covid-19>.
- Hall, C.M., Malinen, S., Vosslander, R., Wordsworth, R., Malinen, S., Vosslander, R., Wordsworth, R., 2016. *Business and Post-disaster Management: Business, organisational and consumer resilience and the Christchurch earthquakes*. Routledge doi:10.4324/9781315640211.
- Hall, C.M., Scott, D., Gössling, S., 2020. Pandemics, transformations and tourism: be careful what you wish for. *Tour. Geogr.* 1–22.
- Heinonen, K., Strandvik, T., 2020. Reframing service innovation: COVID-19 as a catalyst for imposed service innovation. *J. Serv. Manag.* 32, 101–112. doi:10.1108/JOSM-05-2020-0161.

- Henderson, J.C., Ng, A., 2004. Responding to crisis: severe acute respiratory syndrome (SARS) and hotels in Singapore. *Int. J. Tour. Res.* 6, 411–419. doi:10.1002/jtr.505.
- Henry, M., Schraven, D., Bocken, N., Frenken, K., Hekkert, M., Kirchherr, J., 2021. The battle of the buzzwords: A comparative review of the circular economy and the sharing economy concepts. *Environ. Innov. Soc. Transit.* 38, 1–21. doi:10.1016/j.eist.2020.10.008.
- Herring, S.C., 2009. Web content analysis: Expanding the paradigm. In: *International Handbook of Internet Research*. Springer, pp. 233–249.
- Hofstaedter, G., Robinson, R., Riordan, T., 2020. Delivery workers are now essential. They deserve the rights of other employees [WWW Document]. The Conversation URL <http://theconversation.com/delivery-workers-are-now-essential-they-deserve-the-rights-of-other-employees-134406>.
- Holling, C.S., 1973. Resilience and Stability of Ecological Systems. *Annu. Rev. Ecol. Syst.* 4, 1–23. doi:10.1146/annurev.es.04.110173.000245.
- Horgan, D., Hackett, J., Westphalen, C.B., Kalra, D., Richer, E., Romao, M., Andreu, A.L., Lal, J.A., Bernini, C., Tumiene, B., Boccia, S., Montserrat, A., 2020. Digitalisation and COVID-19: The Perfect Storm. *Biomed. Hub* 5, 1–23. doi:10.1159/000511232.
- Hu, R., 2020. COVID-19, smart work, and collaborative space: A crisis-opportunity perspective. *J. Urban Manag.* doi:10.1016/j.jum.2020.08.001.
- Hurley-Hanson, A.E., 2006. Organizational responses and adaptations after 9-11. *Manag. Res. News* 29, 480–494. doi:10.1108/01409170610692806.
- Ibn-Mohammed, T., Mustapha, K.B., Godsell, J., Adamu, Z., Babatunde, K.A., Akintade, D.D., Acquaye, A., Fujii, H., Ndiaye, M.M., Yamoah, F.A., Koh, S.C.L., 2021. A critical analysis of the impacts of COVID-19 on the global economy and ecosystems and opportunities for circular economy strategies. *Resour. Conserv. Recycl.* 164, 105169. doi:10.1016/j.resconrec.2020.105169.
- ILO, 2020. ILO Monitor: COVID-19 and the world of work. Fifth edition International Labor Organization Updated estimates and analysis.
- Impact Hub, 2020. Impact Hub Joins Alliance to Help Social Entrepreneurs Overcome Impacts of COVID-19 [WWW Document]. Mynewsdesk URL <https://www.mynewsdesk.com/se/impacthubstockholm/news/impact-hub-joins-alliance-to-help-social-entrepreneurs-overcome-impacts-of-covid-19-404768>.
- ImpactHub Stockholm, 2020. Health & Safety Policy. Impact Hub Stockh. URL <https://stockholm.impacthub.net/health-safety-policy/>.
- IWG, 2020. Preparing for a New World of Work. International Working Group.
- Johnson Tew, P., Lu, Z., Tolomiczynski, G., Gellatly, J., 2008. SARS: lessons in strategic planning for hoteliers and destination marketers. *Int. J. Contemp. Hosp. Manag.* 20, 332–346. doi:10.1108/09596110810866145.
- Kamal, M.M., 2020. The triple-edged sword of COVID-19: understanding the use of digital technologies and the impact of productive, disruptive, and destructive nature of the pandemic. *Inf. Syst. Manag.* 37, 310–317. doi:10.1080/10580530.2020.1820634.
- Karma, 2020. Our engagement to our community in Coronavirus time [WWW Document]. Karma App - Save Food Wasted URL <https://karma.life/blog/covid19/>.
- Katta, S., Badger, A., Graham, M., Howson, K., Ustek-Spilda, F., Bertolini, A., 2020. (Dis)embeddedness and (de)commodification: COVID-19, Uber, and the unraveling logics of the gig economy. *Dialogues Hum. Geogr.* 10, 203–207. doi:10.1177/2043820620934942.
- Kenny, M., Fourie, R., 2015. Contrasting classic, Straussian, and constructivist Grounded Theory: Methodological and philosophical conflicts. *Qual. Rep.* 20, 1270.
- Kim, B., Johnson, K., Park, S.-Y., 2017. Lessons from the five data breaches: Analyzing framed crisis response strategies and crisis severity. *Cogent Bus. Manag.* 4, 1354525. doi:10.1080/23311975.2017.1354525.
- Konya, K., 2020. SURVEY: How Coworking Spaces are Navigating COVID-19 [WWW Document]. URL <https://www.coworker.com/mag/survey-how-coworking-spaces-are-navigating-covid-19> (accessed 11.30.20).
- Lloyd-Smith, M., 2020. The COVID-19 pandemic: resilient organisational response to a low-chance, high-impact event. *BMJ Lead* doi:10.1136/leader-2020-000245.
- Lomas, N., 2020. TechCrunch. TechCrunch URL <https://social.techcrunch.com/2020/05/29/uber-uk-launches-work-hub-for-drivers-to-find-other-gig-jobs-during-covid-19/>.
- Longwell, K., 2020. Toronto dress rental business has closed for good [WWW Document]. *blogTO* URL https://www.blogto.com/fashion_style/2020/08/toronto-dress-rental-closed/.
- LoveHomeSwap, 2020a. Swap Homes Safely: The Ultimate Guide to Cleaning and Preparing Your Home for Guests [WWW Document]. Love Home Swap URL <https://www.lovehomeswap.com/blog/covid-19-updates-and-resources/home-swapping-with-love-home-swap-how-to-prepare-and-clean-your-home-for-guests>.
- LoveHomeSwap, 2020b. 11 useful phrases when traveling abroad post coronavirus (COVID-19) [WWW Document]. Love Home Swap URL <https://www.lovehomeswap.com/blog/latest-news/phrases-you-might-need-when-travelling-abroad-post-coronavirus-covid-19>.
- Lyft, 2020a. Lyft's latest on COVID-19 [WWW Document]. Lyft URL <https://www.lyft.com/safety/coronavirus>.
- Lyft, 2020b. Clean ride guide [WWW Document]. Lyft URL <https://www.lyft.com/driver/clean>.
- Lyft, 2020c. Help protect our communities when you ride – COVID-19 [WWW Document]. Lyft URL <https://www.lyft.com/safety/coronavirus/ridet>.
- Lyft, 2020d. Helping Lyft's driver community – COVID-19 [WWW Document]. Lyft URL <https://www.lyft.com/safety/coronavirus/driver>.
- Ma, Y., Lan, J., Thornton, T., Mangalagiu, D., Zhu, D., 2018. Challenges of collaborative governance in the sharing economy: The case of free-floating bike sharing in Shanghai. *J. Clean. Prod.* 197, 356–365. doi:10.1016/j.jclepro.2018.06.213.
- Magder, J., 2020. Communauto says trips down 75 per cent during coronavirus crisis. *Montr. Gaz* URL <https://montrealgazette.com/news/local-news/communauto-says-trips-down-75-per-cent-during-coronavirus-crisis>.
- McMillan, S.J., 2000. The microscope and the moving target: The challenge of applying content analysis to the World Wide Web. *J. Mass Commun.* Q. 77, 80–98.
- Miles, M.B., Huberman, A.M., 1994. *Qualitative Data Analysis: An Expanded Sourcebook*, 2nd ed. Sage Publications, Thousand Oaks, Calif.
- Miller, S.R., 2016. First principles for regulating the sharing economy. *Harv. J. Legis.* 53, 147.
- Mithani, M.A., 2020. Adaptation in the Face of the New Normal. *Acad. Manag. Perspect.* 34, 508–530. doi:10.5465/amp.2019.0054.
- Mithani, M.A., Kocoglu, I., 2020. Human and organizational responses to extreme threats: a comparative developmental approach. *Manag. Decis.* doi:10.1108/MD-08-2020-1086, ahead-of-print.
- Muñoz, P., Cohen, B., 2018. A compass for navigating sharing economy business models. *Calif. Manag. Rev.* 61, 114–147.
- Münzel, K., Boon, W., Frenken, K., Blomme, J., van der Linden, D., 2020. Explaining carsharing supply across Western European cities. *Int. J. Sustain. Transp.* 14, 243–254.
- Naumov, N., Varadzkhova, D., Naydenov, A., 2020. Sanitation and hygiene as factors for choosing a place to stay: perceptions of the Bulgarian tourists. *Antolia* 0, 1–4. doi:10.1080/13032917.2020.1771742.
- Novel, A.-S., 2014. Is sharing more sustainable? The environmental promises of the sharing economy. In: Grosclaude, J.-Y., Pachauri, R.K., Tubiana, L. (Eds.), *Innovation for Sustainable Development*, pp. 139–144.
- OECD, 2020. Focus on green recovery [WWW Document]. OECD URL <https://www.oecd.org/coronavirus/en/themes/green-recovery>.
- Oxford Economics, 2020. Latest Global Outlook [WWW Document]. *Oxf. Econ. URL* <https://www.oxfordeconomics.com/>.
- Page, S., Yeoman, I., Munro, C., Connell, J., Walker, L., 2006. A case study of best practice - Visit Scotland's prepared response to an influenza pandemic. *Tour. Manag.* 27, 361–393. doi:10.1016/j.tourman.2006.01.001.
- Pearson, C.M., Clair, J.A., 1998. Reframing crisis management. *Acad. Manag. Rev.* 23, 59–76.
- Pearson, C.M., Roux-Dufort, C., Clair, J.A., 2007. *International Handbook of Organizational Crisis Management*. SAGE Publications.
- Plewania, F., Guenther, E., 2018. Mapping the sharing economy for sustainability research. *Manag. Decis.*
- Poparide, 2020. Guidelines & policies on coronavirus (COVID-19) [WWW Document]. Poparide Help URL <https://support.poparide.com/hc/en-us/articles/360040860131-Guidelines-policies-on-coronavirus-COVID-19->.
- Prayag, G., Ozanne, L.K., 2018. A systematic review of peer-to-peer (P2P) accommodation sharing research from 2010 to 2016: progress and prospects from the multi-level perspective. *J. Hosp. Manag.* 27, 649–678.
- Raj, M., Sundararajan, A., You, C., 2020. COVID-19 and Digital Resilience: Evidence from Uber Eats. *ArXiv Prepr. ArXiv:200607204*.
- Rao, H., Greve, H.R., 2018. Disasters and community resilience: Spanish flu and the formation of retail cooperatives in Norway. *Acad. Manag. J.* 61, 5–25.
- Razeghian, M., Weber, T.A., 2019. Strategic durability with sharing markets. *Sustain. Prod. Consum.* 19, 79–96. doi:10.1016/j.spc.2019.02.007.
- Reilly, A.H., 1993. Preparing for the worst: The process of effective crisis management. *Ind. Environ. Crisis Q.* 7, 115–143.
- Ritchie, B.W., 2004. Chaos, crises and disasters: a strategic approach to crisis management in the tourism industry. *Tour. Manag.* 25, 669–683.
- Ritter, M., Schanz, H., 2018. The sharing economy: A comprehensive business model framework. *J. Clean. Prod.*
- Rubino, L., Coscia, C., Curto, R., 2020. Identifying Spatial Relationships between Built Heritage Resources and Short-Term Rentals before the Covid-19 Pandemic: Exploratory Perspectives on Sustainability Issues. *Sustainability* 12, 4533.
- Runyan, R.C., 2006. Small Business in the Face of Crisis: Identifying Barriers to Recovery from a Natural Disaster. *J. Contingencies Crisis Manag.* 14, 12–26. doi:10.1111/j.1468-5973.2006.00477.x.
- Scheepers, C.B., Bogle, J., 2020. Uber Sub-Saharan Africa: contextual leadership for sustainable business model innovation during COVID-19. *Emerald Emerg. Mark. Case Stud.* 10, 1–18. doi:10.1108/EMCS-05-2020-0165.
- Sharifi, A., Khavarian-Garmsir, A.R., 2020. The COVID-19 pandemic: Impacts on cities and major lessons for urban planning, design, and management. *Sci. Total Environ.* 749, 142391. doi:10.1016/j.scitotenv.2020.142391.
- Shin, Y.A., Yeo, J., Jung, K., 2018. The effectiveness of international non-governmental organizations' response operations during public health emergency: lessons learned from the 2014 Ebola outbreak in Sierra Leone. *Int. J. Environ. Res. Public Health* 15, 650.
- Shrivastava, P., 1993. Crisis theory/practice: Towards a sustainable future. *Ind. Environ. Crisis Q.* 7, 23–42.
- Simpson, M., 2020. Toronto rideshare company Facedrive to acquire HiRide. *Betakit URL* <https://betakit.com/toronto-rideshare-company-facedrive-to-acquire-hiride/>.
- Smith, J.R., 2020. Airbnb and other short-term rentals are caught in the coronavirus crossfire | CNN Travel. *CNN Travel*.
- SnappCar, 2020a. Carsharing during the Coronavirus [WWW Document]. SnappCar Blog. URL <https://blog.snappcar.nl/2020/03/18/maatregelen-snappcar-coronavirus/>.
- SnappCar, 2020b. Carsharing during the Coronavirus. SnappCar Blog URL <https://blog.snappcar.nl/2020/03/18/maatregelen-snappcar-coronavirus/>.

- Sneader, K., Singhal, S., 2020. Beyond coronavirus: The path to the next normal [WWW Document]. McKinsey Co. URL <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/beyond-coronavirus-the-path-to-the-next-normal>.
- Soko Directory Team, 2020. Uber Provides Transport Support For Kenyan Medical Professionals. Soko Dir. URL <https://sokodirectory.com/2020/05/uber-provides-transport-support-for-kenyan-medical-professionals/>.
- Spaces, 2020. Spaces response to COVID-19. Spaces URL <https://www.spacesworks.com/response-to-covid19/>.
- Sturges, D.L., 1994. Communicating through crisis: A strategy for organizational survival. *Manag. Commun.* Q. 7, 297–316.
- Täuscher, K., Laudien, S.M., 2018. Understanding platform business models: A mixed methods study of marketplaces. *Eur. Manag. J.* 36, 319–329.
- Teng-Calleja, M., Caringal-Go, J.F., Manaois, J.O., Isidro, M.Q.Y., Zantua, R.M.S., 2020. Examining Organizational Response and Employee Coping Behaviors amid the COVID-19 Pandemic. *J. Behav. Sci.* 15, 34–50.
- Toyama, K., 2020. The Sharing Economy Will Survive the Pandemic. Is That a Good Thing? *World Polit. Rev.*
- Turo, 2020a. The impact of COVID-19 on Turo in March. *Field Notes Turo Blog*. URL <https://turo.com/blog/insights/the-impact-of-covid-19-on-turo-in-march> (accessed 11.29.20).
- Turo, 2020b. Answers to questions about COVID-19 | Guests [WWW Document]. Turo Support URL <https://support.turo.com/hc/en-us/articles/360045673853-Answers-to-questions-about-COVID-19-Guests>.
- Turo, 2020c. Enhanced cleaning & disinfection guide for Turo hosts [WWW Document]. Turo Car Shar. Marketpl. URL <https://explore.turo.com/enhanced-cleaning-disinfection-guide/>.
- Uber, 2020a. Helping move what matters [WWW Document]. Uber URL <https://www.uber.com/se/en/coronavirus/>.
- Uber, 2020b. When we say “No mask. No ride” we mean it [WWW Document]. Uber Blog URL <https://www.uber.com/en-HR/blog/holding-riders-accountable/>.
- Ukolov, V.F., Solomatin, A.V., Solomatin, Y.V., Chernikov, S.U., Ukolov, A.V., 2016. Food-sharing economy pattern comparison in UK and Russian markets. *Int Bus Manag* 10, 4268–4282.
- Vachon, M.-O., 2020. Ridesharing and COVID-19: What you need to know. URL <https://www.kangaride.com/covid-19> (accessed 10.16.20).
- von Briel, D., Dolnicar, S., 2020. The evolution of Airbnb regulation - An International Longitudinal Investigation 2008-2020.
- Vrbo, 2020a. What can I do if my reservation is affected by the coronavirus (COVID-19)? [WWW Document]. URL <https://www.vrbo.com/en-gb/help/articles/What-can-I-do-if-my-reservation-is-affected-by-the-Coronavirus> (accessed 10.26.20).
- Vrbo, 2020b. How does the novel coronavirus (COVID-19) affect my property? [WWW Document]. Vrbo URL <https://www.vrbo.com/en-gb/help/articles/How-does-the-novel-coronavirus-COVID-19-affect-my-property>.
- Vrbo, 2020c. What are the best practices for hosts during COVID-19? Resources and tips. [WWW Document] URL <https://www.vrbo.com/en-gb/help/articles/How-does-the-novel-coronavirus-COVID-19-affect-my-property>.
- Watson, M., 2020. Disrupting the disruptors: how Covid-19 will shake up Airbnb [WWW Document], the Guardian URL <http://www.theguardian.com/technology/2020/apr/06/disrupting-the-disruptors-how-covid-19-will-shake-up-airbnb>.
- Wen, J., Kozak, M., Yang, S., Liu, F., 2020. COVID-19: potential effects on Chinese citizens' lifestyle and travel. *Tour. Rev.* doi:10.1108/TR-03-2020-0110, ahead-of-print.
- Wenzel, M., Stanske, S., Lieberman, M.B., 2021. Strategic responses to crisis. *Strateg. Manag. J.* 42, 016–027. doi:10.1002/smj.3161.
- WeWork, 2020. Our commitment to health and safety. WeWork URL <https://www.wework.com/info/working-together-to-build-a-healthier-workspace>.
- WHO, 2020. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020 [WWW Document]. World Health Organ. URL <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19--11-march-2020> (accessed 11.29.20).
- Willison, T., 2020a. Sharing During Pandemic - How TTL is dealing with C19 [WWW Document]. Tor. Tool Libr. URL <https://www.torontotoollibrary.com/blogs/post/sharing-during-pandemic>.
- Willison, T., 2020b. Changing Things Up - Toronto Tool Library [WWW Document]. Tor. Tool Libr. URL <https://www.torontotoollibrary.com/blogs/post/Changing-Things-Up>.
- Zenker, S., Kock, F., 2020. The coronavirus pandemic – A critical discussion of a tourism research agenda. *Tour. Manag.* 81. doi:10.1016/j.tourman.2020.104164.
- Zhou, X., 2020. Organizational response to COVID-19 crisis: Reflections on the Chinese bureaucracy and its resilience. *Manag. Organ. Rev.* 16, 473–484.

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