

ACTA

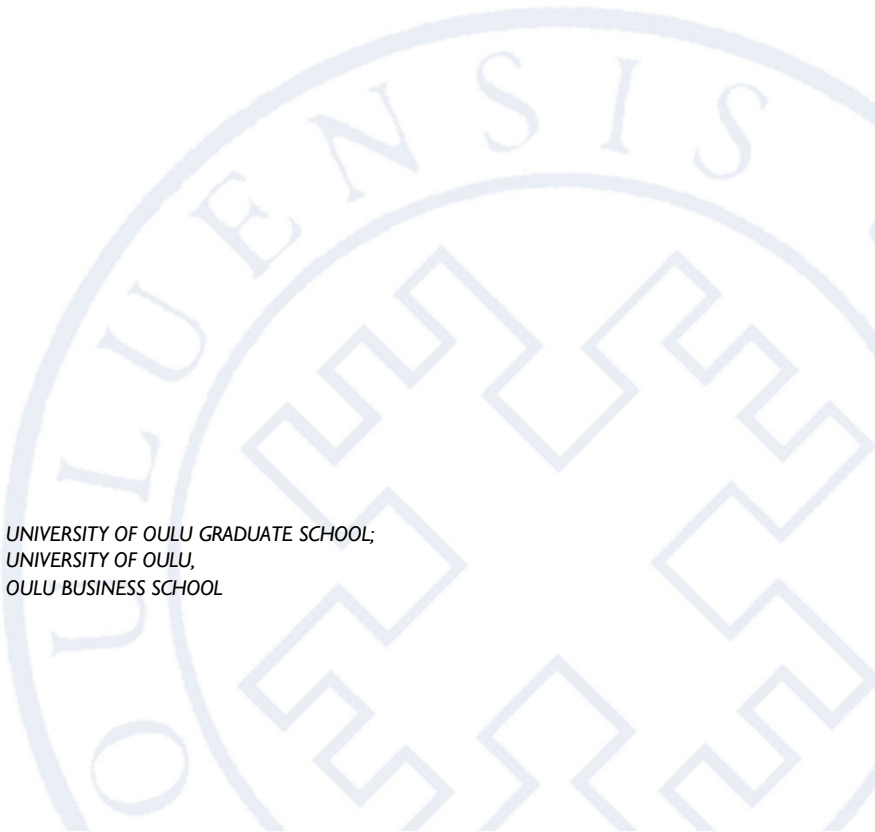
Laura Ristolainen

DIGITAL PLATFORM
OPERATORS' BUSINESS
MODEL INNOVATION

DATA AS A RESOURCE PERSPECTIVE

UNIVERSITY OF OULU GRADUATE SCHOOL;
UNIVERSITY OF OULU,
OULU BUSINESS SCHOOL

G
OECONOMICA



ACTA UNIVERSITATIS OULUENSIS
G Oeconomica 143

LAURA RISTOLAINEN

**DIGITAL PLATFORM OPERATORS'
BUSINESS MODEL INNOVATION**

Data as a resource perspective

Academic dissertation to be presented with the assent of the Doctoral Programme Committee of Human Sciences of the University of Oulu for public defence in the Oulun puhelin auditorium (L5), Linnanmaa, on 12 April 2024, at 12 noon

UNIVERSITY OF OULU, OULU 2024

Copyright © 2024
Acta Univ. Oul. G 143, 2024

Supervised by
Associate Professor Timo Koivumäki
Professor Minna Pikkarainen

Reviewed by
Associate Professor Joel Mero
Associate Professor Yimei Hu

Opponent
Associate Professor Kaisa Koskela-Huotari

ISBN 978-952-62-4055-8 (Paperback)
ISBN 978-952-62-4056-5 (PDF)

ISSN 1455-2647 (Printed)
ISSN 1796-2269 (Online)

Cover Design
Raimo Ahonen

PUNAMUSTA
TAMPERE 2024

Ristolainen, Laura, Digital platform operators' business model innovation. Data as a resource perspective

University of Oulu Graduate School; University of Oulu, Oulu Business School

Acta Univ. Oul. G 143, 2024

University of Oulu, P.O. Box 8000, FI-90014 University of Oulu, Finland

Abstract

The technological advances and increased availability of real-time data collected by companies and individuals themselves enables companies to innovate new business models. Concerning digital transformation, healthcare has, however, been slow to change. Today, the data is in silos, which hinders individuals and other ecosystem actors in fully gaining the value of personal data.

This research contributes to the academic discussion by filling the gap of increasing understanding of digital platform operators' business model innovation from the perspective of personal data as a resource. The purpose of this research is to explore and understand digital platform operators' business model innovation in the context of the health service ecosystem. Furthermore, in this study, digital platform operators' business model innovation is explored through a human-centered approach to personal data management, which refers to providing individuals with the means to control, access, and share their personal data.

This study applies a simultaneous qualitative mixed method as a research methodology, utilizing semi-structured interviews as the core component of data collection. The results of the study are: 1) it proposes a conceptual framework for digital platform operator business model innovation in a health service ecosystem from the perspective of personal data as a resource; 2) it adds to the service marketing discussion of service platforms, value co-creation, and service ecosystems by applying the theoretical concepts to gaining more understanding of the research problem in a qualitative study; and 3) it provides insights into how practitioners can approach digital platform operator business model innovation and consider the future emerging roles and opportunities in a health service ecosystem from the perspective of personal data.

Keywords: business model innovation, digital platform operator, health service ecosystem, personal data, personal data management

Ristolainen, Laura, Digitaalisten alustaoperaattoreiden liiketoimintamalli-innovaatio. Näkökulmana data resurssina

Oulun yliopiston tutkijakoulu; Oulun yliopisto, Oulun yliopiston kauppakorkeakoulu

Acta Univ. Oul. G 143, 2024

Oulun yliopisto, PL 8000, 90014 Oulun yliopisto

Tiivistelmä

Teknologinen kehitys sekä yritysten ja yksilöiden itsensä keräämän reaaliaikaisen tiedon lisääntynyt saatavuus mahdollistavat yritysten uusien liiketoimintamallien innovoinnin. Digitaalisen transformaation osalta terveydenhuolto on kuitenkin muuttunut hitaasti. Nykypäivänä tieto on siiloissa, mikä estää yksilöitä ja muita ekosysteemitomijoita hyödyntämästä henkilötiedon arvoa täysimääräisesti.

Tämä tutkimus kontribuoi akateemiseen keskusteluun täyttämällä aukon tutkimuksessa liittyen ymmärryksen lisäämiseen digitaalisten alustaoperaattoreiden liiketoimintamalli-innovaatiosta näkökulmasta henkilötieto resurssina. Tämän tutkimuksen tarkoituksena on tutkia ja ymmärtää digitaalisten alustaoperaattoreiden liiketoimintamalli-innovaatiota terveyspalvelukosysteemin kontekstissa. Lisäksi tässä tutkimuksessa tarkastellaan digitaalisten alustaoperaattoreiden liiketoimintamalli-innovaatiota henkilötietojen hallintaan liittyvän ihmiskeskeisen lähestymistavan kautta, mikä tarkoittaa, että yksilöille tarjotaan keinot hallita, päästä käsiksi ja jakaa henkilötietojaan.

Tässä tutkimuksessa käytetään tutkimusmetodologiana samanaikaista kvalitatiivista yhdistelmämenetelmää ja tutkimus hyödyntää semistrukturoituja haastatteluja tiedonkeruun pääkomponenttina. Tutkimuksen tulokset ovat: 1) se esittää käsitteellisen viitekehyksen digitaalisen alustaoperaattorin liiketoimintamalli-innovaatiolle terveyspalvelukosysteemissä näkökulmasta henkilötieto resurssina; 2) se tuo palvelualustojen, arvon yhteisluonnin ja palvelukosysteemien palvelumarkkinoinnin keskusteluun soveltamalla teoreettisia käsitteitä tutkimusongelman ymmärtämiseen kvalitatiivisessa tutkimuksessa; ja 3) se tuo näkemyksiä siitä, miten toimijat voivat lähestyä digitaalisen alustaoperaattorin liiketoimintamalli-innovaatiota ja pohtia tulevaisuuden rooleja ja mahdollisuuksia terveyspalvelukosysteemissä henkilötiedon näkökulmasta.

Asiasanat: alustaoperaattori, henkilötieto, henkilötietojen hallinta, liiketoimintamalli-innovaatio, terveyspalvelukosysteemi

For my family, here and in heaven

Acknowledgements

My journey towards this dissertation has been a true learning experience with its share of ups and downs. The journey has also be longer than I initially anticipated. I undertook the final stretch of writing this dissertation while simultaneously working in the industry. There were times when I momentarily forgot about the dissertation, only to remember it again later. However, one day while taking a walk outdoors with my husband, I made a firm decision to complete the dissertation. It has been one of the best decisions and personal promises that I have made.

Throughout this journey, I have learned, among many other things, resilience, the ability to focus on the key things and the skill to comprehend complex topics and connect the dots, ultimately presenting them in an understandable manner. I am grateful for the opportunity to challenge myself during the process of writing the dissertation and learn from others. Without the support of many of you, it would not have been the same, or even possible.

Firstly, I express my gratitude to my supervisors, Associate Professor Timo Koivumäki and Professor Minna Pikkarainen, for your guidance throughout the entire process and your valuable feedback on the manuscript. I would also like to extend special thanks to Professor Veikko Seppänen and my doctoral follow-up group, Professor Petri Ahokangas and Dr. Kaisa Still, for your support, particularly during the early stages of my journey. I am also grateful to my co-authors and to my colleagues from Martti Ahtisaari Institute for the insightful discussions and conference trips.

I want to express my deepest gratitude to my family, including my parents, grandparents, sister, brother, and parents-in-law, as well as my friends. To my late mom, you are dearly missed. To my dear husband Toni, for always supporting me in everything I do and for encouraging me to complete the dissertation. To my soon-to-be-born daughter, we are filled with excitement to meet you and hold you in our arms soon. Already today, you have taught me and reminded me of what truly matters in life.

With an open heart and mind, I am eagerly looking forward to seeing and experiencing the journeys life brings next.

Helsinki, March 2024

Laura Ristolainen

List of abbreviations

i.e. id est
e.g. exempli gratia

List of original publications

In the summary, references are cited by their Roman numerals:

- I Kempainen, L.*, Koivumäki, T., Pikkarainen, M., & Poikola, A. (2018). Emerging Revenue Models for Personal Data Platform Operators: When Individuals are in Control of Their Data. *Journal of Business Models*, 6(3), 79–105. <https://doi.org/10.5278/ojs.jbm.v6i3.2053>.
- II Kempainen, L.*, Pikkarainen, M., Hurmelinna-Laukkanen, P., & Reponen, J. (2019). Connected Health Innovation: Data Access Challenges in the Interface of AI Companies and Hospitals. *Technology Innovation Management Review*, 9(12), 43–55. <https://doi.org/10.22215/timreview/1291>.
- III Pikkarainen, M., Kempainen, L.*, Xu, Y., Jansson, M., Ahokangas, P., Koivumäki, T., Hong Gu, H., & Francis Gomes, J. (2022). Resource Integration Capabilities to Enable Platform Complementarity in Healthcare Service Ecosystem Co-creation. *Baltic Journal of Management*, 17(5), 688–704. <https://doi.org/10.1108/BJM-11-2021-0436>.
- IV Kempainen, L.*, Pikkarainen, M., Koivumäki, T., & Xu, Y. (2022). Drivers for Platform Business Model Innovation: Individuals in Control over Their Personal Data. *Journal of Innovation Management*, 10(3), 46–74. https://doi.org/10.24840/2183-0606_010.003_0003.

*=Ristolainen, L. née Kempainen, L.

Contribution of the author to the publications

Article I: Emerging Revenue Models for Personal Data Platform Operators: When Individuals are in Control of Their Data

As the first author of Article I, I conducted the literature review, analyzed the data collected by the European Commission, and wrote the results and discussion part of the article.

Article II: Connected Health Innovation: Data Access Challenges in the Interface of AI Companies and Hospitals

As the first author of Article II, I was responsible for creating the conceptual framework and synthesis of the empirical findings. I participated in designing and conducting the qualitative data collection and wrote the results partly in collaboration with the co-authors.

Article III: Resource integration capabilities to enable platform complementarity in healthcare service ecosystem co-creation

As the second author of Article III, I conducted the study jointly with the co-authors. I collected data for the article and created the theoretical framework. In addition, I played a key role in putting together the theoretical part of the article.

Article IV: Drivers for platform business model innovation: Individuals in control over their personal data

As the first author of Article IV, I wrote the literature review, designed and conducted the data collection and analysis, and wrote the key findings of the study.

Contents

Abstract	
Tiivistelmä	
Acknowledgements	9
List of abbreviations	11
List of original publications	13
Contents	15
1 Introduction	17
1.1 Purpose of the research	21
1.2 The research objectives and gaps	22
1.3 The research questions	25
1.4 Overview of the research	26
2 Health service ecosystem	27
2.1 Health service ecosystem as a context of this study	27
2.2 Personal data as a resource in a health service ecosystem	29
3 Theoretical foundation	35
3.1 Digital platform operators' business model innovation.....	35
3.2 Digital platform operators creating and capturing value.....	37
4 Research design	43
4.1 Research approach	43
4.2 Mixed method as the research methodology and the process of the study	43
4.3 Data collection and data analysis	47
5 Overview of the papers	49
5.1 Paper I: Emerging Revenue Models for Personal Data Platform Operators: When Individuals are in Control of Their Data	49
5.2 Paper II: Connected Health Innovation: Data Access Challenges in the Interface of AI Companies and Hospitals	49
5.3 Paper III: Resource Integration Capabilities to Enable Platform Complementarity in Healthcare Service Ecosystem Co-creation	50
5.4 Paper IV: Drivers for Platform Business Model Innovation: Individuals in Control over Their Personal Data.....	50
6 Research results and discussion	51
6.1 The results and contributions of the research papers	51
6.2 Theoretical findings and contributions.....	53
6.3 Managerial implications.....	59

6.4 Research assessment, limitations, and suggestions for future studies.....	61
List of references	65
Original publications	79

1 Introduction

The business environment is in constant change (Dogan, 2017). As a response to change in the business or technology environment, companies evolve by engaging in digital innovation and transforming their organization (Skog, 2019). Using new digital technologies triggers disruption and strategic responses from companies to create value in a new way (Vial, 2019). As drivers of the digital transformation, new technologies, as well as the increased amount and availability of real-time data captured, for example, in devices and wearables by individuals (Hermes et al. 2020), have enabled companies to innovate new business models and thus in how value is created and captured (Miklosik & Evans, 2020; Vaska et al. 2021), through digital platforms (Täuscher & Laudien, 2018). It can be said that data has become an important and transformative part of business models (Fruhwith et al., 2020b). The advances in information technology as well as the evolving customer expectations challenge the companies to evolve their business models to digital platform business models where leveraging the data such as purchase history or preferences plays a key role (Hänninen et al., 2018).

In the early 2010s, the literature heralded platform business models as the winning business models (Casadesus-Masanell & Ricart, 2011; Osterwalder & Pigneur, 2010). In such business models, data has played a crucial role, without the data subjects—the individuals—explicitly realizing it (Martin, 2015). The recent literature has identified a need to consider how personal data is utilized and collected in digital platform operators' business model. (Trabucchi et al., 2023; Fruhwirth et al., 2020a)

This research explores digital platform operators' business model innovation from the perspective of personal data as a focal resource. As business model innovation itself is not directly observable (Foss & Saebi, 2018), in this study, business model innovation is defined through the activities of the digital platform operator creating and capturing value in a new way (Clauss et al., 2020; Foss & Saebi, 2018; Fehrer et al., 2018). It can be argued that a new way, or change, in a business model happens when the core elements of the business model, value creation, value capture, or value proposition change incrementally (Kraus et al., 2022), and this triggers a need for a company to change the prevailing business model to a new one, in which a prevailing business model refers to the traditional and existing business model that has been applied in established companies and has proved successful (Şimşek et al., 2022). For example, only stating a new name or focus areas for the business, like Facebook changing its name to Meta and

presenting a new company focus on the metaverse in 2021, is not considered sufficient to be called business model innovation (Kraus et al., 2022).

Grounded in the marketing logic of service-dominant logic (see Vargo & Lusch, 2004), in this study, a digital platform operator is defined as a provider of a service platform that facilitates the interaction of actors and resources in a service ecosystem (Lusch & Nambisan, 2015). This study is conducted in the context of the health service ecosystem, which refers to resource-integrating actors connected by mutual value creation (value co-creation), enabled by a service platform provider (Lusch & Nambisan, 2015)—thus, a digital platform operator. The unit of analysis of this study is digital platform operators' business model innovation. The purpose of this study is to fill the research gaps discussed in the next chapter by increasing theoretical and practical understanding of how digital platform operators can create and capture value in the context of the health service ecosystem. The study contributes to the existing literature within service marketing and business model innovation as follows. First, this research adds to the service marketing discussion of service platforms, value co-creation, and service ecosystems (see Lusch & Nambisan, 2015) by applying the theoretical concepts for to gain more understanding of the research problem in a qualitative study. Second, this research contributes to the innovation management literature by adding to the discussion of digital platform operators' business model innovation (see Clauss et al., 2020; Foss & Saebi, 2018; Fehrer et al., 2018) from the perspective of personal data as a resource (see Beirão et al., 2017). This study takes a focused approach to value creation and value capture in digital platform operators' business model innovation (see Fehrer et al., 2018) and increases knowledge about the use of personal data as a focal resource in business model innovation in the context of the health service ecosystem (see Engel & Ebel, 2019; Huhtala, 2018).

In the multidisciplinary literature, “a digital platform” refers to an online marketplace or environment that connects ecosystem actors such as individuals and service providers and helps create value for both sides of the platform (see Saxena et al., 2020; Ciasullo et al., 2018, Almunawar et al., 2022, Kim, 2016). Meanwhile, a digital platform operator (also called a platform owner or platform provider) is used by a company that acts as an intermediary that connects two users or groups of users and enables their direct interaction (Zhu & Furr, 2016; Trabucchi & Baganza, 2019). It has been argued that examining the digital platform operator, not the platform itself, helps understand value creation as something that is determined by the digital platform operator (Saarikko, 2015). For example, Airbnb

is a digital platform operator that enables individuals to book apartments, and this is done through their technology, the digital platform (Almunawar et al., 2022).

Recent studies have explored digital platform operators from the perspective of resources (see Zeng et al., 2021, Toscher, 2021). From the resource perspective, digital platform operators can play at least three different roles in an ecosystem, namely, 1) updating their own resources; 2) collecting and analyzing significant volumes of data drawn from the ecosystem and enable the value creation of the involved parties; and 3) creating value in the ecosystem through resource coordination by mobilizing, accessing, and coordinating the ecosystem resources to create new market opportunities (Zeng et al., 2021). It is argued that the latter role adopted by a digital platform operator, thus coordinating the unconnected resources to enable the mix and match of the resource combinations, results in diverse interactions among the other actors in the ecosystem to which they belong and provides opportunities for new business models and solutions to emerge. From this perspective, digital platform operators' value creation can be achieved through purposeful interactions with external resources (Zeng et al., 2021). Continuing with the example of Airbnb, by connecting the apartment owners with travelers looking for apartments, the digital platform operator enables the changes in the roles the individuals can play and furthermore enables new resources to be integrated within the ecosystem (from hotels to private apartments) (Koskela-Huotari et al., 2016). From the perspective of personal data as a resource, digital platform operators may create value from data that they gather themselves in the service or involve other ecosystem actors to leverage the data (Trabucchi & Buganza, 2019). Applying the service-dominant logic, personal data becomes a resource when it is deployed for a specific activity, and value is derived (Gummesson & Mele, 2010; Löbler, 2013).

In previous service marketing studies, applying a service ecosystem perspective has been found helpful in the healthcare context, for example, to increase understanding of healthcare systems in which actors collaborate and apply resources to co-create value (see Brodie et al., 2021), increase understanding of institutions enabling or constraining customer-centricity, value co-creation (see Pop et al., 2018) and the nature and dynamics of value co-creation in the service ecosystem (see Beirão et al., 2017), analyze service design activities in health services (see Vaz & Araujo, 2023), and contextualize new concepts in the service ecosystem literature with the example of the healthcare context (see Vink et al., 2021). Taking an ecosystem view as the context enables the focus to be transferred from individual actors to their relationships and the value creation of the whole (healthcare) system (Laihonen, 2012).

In this study, value co-creation refers to mutual value created by various actors (such as the service provider and customer) through resource integration. (Lusch & Nambisan, 2015). Furthermore, value creation and value capture are the key perspectives for business model innovation (Massa et al., 2017; Climent & Haftor, 2021), where value capture refers to gaining of monetary benefits in exchange for value through the variety of revenue models (Richardson, 2008; van Putten & Schief, 2012), and value creation to facilitating access to resources that are owned by different value co-creating actors (Amit & Han, 2017). Revenue models refer to one or multiple fees requested from the stakeholders (Shafer et al., 2005; Brunn et al., 2002).

The emergence of platform businesses (see Zutshi & Grilo, 2019; Rangaswamy et al., 2020) and the growing importance of access to data (Pikkarainen et al., 2019) in innovating in healthcare has created a need to find new ways of creating and capturing value with personal data (see Gregory et al., 2021; Pikkarainen et al., 2019). This research is expected to increase knowledge about how digital platform operators can create and capture value in a health service ecosystem that consists of resource (data) integrating actors such as individuals, service providers, and digital platform operators (Gleiss et al., 2021). Furthermore, in this study, digital platform operators' business model innovation is explored through a human-centered approach to personal data management (see de Montjoye et al., 2012; Wang & Wang, 2014; Vescovi et al., 2015; Huhtala et al., 2019; Lehtiniemi & Ruckenstein, 2018; Kariotis et al., 2020), which refers to providing individuals with the means to control, access, and share their personal data in the health service ecosystem, for example, with firms or organizations of their choice (Poikola et al., 2015, Vescovi et al., 2015; Spiekermann & Novotny, 2015; Lehtiniemi & Ruckenstein, 2018). The aim of a human-centered approach to personal data is to enable individuals to become more active in using their personal data as a resource in the ecosystem (Lehtiniemi & Ruckenstein, 2018; Vescovi et al., 2014).

The choices made in this thesis are in line with the shift in thinking about value in the service marketing literature, thus moving from sequential value creation to a business logic that emphasizes the customer's active role in value co-creation (see Vargo & Lusch, 2004; Grönroos, 2006; Heinonen et al., 2010).

To address the objectives of a study, instead of strictly adopting only one method, qualitative researchers increasingly combine different methods such as data collection, processes, and principles from two or more methodologies in research studies (Lal & Suto, 2012). This study is conducted using a simultaneous mixed method (Morse, 2010). In line with some earlier studies, to allow the

generation of rich data to answer the research question (see Kyrousi et al., 2022; Singh & Pathak, 2020), in this study, a research design encompassing a qualitative approach was implemented. Semi-structured interviews form the core component of the data collection, supplemented by data from a qualitative open-ended questionnaire, observations, workshops, and meeting notes.

The key results are related to the key findings of this qualitative study that build on the current understanding and literature about how digital platform operators can create and capture value: (1) adopting a human-centered approach to personal data management is seen as an opportunity to create and capture value in a new way in health service ecosystems by digital platform operators; (2) data access challenges among the ecosystem actors exist at multiple levels and call for an orchestrator in a health service ecosystem; and (3) enabling resource integration through complementarity enables value co-creation in the health service ecosystem from the perspective of personal data as a resource.

For practitioners, this study provides several implications, including a conceptual framework to build an understanding of digital platform operators' business model innovation in a health service ecosystem from the perspective of personal data as a focal resource. This study's findings also provide practitioners with an opportunity to reflect on their role in their health service ecosystem, who the other actors in the health service ecosystem are, and how they can individually and together enable a bigger impact by taking measures to enable the flow of personal data for mutual value.

This study's contribution from a theoretical perspective is to propose a conceptual framework of digital platform operators' business model innovation from the perspective of personal data as a resource in a health service ecosystem. In the following chapters, the purpose of the research, research questions, theoretical research objectives, and results and implications of this research are discussed.

1.1 Purpose of the research

The main purpose of this research is to explore and understand digital platform operators' business model innovation in the context of health service ecosystem. The unit of analysis is digital platform operators' business model innovation, and the context of this research is a health service ecosystem. Furthermore, in this study, digital platform operators' business model innovation is explored through a human-centered approach to personal data management, which refers to providing

individuals with the means to control, access, and share their personal data in the health service ecosystem (Lehtiniemi & Ruckenstein, 2018; Kariotis et al., 2020).

1.2 The research objectives and gaps

This research's main theoretical objective is to increase understanding and contribute to the academic discussion of digital platform operators' business model innovation and personal data as a resource in the context of a health service ecosystem. The main empirical objective of this study is to identify and explore the existing digital platform operators' business model innovation through the activities of value creation and value capture in a health service ecosystem from the perspective of personal data as a resource. This chapter discusses the previous research on digital platform operators' business model innovation and personal data as a resource. Finally, the research gap and contribution of this study are summarized.

The recent literature on digital platform operator business models in the marketing field includes studies from the perspective of platform business model logic (see Fehrer et al., 2018), the value co-creation of a large e-commerce platform (Yao & Miao, 2021), and the design factors for digital service platforms to enable value co-creation in service ecosystems (Fischer et al., 2020). In addition, the recent literature on platform business models in the management field includes the platform business model innovation of a global technology company (Şimşek et al., 2022), how large GAFAM (Google, Apple, Amazon, and Microsoft) digital platform operators introduce new value-creating roles and mechanisms in healthcare (Gleiss et al. 2021), and a study of customer perception of the value of platform business models (Clauss et al., 2019), and how platform business models evolve in the context of competition (Zhao et al., 2020). Nevertheless, a focused approach to value creation and capture in digital platform operators' business models has remained absent in the service marketing literature (Fehrer et al., 2018). Furthermore, in a structured literature review of peer-reviewed journals from 2014 to 2020, it was found that although the technological advances in today's world have impacted value creation and capture in almost every industry, business model innovation remains a new field of research (Vaska et al., 2021). Although some empirical papers have studied digital platforms operators through value creation activities (see Fu et al., 2017) and resource integration activities (see Kullak et al., 2021), little extant research exists about digital platform operators' business model innovation, thus how digital platform operators transform business models and thus

how value can be created and captured in today's digitalized world, where data and new technologies such as artificial intelligence are increasingly applied (Veile et al., 2022), especially by small and medium-sized companies (Pucihar et al., 2019) and in the context of healthcare, which has been slow to adapt to new technologies and practices but is increasingly seeing fundamental digital transformation for example because of the Covid-19 pandemic (Gleiss et al., 2021).

Regarding the use or role of data as a resource in digital platform operators' business models, the previous academic discussion is based on the perspectives of big data and business analytics (see Ajah & Nweke, 2019), a blockchain-based solution (see Truong et al., 2019), or focuses on privacy discussions (see Weber, 2015), for example. Overall, data has become an important and transformative part of business models (Fruhwith et al., 2020b). Gartner's online survey found that customer data and analytics, and therefore an understanding of the customer's needs and expectations through their data, were the priority for achieving customer service and support goals in 2023 (Gartner, 2023). Data-driven business model innovation (a company adopts a new approach to use data to deliver value) (Fruhwith et al., 2020b) has been studied from various perspectives such as tools and methods to support data-driven business model innovation (Fruhwith et al., 2020b), employees, (Förster et al., 2022), data as a key resource for service innovation and the required organizational capabilities (Schymanietz et al., 2022), and the barriers to data-driven business model innovation (Mosig et al., 2021). In the previous research, data-driven business model innovation has been explained by the focus on the company to realize value from data with the business model (Förster et al., 2022) through the process of collecting, organizing, and summarizing external or internal data with the goal of identifying consumer needs or improving the company's capability to recommend products to the consumer (Sorescu, 2017). The extant literature lacks studies of data as the focal resource on digital platforms and viewing data as a (boundary) resource (Otto & Jarke, 2019) through which ecosystem actors can create relationships and interact in co-creating value (Eaton et al., 2015).

To summarize, recent business model research calls for further research to identify new data-driven and digitally enabled business model innovation (Nielsen & Aagaard, 2021) by taking a focused approach to value creation and value capture in digital platform operators' business model innovation (see Fehrer et al., 2018). In addition, there is a need to extend the knowledge of personal data as a focal resource in business models and in service ecosystems (Engel and Ebel, 2019; Huhtala, 2018).

This study is distinguished from previous studies by its empirical focus. Given the above research gaps, this research contributes to the academic discussion in two ways. First, this research increases the understanding of business model innovation of digital platform operators through the activities of creating and capturing value in a new way (Clauss et al., 2020; Foss & Saebi, 2018; Fehrer et al., 2018). Second, this research extends knowledge about personal data as a resource in digital platform operators' business model innovation in adopting a human-centered approach to personal data management (Engel & Ebel, 2019; Huhtala, 2018) by focusing on small and medium-sized digital platform operators (Pucihar et al., 2019) that can be seen as competing for large prevailing digital platform providers today from the perspective of personal data as a resource – an identified area for further research exploration (Gleiss et al., 2021).

Figure 1 illustrates the theoretical basis of this thesis, which is derived from the field of service marketing and innovation management, and more specifically, the literature on digital platform operators' business model innovation, and personal data as a resource and health service ecosystem. In Figure 1, value is where the three concepts meet. Through the lenses of service-dominant logic, value emerges in use rather than in exchange, the roles of the ecosystem actors (such as producer and consumer) are not distinct, and the value is co-created in an interaction among the ecosystem actors through resource integration (Vargo et al., 2008). Examining this through the key concepts of this study, digital platform operators' business model innovation is explored through the activities of a digital platform operator creating and capturing of value in a new way (Clauss et al., 2020; Foss & Saebi, 2018; Fehrer et al., 2018). A digital platform operator facilitates the interaction of actors and resources in a health service ecosystem (Lusch & Nambisan, 2015), where value is co-created (Vargo & Lusch, 2016; Vink et al., 2021) by the service provider and the service beneficiary (customer) through resource (data) integration (Lusch & Nambisan, 2015). The value of using data as a resource is determined by digital platform operators' and other health ecosystem actors' ability to make the resource available at the right time for the specific purpose in a health service ecosystem (Storbacka et al., 2012) for the benefit of another actor or the actor itself (Vargo & Lusch, 2004). The intersection of (business model) innovation, value, and resources is where a common understanding remains lacking (Schymanietz et al., 2022). This study brings these concepts together to answer the research question in the context of a health service ecosystem from the perspective of personal data as a resource. The theoretical concepts will be further discussed in the next chapters.

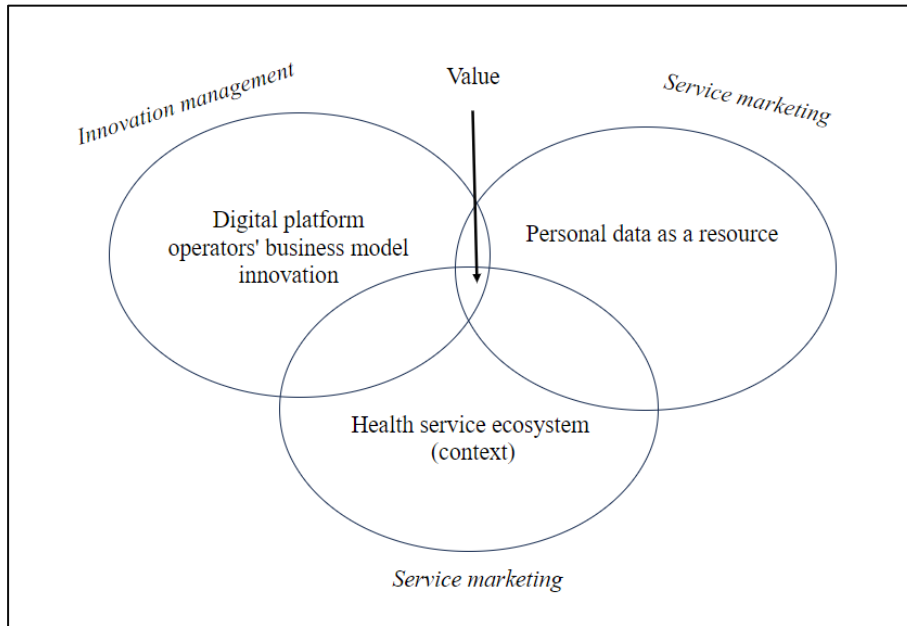


Fig. 1. Theoretical perspectives for exploring and understanding the business model innovation of digital platform operators in the context of a health service ecosystem from the perspective of personal data as a resource.

1.3 The research questions

The purpose of this study is to explore and understand digital platform operators' business model innovation in the context of a health service ecosystem. Business model innovation refers to the new value creation and value capture activities of a digital platform operator (Clauss et al., 2020; Foss & Saebi, 2018; Fehrer et al., 2018). The research problem leads to the main research question:

How can value be created and captured by digital platform operators in the context of a health service ecosystem?

The main research question is divided into four sub-research questions that together answer the main research question. Each article answers one research question:

Sub-question 1 (Paper I): *“How does a digital platform operator capture value with revenue models?”* There is a need to gain more understanding of the emerging

revenue models for digital platform operators. The first sub-question contributes to the main research question by identifying how digital platform operators capture value. The research also sheds light on the propositions as the foundation for digital platform operators' revenue model creation.

Sub-question 2 (Paper II): *“What are the challenges and solutions for access to data for innovation?”* The second research question explores the challenges and potential solutions regarding data access for innovation. Although the challenge associated with data access has been acknowledged, there is a lack of understanding of the precise nature and various dimensions of the challenge. This gap in innovation management research is addressed in sub-question 2.

Sub-question 3 (Paper III): *“What is meant by resource complementarity from a healthcare technology platform provider's perspective, and what are the capabilities needed when enabling resource complementarity?”* The third research question addresses the need for resource complementarity to create value in the health service ecosystem. The current research lacks a holistic understanding of what resource capabilities are needed to enable resource complementarity when co-creating data-driven services in a health service ecosystem. This gap in research is addressed in sub-question 3.

Sub-question 4 (Paper IV): *“What are the drivers of digital platform operators' business model innovation?”* The fourth research question sheds light on the drivers of digital platform operators' business model innovation. It also answers the need for a better understanding of how business model innovation is driven by internal and external drivers.

For consistency, the sub-questions in this thesis are condensed and presented consistently and more clearly. However, they still include the essence of the individual papers' research questions.

1.4 Overview of the research

This research consists of three sections. The first section addresses the context and background of the research, and the second part introduces the key theoretical concepts and research methodology. Finally, the third section explains the research results and managerial contribution of this study.

2 Health service ecosystem

The literature review in this thesis is divided into two sections: the context; and the key theoretical concepts. This chapter presents the context of this study, a health service ecosystem, and personal data as a resource in a health service ecosystem.

2.1 Health service ecosystem as a context of this study

Healthcare is constantly changing (Wallin, 2017). An aging population and the increasing number of people experiencing complex healthcare needs challenge health systems and healthcare resources (Tynkkynen et al., 2022). To address the increasing needs and challenges in healthcare, health system reforms have been conducted in Finland, for example (Tynkkynen et al., 2022). Where digital transformation is concerned, however, healthcare has been slow to change compared with other industries (El Khatib et al., 2022), although in the spring of 2020, the Covid-19 pandemic expedited technological changes in the healthcare sector, with the inception of several innovation projects in collaboration with ecosystem actors (Liu et al., 2022). The “Finnish health sector growth and competitiveness vision 2030” report conducted by Sitra, the Finnish Innovation Fund, argued that an open-minded approach to new technologies and data, for example, through personalized data-driven services, was the key to succeeding in such healthcare reforms and ensuring the availability of healthcare resources (Lehto & Malkanmäki, 2023). In Finland’s healthcare system, electronic patient records are currently extensively used in the public and private sectors. However, due to the system’s decentralized nature, the information interoperability is often lacking (Keskimäki et al., 2019). In the vision for Finland’s healthcare for 2030, the value of health data is being unleashed through data-driven decision making that is a result of the seamless sharing of data collected from multiple sources such as registers and the individuals themselves (Lehto & Malkanmäki, 2023). Patient data collected by patients themselves is becoming increasingly important in healthcare due to its increasing availability with the use of smart watches and health applications that collect data from the individual. Through the applications, individuals can easily share their real-time data with their doctor to support their care (Amagai et al., 2022).

It has been argued that due to the complexity that arises from the interconnectedness of actors, health systems are being transformed into health ecosystems—which can also be used as a context for analyzing healthcare at the

system level (Laihonen, 2012). Taking an ecosystem view as the context of a study enables the focus to be transferred from individual actors to their relationships and the value creation of the whole (healthcare) system in providing effective service (Laihonen, 2012). The actors in a health service ecosystem may include healthcare providers, individuals (or patients), insurers, a health technology platform or solution providers, and digital platform providers that can facilitate interaction among the actors (Gleiss et al., 2021). In the context of a health service ecosystem, the value proposition describes the potential benefits of resource sharing among the actors (Frow et al., 2014).

The service ecosystem perspective emphasizes that value is co-created by multiple actors (Vargo & Lusch, 2016; Vink et al., 2021). Their recent conceptualization of service ecosystem design summarizes that the service ecosystem exists to enable mutual value creation through the process of exchanging applied resources among actors, and that value in the service ecosystem context means an emerging change in the wellbeing or viability of a particular actor or system and is determined by the actors in the service ecosystem (Vink et al., 2021). The wellbeing of the service ecosystem is characterized by purposeful and guided resource integration by actors, resulting in shared value co-creation to meet the shared goal or worldview (Frow et al., 2019). An example of such resource integration in healthcare is patient-centered care in a hospital, where a multidisciplinary team of nurses, clinicians, and other healthcare personnel focuses on providing patients with information and the opportunity to participate in their own care (Frow et al., 2019). As the Finnish healthcare in 2030 report envisions, collaboration and integrating complementary resources among public and private actors (such as hospitals and private companies) in the ecosystem is essential for the future development of the healthcare sector (Lehto & Malkanmäki, 2023). However, challenges in the collaboration in the health service ecosystem can emerge, for example, from the motivation of individual well-being of the actors instead of collective wellbeing (Mars et al., 2012) or different goals of the actors (Frow et al., 2019).

The recent marketing research in the context of healthcare has defined a health service ecosystem through the definition of Vargo and Lusch (2016: 10–11) as “a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange” (see Pop et al., 2018; Vink et al., 2021; Brodie et al., 2021). In the service innovation framework of Lusch and Nambisan (2015), a service ecosystem is defined along the same lines as (with differences in cursive) “a

relatively self-contained, self-adjusting system of *mostly loosely coupled social and economic* (resource integrating) actors connected by shared institutional *logics* and mutual value creation through service exchange” (Lusch & Nambisan 2015: 162). In line with definition applied in previous marketing research, albeit with the unit of analysis in digital platform operators’ business model innovation, in this study, a health service ecosystem refers to resource-integrating actors connected by mutual value creation (value co-creation) and enabled by a service platform provider, and thus a digital platform operator.

In this study’s research papers, the research problem has been studied in different sub-contexts, namely, human-centered personal data management (Paper I), a connected health network (Paper II), the healthcare service ecosystem (Paper III), and the personal data used in the healthcare sector (Paper IV). In this study, a health service ecosystem is used as an overall context that covers all the papers and their findings.

As personal data is a key resource for data-driven services and business models (see Schymanietz et al., 2022; Huhtala, 2018) and access to resources and making the right resources available in a context to create value (Storbacka et al., 2012) the sub-contexts of human-centered personal data management and personal data used in the healthcare sector are covered by the overall context of a health service ecosystem. The sub-context of a connected health network encompasses technology, information sharing and integration, proactive care, and integrated healthcare services (Burmaoglu et al., 2017). Connected health is a term used to refer to the connectedness of stakeholders through the timely sharing of information, in which services are designed around the needs of patients, and the patient receives care in the most proactive and efficient manner possible through the better use of data, devices, platforms, and people (Caulfield & Donnelly, 2013). In the context of a health service ecosystem and in the definition adopted in this study, all the mentioned elements are included: a health service ecosystem refers to resource-integrating actors (*people, information sharing, and integration*) connected through mutual value creation (value co-creation) (*services*), enabled by a service platform provider, and thus a digital platform operator (*technology*).

2.2 Personal data as a resource in a health service ecosystem

According to Storbacka et al. (2012), resources are the foundation of co-creation. Furthermore, access to resources is a crucial element of the service ecosystem as well as making the right resources available at the right time for the specific

purpose in the context of creating value (Storbacka et al., 2012). Maximum resource density, thus facilitating easy access to appropriate resources or bundles of resources can be achieved when an actor integrates all the resources necessary for co-creating value (Lusch et al., 2010; Lusch & Nambisan, 2015).

Resources can be knowledge, technology, and institutions (Srivastava & Shainesh, 2015), or financial, physical, legal, human, organizational, informational, or relational (Hunt et al., 2006; Gummesson & Mele, 2010). In the recent service marketing research, data has been considered a key resource for data-driven services and business models (see Schymanietz et al., 2022; Huhtala, 2018). Studies concerning data as a resource have focused for example on integrating healthcare data for the benefit of stakeholders (see Beirão et al., 2017), the potential of customer data in retailing (see Saarijärvi et al., 2016), and the use of personal data to advance a preventive healthcare service (see Huhtala, 2018). In this research, the focus is on personal data as a resource, as this is an increasingly available resource whose extensive use in the healthcare sector can be especially beneficial (Huhtala, 2018).

From the perspective of service-dominant logic, resources (something to draw on for support) can be further categorized as operant resources (resources capable of acting on other resources to create value, e.g., knowledge, skills) and operand resources (static resources that require some action to be performed on them before they can provide value) (Lusch & Vargo, 2014; 13). Personal data can be understood both as an operant and operand resource (Huhtala, 2022) or as a dynamic resource that is embedded in all levels of aggregation in a service ecosystem (Pekkala et al., 2023). In this study, personal data is considered as both an operant and operand resource. When personal data is seen as an operand resource, it plays a supportive or enabling role and requires action (Lusch & Nambisan, 2015) such as data analysis to be performed to provide value (Lim et al., 2018). On the other hand, as an operant resource, personal data itself can be used in value-creating acts (Lusch & Vargo, 2014; 13) such as the abilities to foster, direct, or support the use of other resources like money or skills and knowledge to develop data-based solutions to meet customers' needs (Chan et al., 2018). Personal data refers to any information that relates to an identified or identifiable individual (European Commission, 2024).

The actors in a service ecosystem can have different resources that serve in different ways and need integration to create value (Gummesson & Mele, 2010), or they have their own needs and interests (Makkonen and Komulainen, 2018), which calls for the incorporation of resources, and thus complementary in resource

integration (see Gummesson & Mele, 2010). Resource integration refers to the combining or bundling of resources with other resources for usefulness or value by actors in the service ecosystem (Lusch & Nambisan, 2015).

In today's business environment, data is siloed (Stevens et al., 2022; de Montjoye et al., 2012), and it is difficult for individuals to gain a holistic view of what data is collected, or fully exploit their personal data (Vescovi et al., 2015). Moreover, individuals are unaware of the monetary value or financial power of their data, meaning they cannot fully exploit the data themselves (Malgieri & Custers, 2018). For example, it has been argued that large platform providers collect and disclose their users' data to third parties that use the data for commercial and marketing purposes (Padilla et al., 2022).

Regarding access to data, in the innovation network literature, studies call for network orchestration (thus taking systematic and purposeful actions that focus on initiating and managing innovation processes with many stakeholders, thus creating and capturing value) (Dhanaraj & Parkhe, 2006). From this perspective, data access needs to be identified and solved through the collaboration of all the participating actors (Möller & Halinen, 2017). Data access challenges and solutions can lie at any level of data management such as data policies, data standards, data roles and responsibilities, data technologies, data requirements, data processes, data strategy, and data guidelines (Alhassan et al., 2018).

Furthermore, individuals are starting to express their need to have trust in how their sensitive health and wellness data is stored and managed in a health service ecosystem (Oshni Alvandi et al., 2021). In this vein, a human-centered approach to personal data management has been suggested (see de Montjoye et al., 2012; Wang and Wang, 2014; Vescovi et al., 2015; Huhtala et al., 2019), which refers to providing individuals with the means to control, access, and share their personal data (Kariotis et al., 2020) and enabling individuals to become more active in using their personal data as a resource (Lehtiniemi & Ruckenstein, 2018).

The European Data Protection Supervisor (2024) considers digital platform operators as enablers that give individuals more control of their personal data, allow them to manage their personal data in secure, local, or online storage systems, and share it when and with whom they choose. They call for interaction among ecosystem actors such as advertisers with the digital platform operators if they plan to process individuals' data to enable new business models. A recent case study has identified the adoption of a human-centered approach to personal data management and using personal data as a resource as having an impact on the business model, including access to new resources and new sources of revenue (Huhtala et al., 2019).

In supporting a human-centered approach to personal data management, digital platform operators have been emerging on the market (see Spiekermann & Novotny, 2015; Vescovi et al., 2015; Krämer, 2021; Dong et al., 2010). Digital platform operators can offer a dashboard for individuals to monitor and control the flow of their personal data and ultimately empower them to participate in the larger ecosystem with their personal data as a resource (Krämer, 2021). Digital platform operators therefore can enable individuals to move from passive to empowered actors by providing individuals with control of their health and wellbeing and enabling them to connect with others in the ecosystem (Oshni Alvandi et al., 2021).

The emerging shift to a human-centered approach and a new market of data has been supported by legal means such as the European General Data Protection Regulation (GDPR) (European Commission, 2015), which came into effect in 2018 and set rules for better data portability between platforms and increase individuals' rights to control of their personal data. As the Guardian explained in 2018, the GDPR strengthens the rights of individuals to know what data the company has collected about them and ask for access to their personal data. As a result, large platform providers like Facebook and Apple updated their websites to inform their customers, presenting tools for people to be in more control of their data (Hern, 2018). The GDPR also gives individuals in the European Union the right to port (share) their personal data between service providers (Krämer, 2021). It has been argued that enabling the sharing of personal data in real time with a chosen service provider will be necessary to empower individuals with the support of digital platform operators (Krämer, 2021).

Since 2018, GDPR has greatly impacted the legal framework of data-driven business models in Europe and the companies operating in it (Ziegler et al., p. 201). It is argued that due to the new legislation, data-driven business models should be designed with individuals, or data subjects, at the center of the business model to enable the rights and control of the individuals of their data, including the right to transfer data to third parties (Ziegler et al., 2019, p. 221).

A study exploring individuals' willingness to share their personal data argues that the GDPR has impacted the data-sharing behavior of individuals, and they are willing to share their data about consumption, purchases, values, beliefs, and health (Karampela et al., 2019). However, wealth is a piece of information that individuals are reluctant to share according to the study. One explanation provided by the authors is that individuals are willing to share personal data if they can see the benefit of the sharing for themselves (Karampela et al., 2019).

In this vein, large platform providers such as Microsoft, Amazon, Google, and Apple are entering healthcare (Hermes et al., 2020) and enabling the collection and use of different type of data by digitizing and improving medical records (Microsoft), analyzing the user's voice through speech and calculating body fat (Amazon), helping clinicians organize patient data (Google), and measuring blood oxygen levels with an Apple Watch (Apple), for example (Akhtar, 2021). A large amount of data exists, is documented, and stored in healthcare. However, in daily life, the data is not currently combined, analyzed, or made available at a large scale for professionals, individuals, research institutions, or companies for secondary use (Wang et al., 2023). For new digital platform operators to enter the market, it has been suggested that new entrants need to develop significant medical and technical skills to find areas that are not immediately dominated by the large companies (Hermes et al., 2020). For example, Apple has a significant competitive advantage in the market due to the existing control of health data collected by individuals with their products and services (Hermes et al., 2020).

In this study, we take a service-dominant logic perspective on resources; personal data as a resource becomes a resource when it is deployed for a specific activity and value is derived (Gummesson & Mele, 2010; Löbner, 2013). Resources cannot be owned or controlled by a single actor, but they are influenced by multiple actors through service intermediaries (Rindfleisch & Moorman, 2001; Chandler & Vargo, 2011) like digital platform operators. The value of using data as a resource can be seen through digital platform operators' and other health ecosystem actors' ability to make the resource available at the right time for the specific purpose in a health service ecosystem (Storbacka et al., 2012) for the benefit of another actor or the actor itself (Vargo & Lusch, 2004).

3 Theoretical foundation

This chapter presents the relevant theoretical concepts that lay the foundation for this study.

3.1 Digital platform operators' business model innovation

The business model has been the focus of many research in recent years (see Shafer et al., 2005; Voelpel et al., 2004; Nielsen & Aagaard, 2021; Thornton, 2024). For example, business models can play a powerful role in a company, answering the questions of who the customer is, what the customer value does, and how the company captures value (Shafer et al., 2005). The business model is also characterized as a story that is told to customers and transformed into revenue (Magretta, 2002). Like stories, business models are not static, but changing technologies and changes in the market can dramatically change business models over time (de Reuver, Bouwman, & MacInnes, 2009; Nielsen & Aagaard, 2021).

The business model is a multidisciplinary topic (Pateli & Giaglis, 2004). Business models have been discussed in the field of business, strategy, and information systems (see Pateli & Giaglis, 2004; Al-Debei & Avison, 2010), and in the early twenty-first century, researchers from the field of information systems introduced topics like eBusiness models (see Gordijn & Akkermans, 2001; Osterwalder & Pigneur, 2002; Brousseau & Penard, 2007). Later, researchers in the field of information systems, marketing, and management discussed digital business models (see Veit et al., 2014; Brousseau & Penard, 2007; Ziegler et al., 2019) and platform business models (see Fehrer et al., 2018; Täuscher & Laudien, 2018; Zhao et al., 2020). In the literature, a business model can be considered digital if changes in technologies trigger the need to change how business is conducted and revenue generated (Veit et al., 2014).

Timmers (1998, p. 2) defines business models “for the internet era” as “an architecture of the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and a description of the sources of revenues.” Furthermore, business models can be divided into novelty- and efficiency-centered (Zott & Amit, 2007). According to the researchers, a novelty-centered business model refers to the conceptualization and adoption of new ways of conducting economic exchanges among actors by connecting previously unconnected actors, linking actors in new ways and designing new transaction

mechanisms. Questions companies can ask when designing a novelty-centered business model are “does the business model bring together new participants?” and “are the incentives offered to participants novel?” Efficiency-centered business models refer to the actions a firm may take to achieve transaction efficiency, for example, by enhancing transparency, thus reducing transaction costs and information asymmetry among other actors, and speeding up transactions. The questions to be asked can be “are the transactions transparent and verified?” and “does the business model enable participants to make informed decisions?” (Zott & Amit, 2007, p. 196).

Business models can be characterized as providing access to content (online newspapers), an exchange place for buyers and sellers of goods and services (the online marketplace), a structure for navigation (a search engine), and the prerequisites for the exchange of information (a network provider) (Wirtz et al., 2010). Companies have identified a need to transform traditional business models or develop new ones that better fit today’s market needs and exploit the opportunities technological innovations enable (Pateli & Giaglis, 2004). In the twenty-first century, the market has not been shaped by companies that create products but by platforms that connect producers and consumers like app developers and individual phone owners in the case of Apple’s App Store (Van Alstyne et al., 2016, p. 56). It can be said that the providers of these digital platforms, by acting as intermediaries that connect two or more actors and enable their interaction (Zhu & Furr, 2016), have transformed almost every market (de Reuver et al., 2017) by shifting from a product-based business model to a platform-based business model (Zhu & Furr, 2016). Accordingly, a business model should enable value co-creation opportunities for the firm and other ecosystem actors (Storbacka et al., 2012).

New business models have always been developed to remain competitive in a changing environment (Andries et al., 2006). Companies with a business model innovation may redefine how a service is provided to the customer (Markides, 2006) as a response to customers’ changing expectations (Pynnönen et al., 2012). Business model innovation, also called business model reinvention (de Reuver et al., 2009; Johnson et al., 2008) and business model change (Pateli & Giaglis, 2005) do not have to be disruptive, but they can simply generate a change in the value creation, value appropriation, or value of a firm and result in improvements in its value proposition (Sorescu, 2017). For an established firm, business model innovation can mean a new value proposition for customers (Souto, 2015) or the discovery of a fundamentally different business model in an existing business

(Markides, 2006, p. 20). On the other hand, for a firm just starting a business, business model innovation can mean creating value by challenging the existing business models and current industry roles (Aspara et al., 2010), for example, by adopting a new way of capturing value from stakeholders (Casadesus-Masanell & Zhu, 2013).

According to the literature, business model innovation is driven by the internal and external drivers in the market (Al-Debei & Avison, 2010), where drivers refer to the changes or needs to which a firm must respond with business model innovation (Foss & Saebi, 2017). The drivers can emerge in four categories, namely, (1) technology-related drivers (opportunities and risks), (2) market-related drivers (potential demand, expected benefits, and risks), (3) policy-related drivers, and (4) competition-related drivers (Zhang et al., 2017).

Value creation and value capture are the key perspectives for business model innovation (Massa et al., 2017; Climent & Haftor, 2021), where value capture refers to gaining monetary benefits in exchange of value through the variety of revenue models (Richardson, 2008; van Putten & Schief, 2012) and value creation refers to the facilitation of access to resources that are owned by different value co-creating actors (Amit & Han, 2017). In this thesis, the focus is on digital platform operators' business model innovation, which is defined through the activities of the digital platform operator creating and capturing value in a new way (Clauss et al., 2020; Foss & Saebi, 2018; Fehrer et al., 2018). The next chapter will discuss digital platform operators creating and capturing value.

3.2 Digital platform operators creating and capturing value

The previous research on business models has frequently been firm-centric (Storbacka et al., 2012). However, how value creation is seen has shifted from a product- and firm-centric view to seeing customers as informed, connected, empowered, and active actors that interact and co-create value with the firm (Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2004; Grönroos, 2006; Heinonen et al., 2010). The interactions between a customer and a firm create a market in which dialog, transparency, and access are central (Prahalad & Ramaswamy, 2004), and value is co-created (Grönroos & Helle, 2010). Around this idea, in marketing research, marketing logics have emerged, namely, the service-dominant logic (Vargo & Lusch, 2004), service logic (Grönroos, 2006, 2008), and customer-dominant logic (Heinonen et al., 2010). The key concepts that are applied in this thesis, namely, service platform, resource integration, value co-creation, and

service ecosystem are grounded in the service-dominant logic (Vargo & Lusch, 2004; Lusch & Nambisan, 2015) that can be applied in the research of business model innovation (Maglio & Spohrer, 2013). Value co-creation in this study refers to the mutual value created by various actors through resource integration (Lusch & Nambisan, 2015). With this approach, digital platform operators enhance the efficiency and effectiveness of the service exchange of these actors by facilitating easy access to resources (such as data) in the service ecosystem and enable value co-creation (Lusch & Nambisan, 2015; Frow et al., 2014). Through the lens of service-dominant logic, individuals or companies cannot create and capture value in isolation or have all the required resources to create or capture value (Vargo & Akaka, 2009). To ensure the flow of resources and value co-creation in the ecosystem, resource integration is needed, enabled by the digital platform operators (service platform providers) (Lusch & Nambisan, 2015), taking into consideration the fact that the resources shared in the ecosystem are the right resource combinations (i.e., resource complementarity) to create value (Harrison et al., 2001). In their conceptualization, Lusch and Nambisan (2015) emphasize the following: (1) innovation is a collaborative process that occurs in an actor-to-actor network; (2) service in an ecosystem is provided by applying specialized competences for the benefit of another actor or the actors themselves; (3) the amount of resources can be unleashed by service platform providers that enable resource liquefaction and resource density in the ecosystem; and (4) resource integration is the fundamental way of enabling innovation. Resource integration means combining or bundling resources with other resources for usefulness or value by actors in the service ecosystem, all of which are resource integrators (Lusch & Nambisan, 2015).

The revenue model is one of the most accepted elements of platform operators' business model components (Schweiger et al., 2016). It has been suggested that value capture must be operationalized so that it does not have a negative impact on stakeholders (Frow & Payne, 2011). However, due to companies shifting from a product-based to a service-based ideology, the revenue model is increasingly about finding new ways of generating recurring returns for the company instead of only selling a product or service (Iivari et al., 2016). An example of opportunities for value capture in healthcare is the offering of personalized prices for a service based on the use of real-time data captured by the individual's devices and wearables (Hermes et al., 2020). However, it is good to note that factors such as the format or cleanliness of the data from the different sources can pose challenges in fully

utilizing and combining the available data. While some information can be easily usable, some may require processing or interpretation (Earley, 2018).

When focusing on the value creation and value capture of digital platform operators, the traditional view (goods-dominant logic) of value creation has been that the firm creates value and distributes it to the market. Here the producer and consumer roles are distinct, and value co-creation occurs through the producer's activities (Vargo et al., 2008). Through the lenses of service-dominant logic, value emerges in use rather than in exchange, the roles of the ecosystem actors (such as producer and consumer) are not distinct, and value is co-created in an interaction among ecosystem actors through resource integration (Vargo et al., 2008).

The theoretical review creates the initial conceptual framework (Fig. 2). The four key elements of the conceptual framework of this study follow a recent model suggested for exploring value creation and value capture and has been developed by a systematic literature review covering the marketing, management, and strategy disciplines (Minerbo & Brito, 2022). The model provides a framework for exploring how value can be created, captured, and enabled. The components of the model are: (1) drivers of value creation, in this study, the *drivers of business model innovation*; (2) *value creation*; (3) the relationship characteristics that influence value creation and value capture, in this study, *resource complementarity* and *data access*; and finally, (4) *value capture*.

Based on the theoretical review, value creation and value capture are the key perspectives for digital platform operators' business model innovation (Massa et al., 2017; Climent & Haftor, 2021). Value capture refers to gaining monetary benefits in exchange of value through the variety of revenue models (Richardson, 2008; van Putten & Schief, 2012). Revenue models refer to one or multiple fees requested from the stakeholders (Shafer et al., 2005; Brunn et al. 2002). Value creation refers to the facilitation of access to resources that are owned by different value co-creating actors (Amit & Han, 2017). Business model innovation is driven by the internal and external drivers in the market (Al-Debei & Avison, 2010), where drivers refer to the changes or needs to which a digital platform operator must respond with a business model innovation (Foss & Saebi, 2017).

In this study, a digital platform operator is defined as a provider of a service platform that facilitates the interaction of actors and resources in a service ecosystem (Lusch & Nambisan, 2015). To understand how value can be created and captured by digital platform operators in the context of a health service ecosystem, based on the theoretical review, resource complementarity and data access are crucial when taking the perspective of personal data as a resource, and

more specifically when exploring digital platform operators' business model innovation through a human-centered approach to personal data management (see Kariotis et al., 2020). Data silos are a known challenge, especially in healthcare (Stevens et al., 2022; Rieke et al., 2020; Asimwe et al., 2021), limiting other services', individuals', or researchers' access to the data, whether it is siloed within organizations or outside health services in wearable devices, for example (Kariotis et al., 2020). Furthermore, data access challenges and solutions can lie at any level, ranging from technologies to data guidelines and policy (Alhassan et al., 2018). By adopting a human-centered approach to personal data management, a digital platform operator provides individuals with the means to control, access, and share their personal data with the firms or organizations of their choice (Lehtiniemi & Ruckenstein, 2018; Kariotis et al., 2020). Here, resource complementarity is needed to enable the ecosystem actors of the individuals' choice, such as companies and hospitals, to integrate their resources and to co-create value (Gummesson & Mele, 2010). The enabling of data access and resource integration in a complementary manner among ecosystem actors is presented with arrows in Figure 2. Within the arrows, value co-creation refers to the mutual value created by various actors (such as the service provider and customer) through resource integration (Lusch & Nambisan, 2015). Figure 2 also shows how the individual papers and sub-questions of this research contribute to and are positioned within the conceptual framework.

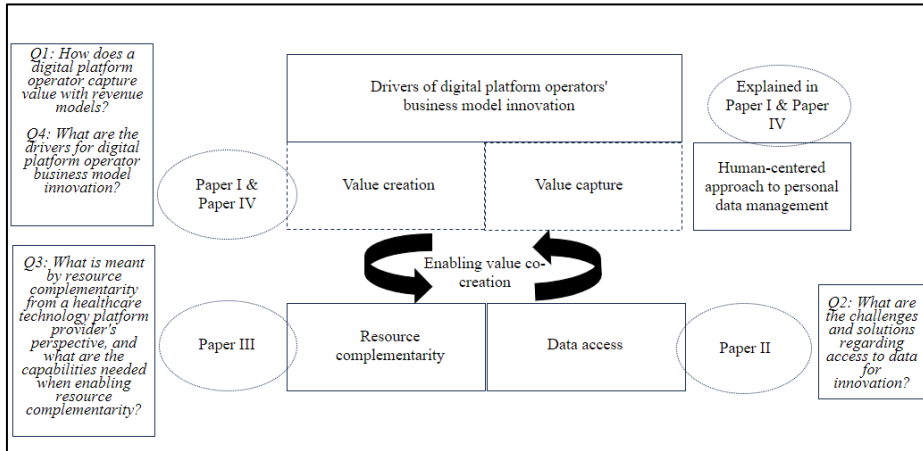


Fig. 2. Conceptual framework of the research: Digital platform operators' business model innovation in a health service ecosystem.

4 Research design

This chapter describes the study's research design. The first section provides the rationale for the research approach. This follows a chapter discussing the research process and the selected qualitative research methodology, and the final chapter opens up the data collection and data analysis.

4.1 Research approach

Ontology, epistemology, and methodology guide the researcher as basic beliefs and worldviews (Guba & Lincoln, 1994). This study adopts a constructivism paradigm which seeks understanding and reconstruction. Goodness of a study is judged by its trustworthiness, authenticity, and misapprehensions. When a constructivism paradigm is applied, the researcher is an orchestrator of the research process, and knowledge accumulates through the formation of informed and sophisticated constructions (Guba & Lincoln, 1994: pp. 112, 114). Constructivism paradigm requires a dialectical methodology that can be elicited only through interaction between and among the researcher and the respondents (Guba & Lincoln, 1994: p. 111). Applying the constructivism paradigm in this research guides the selection of this study's applicable research method, which is discussed in the next chapter. From this paradigm's perspective, the truth is relative, and it depends on one's perspective (Baxter & Jack, 2008).

4.2 Mixed method as the research methodology and the process of the study

The purpose of this study is to explore and understand digital platform operators' business model innovation in the context of a health service ecosystem. First, this qualitative research discusses the emerging revenue models for personal data platform operators (digital platform providers) (Paper I). Then, using a single case study method, the research explores the challenges of and potential solutions for data access (Paper II) and resource complementarity (Paper III). Finally, the research explores the drivers of platform business model innovation (Paper IV).

To address the objectives of a study, instead of strictly adopting only one method, qualitative researchers increasingly combine different methods such as data collection, processes, and principles from two or more methodologies (Lal & Suto, 2012). This study applies a simultaneous qualitative mixed method as a

research methodology (Morse, 2010). Although some researchers refer to the mixed method only in research that uses both qualitative and quantitative research approaches (for example, the use of qualitative and quantitative viewpoints, data collection, or analysis) (Schoonenboom & Johnson, 2017; Tashakkori & Creswell, 2007), other methodological papers suggest that the mixed method can apply in within-paradigm research, entailing the use of two or more qualitative or quantitative methods alone (Morse, 2010; Lal & Suto, 2012) Indeed, a mixed method research design that applies only qualitative methods has also been found applicable in recent marketing and management research (see Singh & Pathak, 2020; Zhan & Chen, 2021) when exploring a novel area in research and in a relatively unexplored context (see Singh & Pathak, 2020), in this study, a health service ecosystem, that is selected as a context for its suitability considering the research question. In line with some earlier studies, to allow the generation of rich data to answer the research question (see Kyrousi et al., 2022; Singh & Pathak, 2020), in this study, a research design encompassing a qualitative approach was implemented.

The mixed method consists of a core component (method) and one or more supplementary components (Morse, 2010). In this study, the core and supplementary components were chosen to best enable the research question to be answered in the papers (Morse, 2010). To answer the first research question, the authors adopted an open-ended questionnaire, and data was collected from 27 companies and other ecosystem actors from Europe, the US, and Australia and analyzed using a thematic analysis coding method. To address the second research question, the authors adopted the autoethnography approach with a single case study (see Rashid et al., 2015; Duncan, 2004). The focus on autoethnography is in the researchers' experiences in the particular context (Boyle & Parry, 2007; Rashid et al., 2015) and utilizing a variety forms of texts (Boyle & Parry, 2007). In our study, the researchers' meeting notes and a project diary from a 12-month multidisciplinary research project in which the researchers orchestrated interviews and workshops with hospitals and healthcare technology platform providers to understand the nature of the data access challenges were utilized. The third research question was addressed by adopting an illustrative, explorative qualitative single case study. This methodology enabled the authors to incorporate multiple sources of data (Morgan et al., 2017) and explore and illustrate the research topic in a descriptive manner, focusing on one case to answer the research question (see Yin, 2009: p. 20) Finally, the fourth research question was addressed by conducting semi-structured interviews and using complementary material provided by the

interviewed companies, such as company presentations and articles. The semi-structured interview method allows the author to ask questions outside the predefined interview guide to clarify or ask more about an issue raised in the discussion (Adams, 2015: p. 498). The semi-structured interviews serve as the core component of this study, and it has been applied in three of the four papers—see Table 1 below. The qualitative open-ended questionnaire, observations, workshops, and meeting notes form the supplementary component of this study and provide an explanation and insight to support the insights from the core component (Morse, 2010). Adopting an open-ended questionnaire enabled the researchers to access details about the landscape of the services of human-centered personal data management and the revenue models of digital platform operators. The participants in the questionnaire were selected mainly by the European Commission as part of their consultation process on the data-driven economy and the topic of digital tools that have the potential to help individuals better control and secure their data (see European Union, 2014)

The unit of analysis in each paper of this thesis is determined and derived from the research question and answers to what and who is being studied (Kumar, 2018). In Paper I, the unit of analysis is an organization that has identified a revenue model for a personal data platform operator, and in Paper IV, it is a platform business model, in which individuals are empowered to control their personal data. In Paper II, the unit of analysis is the participants in a 12-month multi-disciplinary research project, and in Paper III, it is a health service ecosystem co-creating a technological surgical innovation.

Zott, Amit, and Massa (2011: p. 20) state that the business model as a unit of analysis offers “a systemic perspective on how to ‘do business,’ encompassing boundary-spanning activities (performed by a focal firm or others), and focusing on value creation as well as on value capture”. Business model innovation has become an increasingly important unit of analysis in innovation management studies (Massa & Tucci, 2013: p. 420; Bashir et al., 2020), and later studies of business model innovation have adopted business model innovation as the unit of analysis (see Cortimiglia et al., 2016; Sjödin et al., 2020; Snihur et al., 2018). In line with the recent innovation management studies in this regard, and to answer the main research question of this thesis (Kumar, 2018), the unit of analysis in this thesis is digital platform operators’ business model innovation, meaning the activities of the digital platform operator in creating and capturing value in a new way (Clauss et al., 2020; Foss & Saebi, 2018; Fehrer et al., 2018).

Table 1. Summary of the methods used and data sources in the four publications of this thesis.

Paper No.	Methodology	Method of data collection	Method of data analysis	Data sources	Unit of analysis
I	Qualitative research	Open-ended questionnaire	Coding method (abductive thematic analysis)	27 respondents, including digital platform operators and other health service ecosystem actors from 12 different countries from Europe, the US, and Australia	Organization that has identified a revenue model for a personal data platform operator
II	Autoethnography with a focus on a single case study	Semi-structured interviews, workshops, meeting notes, observation and project diary	Coding method (inductive thematic analysis)	4 hospitals from Finland and Singapore and several companies participating in co-creation workshops	Participants in a 12-month multidisciplinary research project
III	Illustrative, exploratory qualitative single case study	Semi-structured interviews, workshops, meeting notes with the ecosystem actors	Coding method (inductive thematic analysis)	12 companies, 3 hospitals, and 3 research organizations from Finland and Singapore	Health service ecosystem co-creating a technological surgery innovation
IV	Qualitative research	Semi-structured interviews, and presentations, videos, and published articles of the interviewed companies	Coding method (abductive thematic analysis)	5 digital platform operators from Europe	Platform business model, in which individuals are empowered to control their personal data

4.3 Data collection and data analysis

In a qualitative research process, well-established steps and procedures must be followed, namely, selecting the data collection method, selecting the respondents, and analyzing the data (see Ritchie & Lewis, 2003; Maxwell, 2013). In this study, data collection was conducted simultaneously in 2015–2020. Data was collected within two research projects, namely, Digital health revolution and Intelligent customer-driven solution for orthopedic and pediatric surgery care (Icory). In addition, a qualitative open-ended questionnaire was designed in collaboration with a representative from the European Commission and used in Paper I.

This study collected data from a wide range of actors from Europe, the US, and Australia, including digital platform operators providing individuals with the means to control, access, and share their personal data with firms or organizations of their choice (called personal data platform operators and personal data platform providers in Papers I and IV) (Poikola et al., 2015; Vescovi et al., 2015; Spiekermann & Novotny, 2015; Lehtiniemi & Ruckenstein, 2018), and healthcare technology platform providers (called service platform providers or healthcare technology providers in Papers II and III). The healthcare technology platform providers, including a patient engagement platform provider, an AI company, a gaming start-up, and a video conferencing platform provider, were part of the previously mentioned Icory research project. The other actors were hospitals and other commercial, public, or research organizations developing, researching, or offering personal data management services in Europe or otherwise active in the field of human-centered personal data management. In the later parts of this thesis, the concepts of digital platform operator and healthcare technology platform provider are used to ensure conceptual consistency.

In this qualitative research, the participants were selected applying purposeful sampling, meaning the participants were selected because they had experienced the phenomenon (Creswell, 2014; Etikan et al., 2016). In this study, this approach to sampling allows the selection of the individuals who will best help answer the research questions (Creswell, 2014) and thus explore the real-life experiences of participants regarding digital platform operators' business model innovation (Papers I and IV), resource complementarity, and where data access challenges already take place or are experienced among healthcare technology platform providers and hospitals in a health service ecosystem (Papers II and III).

Table 1 lists all the data collected and the data collection methods in the papers of this thesis. The data sources are comprised of semi-structured interviews (Papers

II, III, and IV), complemented by additionally provided material from interviewed companies, namely, presentations, videos, and published articles (Paper IV), an open-ended questionnaire (Paper I), notes from workshops (Papers II and Paper III), meeting notes (Papers II and III), and observation and a project diary (Paper II).

The data was analyzed in all the papers using a coding method that has been found suitable for conducting qualitative data analysis (see Basit, 2003; Saldaña, 2021: p. 1). The coding and analysis in the papers was conducted following thematic analysis, which is a method for identifying, analyzing and reporting themes within data (see Braun & Clarke, 2006; Guest, 2012).

The data analysis process was conducted as follows: First, in collaboration with the co-author(s) of the papers, I familiarized myself with the collected qualitative data. For example, in Paper III, the data analysis was first conducted by two researchers; then one researcher joined in the data analysis and enriched the data collection by adding the perspectives of eight further interviews to the study. Second, we labeled and sorted the data. As a result, we identified and created several codes. A code refers to a researcher-generated word or a short phrase that captures the essence of the qualitative data (Saldaña, 2021: p. 4). The third step was to further analyze the codes and identify several higher-order themes to build an understanding of the research question in the paper, thus grouping the codes into categories using an analysis matrix (Elo et al., 2014). In Papers I and IV, abductive thematic analysis was the suitable perspective because in the analysis process, it was necessary to go back and forth between the papers' conceptual framework and our own observations from the data (Tavory & Timmermans, 2014: p. 5). In Papers II and III, inductive thematic analysis is applied, which refers to a "bottom-up" content analysis and includes three main phases, namely, preparation, organization, and reporting, where words are divided into content-related categories to provide new knowledge of the phenomenon (Elo et al., 2014; Braun & Clarke, 2006).

5 Overview of the papers

This chapter presents the four papers that form this research.

5.1 Paper I: Emerging Revenue Models for Personal Data Platform Operators: When Individuals are in Control of Their Data

The purpose of Paper I is to identify emerging revenue models for personal data platform operators (i.e., the digital platform operators in this thesis) in the context of human-centered personal data management. In this paper, human-centered personal data management refers to individuals with the ability to control the use and access of their personal data for third-party services. The study describes how a digital platform operator captures value, meaning the gaining of monetary benefits in exchange for value through revenue models (Richardson, 2008; van Putten & Schief, 2012). The paper's literature review explores revenue models for personal data platform operators. The paper identifies a gap in the research on suitable revenue models in the context of human-centered personal data management. The paper aims to fill the gap by contributing to platform business model research in the chosen context from a revenue model perspective.

5.2 Paper II: Connected Health Innovation: Data Access Challenges in the Interface of AI Companies and Hospitals

This paper explores the challenges and potential solutions for data access for innovation. The study is based on the integration of theoretical frameworks of data management activities (Alhassan et al., 2018) and information (knowledge) mobility as a central innovation network orchestration activity (Hurmelinna-Laukkanen & Nätti, 2018; Nambisan & Sawhney, 2011) to understand innovation network orchestration challenges from the perspective of data access in the healthcare sector. Innovation network orchestration refers to taking systematic and purposeful actions that focus on initiating and managing innovation processes with many stakeholders, thus creating and capturing value (Dhanaraj & Parkhe, 2006). Information mobility refers to ensuring that relevant knowledge or data is available (Dhanaraj & Parkhe, 2006). The study discusses the managerial data access challenges of AI-based healthcare technology platform providers and the potential solutions for overcoming the challenges from an innovation network orchestration perspective. Empirically, the paper increases understanding of data access in the

context of a connected health network. Paper II fills a research gap concerning how (or if) data access can be managed by means of innovation network orchestration.

5.3 Paper III: Resource Integration Capabilities to Enable Platform Complementarity in Healthcare Service Ecosystem Co-creation

This paper aims to increase understanding of resource complementarity in service ecosystems. In resource integration, there is a need to find the right resource combinations (i.e., complementarity) and to use heterogeneous resources to co-create value (Harrison et al., 2001). The paper identifies a gap in the research concerning a holistic understanding of what resource capabilities, shortly resources, are needed to ensure resource complementarity in health service ecosystems where data-driven services are co-created. Paper III addresses this research gap by increasing understanding of resource complementarity in service ecosystems from the healthcare technology platform provider's perspective. The paper also discusses the resource capabilities needed when enabling resource complementarity in health service ecosystems.

5.4 Paper IV: Drivers for Platform Business Model Innovation: Individuals in Control over Their Personal Data

The fourth paper focuses on increasing understanding of the drivers of platform business model innovation in the context of the personal data used in the healthcare sector. In this paper, drivers refer to the change or needs to which a company must respond with business model innovation (Foss & Saebi, 2017). The paper highlights that value creation and value capture are the key perspectives for business model innovation (Massa et al., 2017), and yet the extant platform business model innovation literature (e.g. Gatautis, 2017) has focused primarily on just the value creation aspect. To fill this gap, Paper IV proposes a holistic framework to examine the drivers of platform business model innovation by combining a business model innovation framework (Zhang et al., 2017) that illustrates the drivers of business model innovation and the business model elements of value creation and value capture (Fehrer et al., 2018). Through this framework, this study examines the drivers of platform business model innovation that enable individuals to search for, control, and share their personal data (Vescovi et al., 2014).

6 Research results and discussion

This chapter summarizes the research results of this thesis and the related research.

6.1 The results and contributions of the research papers

The results of Paper I show that digital platform operators that adopt a human-centered approach to personal data management, capture value with transaction, service, connection, and membership fees from service providers, data sources, and individuals using the platform. Our research findings show that digital platform operators avoid monetizing personal data with advertising. This study also reveals two propositions as the foundation of revenue model creation in the context of human-centered personal data management, namely, a no-advertising and free-for-users model. This study calls for further research into how providing control of personal data to individuals influences the business models of digital platform operators and service providers. The practical implications of this research offer new insights into revenue models being developed by digital platform operators in the European market.

Paper II indicates that the challenges and solutions in data access can be categorized according to the level where they emerge: individual; organizational; and institutional. Paper II provides new knowledge for academics and practitioners about the challenges and solutions for data access and management in networked contexts. The paper shows that depending on the level, the challenges require solutions from different categories. The Paper shows that the greatest challenges among healthcare providers and healthcare technology platform providers that need the data (AI companies) lie in uncertainties and interpretations concerning regulation, data strategy, and guidelines. Creating guidelines for data use and access in a hospital can be a first step to creating connected health innovation in collaboration with companies. While solutions are generally scarce, organizational-level solutions seem to hold extensive potential to address many data access challenges. As for the managerial findings, the paper suggests that to succeed with data access, AI companies need to find the right orchestrators, build personal connections and trust among hospital personnel, and understand and follow the regulations and guidelines related to data protection, transfer, and storage. Orchestrators or intermediaries need to be aware of the expectations of each party and the resource limits to promote practices that ease data access challenges without jeopardizing confidentiality or privacy requirements.

Paper III increases the understanding of resource complementarity in a health service ecosystem. The study shows that resource integration through resource complementarity is an important mechanism through which value co-creation can be enabled in a health service ecosystem. The study shows that the resource capabilities, shortly resources, that can enable resource complementarity are knowledge and skills, data, technology and solutions, and motivation. Based on the findings, the study proposes that access to personal data as a resource (in pseudonymized format) is an enabler of the creation of technological solutions that can better support the quality of care. The study also suggests that different skills as resources are needed to develop the technological capability. Finally, the study's findings reveal the motivational factors of healthcare technology platform providers to use resources to enable value co-creation in the health service ecosystem. Based on the findings, the healthcare technology platform providers used the resources in value co-creation because they wanted to grow their business, engage in technical service development, acquire information, gain a competitive advantage, have access to data, enter the hospital as a customer, or engage in internationalization.

Paper IV focuses on analyzing the drivers of digital platform operators' business model innovation. The findings of this research reveal six drivers of novel value creation and capture of digital platform operators in the context of the personal data used in the healthcare sector. With drivers, the paper refers to the changes or needs to which a firm must respond with business model innovation (Foss & Saebi, 2017). The drivers are: (1) better data access for services and research; (2) data compliance and data protection; (3) external personal storage for service providers and individuals; (4) the lack of individual empowerment and transparency in the prevailing platform business models from the data perspective; (5) data silos; and (6) the technological maturity of digital platforms and analytics. In line with previous research, which identifies a change in platform business models, especially concerning the use and collection of personal data (see Bataineh et al., 2016; Fruhwirth et al., 2020a), Paper IV's findings show that by adopting a human-centered approach to personal data management, meaning giving control of data to the individual, digital platform operators change how value is created and captured in the platform business from the personal data perspective. The paper shows that while, according to the previous literature and the findings of this study, many prevailing platform providers gain monetary benefits by using data in targeted advertisements or selling data, digital platform operators generate revenue from data-requesting third parties when a user consents to the data sharing and

receives something in return as agreed with a third party such as a service provider. The findings show that the business model innovation of the digital platform operator means enabling users to control, access, and share their personal data with a third party via the platform (value creation), and revenue is generated mainly from the firm or research organization asking for access to the data (value capture). Paper IV sheds light on the key drivers of digital platform operators' business model innovation in the context of the personal data used in the healthcare sector in the European market. The study also enriches the theoretical perspective of business model innovation. As practical implications, this research provides evidence that the market, technology, and competition can also be the driving forces of innovation. Digital platform operators with a bottom-up approach can thus provide education about the value of data and personalized data-driven services for citizens, empowering individuals to holistically leverage the full potential of their personal data (such as medical, wellness, and social data) in healthcare services.

6.2 Theoretical findings and contributions

The study's academic contributions are related to the increasing understanding of business model innovation adopted by digital platform operators from the perspective of personal data as a focal resource and in the context of a health service ecosystem. This research addresses two theoretical gaps. First, it increases the understanding of the business model innovation of a digital platform operator (Nielsen & Aagaard, 2021) by taking a focused approach to value creation and value capture in digital platform operators' business model innovation (see Fehrer et al., 2018). Second, this research extends the knowledge of personal data as a resource in digital platform operators' business model innovation by adopting a human-centered approach to personal data management (see Engel and Ebel, 2019; Huhtala, 2018). Next, the three key findings of this study are discussed and the research question, *How can value be created and captured by digital platform operators in the context of health service ecosystem?* is answered.

Key finding one: Adopting a human-centered approach to personal data management is seen as an opportunity to create and capture value in a new way in health service ecosystems by digital platform operators

This study broadens the current understanding of value creation and value capture by digital platform operators (see Schreieck et al., 2021; Hein et al., 2019) by examining value creation and value capture through personal data as a resource and

more specifically, through a human-centered approach to personal data management (see Wang & Wang, 2014; Huhtala et al., 2019) in the context of a health service ecosystem.

Since the 2010s, platform business models such as Facebook have been used as examples of successful business models in research (Casadesus-Masanell & Ricart, 2011; Osterwalder & Pigneur, 2010). It has been argued that large platform providers collect and share their users' data to third parties, which use the data for commercial and marketing purposes (Padilla et al., 2022). In the literature, we can see the emergence of new business models of digital platform operators that approach personal data use and collection from a different perspective (Bataineh et al., 2016; Huhtala et al., 2019). This new perspective on digital platform operators' business model innovation is to create value by enabling individuals to search for, control, and share their personal data with firms of their choice for the individuals' benefit, thereby adopting a human-centered approach to personal data management (Vescovi et al., 2014; Lehtiniemi & Ruckenstein, 2018; Kariotis et al., 2020).

This study broadens the understanding of drivers of business model innovation from the perspective of personal data. Based on the findings in Paper IV, the drivers of business model innovation for digital platform operators are related to (1) better data access for services and research, (2) data compliance and data protection, (3) external personal storage for service providers and individuals, (4) the lack of individual empowerment and transparency in the prevailing platform business models from the data perspective, (5) data silos, and (6) the technological maturity of digital platforms and analytics.

Paper I's findings show that digital platform operators can capture value from the service providers, data sources, and individuals using the platform. Furthermore, revenue is generated mainly from service providers, which request personal data from individuals on the platform. The fees can be divided into two categories, namely, a transaction-based model (generating revenue by facilitating data transactions between the stakeholders) and a service-based model (generating revenue by offering value-adding services on the platform or charging for the use of the platform). Furthermore, the findings show that when digital platform operators adopt human-centered personal data management, they consciously adopt a no-advertising model and free-for-users model, meaning they avoid the monetization of personal data with advertising. This differs significantly from the prevailing platform business models discussed in the literature, where the platform is free to use for individuals, and in return, the individuals' personal data is collected on the platforms and sold to third parties such as advertisers (Gleiss et al., 2021;

Weber, 2015). The study shows that when adopting a human-centered approach to personal data management, a revenue model cannot be based on monetizing individuals' data and selling it to an advertiser, but other models must be developed to enable transparency for the individuals concerning how their data is used.

As Paper IV shows, the reason for and key driver of digital platform operators' business model innovation is the identified need to design a business model differently from the prevailing platform business models to create value for individuals from the perspective of personal data as a resource. The interviews with digital platform operators doing business in the European market shows that digital platform operators aim to create value for service providers and individuals by enabling access to personal data in a way in which the individual is in control of the data use and experiences value from it in the form of a personalized service.

Key finding two: Data access challenges among the ecosystem actors exist at multiple levels and call for an orchestrator in a health service ecosystem

This study identifies the crucial role of data access in creating and capturing value in health service ecosystems. For example, companies increasingly need data to create solutions that add value for healthcare providers and patients (Dowd et al., 2018). As the findings in Paper I and IV show, digital platform operators have identified an unmet need of individuals, service providers, and researchers in a health service ecosystem: How do we access personal data simply so that the individual is in control of the data and also gains the value of the data sharing? To ensure data access, Paper II found that companies needing data, such as AI companies, require the support of orchestrators to compliantly ease access to data. Based on Paper II's findings, more efforts are needed at different levels to enable data access to solutions and services that benefit individuals and the ecosystem. Building on a previous data management study (Alhassan et al., 2018), this study shows that data access challenges may emerge at the individual level in the relationships between people, at the organizational level, for example, with the lack of processes, and at institutional level, for example, regarding regulation.

An earlier qualitative study identifies data access as a key challenge to unlocking the use of data in services and proposes that one way to mitigate the challenge is to consider different models of data ownership (Schymanietz et al., 2022). Building on the earlier findings, in this study, we find that there is a need for orchestrators such as digital platform operators in the health service ecosystem to build the foundation for interaction among data-requesting and data-providing actors in the ecosystem to have a common agreement for the collection and use of

data for the benefit of individuals (Papers I and II). Overall, this study shows that providing access to personal data for individuals is seen as an opportunity to open the gates of personal data in the health service ecosystem, as it is not the companies who need to share the data, but individuals themselves consenting to the sharing of data with services that benefit them and create value (Papers I and IV). The finding is in line with a recent white paper, “Towards network-based Ecosystems,” which observes that large platform providers such as Apple and Google are creating their own and thus competing ecosystems around their platforms instead of creating or enabling an ecosystem around individuals from the perspective of personal data (Wilson et al., 2023). Placing individuals at the center from the perspective of personal data as a resource is relevant especially in the healthcare sector, where companies face challenges in accessing data in a compliant, trustworthy, and transparent manner (Papers II and IV).

Key finding three: Enabling resource integration through complementarity enables value co-creation in the health service ecosystem from the perspective of personal data as a resource

Based on the findings in Paper III, this study shows that resource integration through resource complementarity is an important mechanism by which value co-creation can be enabled in a health service ecosystem. Actors in the service ecosystem have their own needs and interests (Makkonen & Komulainen, 2018). To collaborate, companies need to develop capabilities to deal with complementary resource integration, thus matching the resources to support the creation of value for the whole ecosystem, not only for one actor (Gummesson & Mele, 2010). This study extends the current knowledge about personal data as a resource in digital platform operators’ business model innovation when adopting a human-centered approach to personal data management (see Engel & Ebel, 2019; Huhtala, 2018) by showing that to create and capture value in a health service ecosystem digital platform, operators need to find a way to manage personal data in a way that creates value not only for themselves but also for the other ecosystem actors, meaning individuals and service providers that can have either the role of a service provider or data source (Papers I and IV). In their business model innovation, digital platform operators aim to enable individuals to store, manage, and share their personal data with the service providers or organizations in return for a service. Digital platform operators therefore act as enablers of value co-creation between the individual and the service provider, allowing the integration and use of personal data as a resource in a compliant manner to benefit the individual and the company

providing the service (Papers III and IV). Meanwhile, based on the findings of Paper I, data sources may use digital platform operators as trusted outsourced data management platform providers that manage the data according to regulations and enable individuals to access, see, and share the data in the larger health service ecosystem. Furthermore, this study shows that resource complementarity in resource integration from the perspective of personal data is needed to move from data silos to using the collected data in the health service ecosystem with the consent of the individual, and sometimes in a pseudonymized manner (Paper III). These findings are in line with findings from previous research, which highlights the need for deeper collaboration among ecosystem actors (including between companies and individuals) from the perspective of data (Schymanietz et al., 2022). It is also observed that before companies find ways to collaborate for the benefit of individuals, value creation with personal data in a health ecosystem is unlikely to become a common practice (Karhu & Ritala, 2021).

Conceptual framework

This research shows that digital platform operators can create and capture value in a new way in a health service ecosystem when adopting a human-centered approach to personal data management and enabling ecosystem actors to access personal data in a way that complements the current data or other resources. This study also sheds light on how digital platform operators' value creation and value capture in a new way compared with the prevailing platform business models from the perspective of personal data as a resource (see Bataineh et al., 2016; Fruhwirth et al., 2020a) can enable access to data through orchestration, which is an identified key challenge in the health service ecosystems (Alhassan et al., 2018; Nambisan & Sawhney, 2011).

As a research contribution, this research adds to the service marketing discussion of service platforms, value co-creation, and service ecosystems (see Lusch & Nambisan, 2015) by applying the theoretical concepts to gaining more understanding of the research problem in a qualitative study. This research also contributes to the innovation management literature by adding to the discussion of digital platform operators' business model innovation (see Clauss et al., 2020; Foss & Saebi, 2018; Fehrer et al., 2018) from the perspective of personal data as a resource (see Beirão et al., 2017)

This study creates a conceptual framework (Figure 3) to increase the understanding of digital platform operators' business model innovation from the

perspective of personal data as a resource in the context of a health service ecosystem. The framework illustrates how value is created and captured by digital platform operators in the context of a health service ecosystem. The framework includes the opportunities for value creation and value capture considered by digital platform operators in the European market. The framework also includes two elements that, based on this study, are needed for digital platform operators to create and capture value as providers of a service platform that facilitates the interaction of actors and resources in a service ecosystem (Lusch & Nambisan, 2015). They are resource complementarity and data access, which can be enabled by digital platform operators in collaboration with other ecosystem actors, namely, service providers and individuals.

The four key elements of the conceptual framework of this study are in line with a recent model for value creation and value capture that was developed by a systematic literature review covering marketing, management, and strategy disciplines (Minerbo & Brito, 2022). The model provides a framework to explore how value can be created, captured, and enabled. The components of the model are: (1) drivers of value creation, in this study, the drivers of business model innovation; (2) value creation; (3) relationship characteristics that influence value creation and value capture, in this study, resource complementarity and data access; and finally, (4) value capture. In this study, the empirical evidence shows that all the suggested four components of the model are needed to explore and build an understanding of digital platform operators' business model innovation from the perspective of personal data as a resource.

Previous empirical studies in innovation management have shown that data is becoming an increasingly important resource for future innovations (Pikkarainen et al., 2019), the resources in healthcare in general are scarce (Bianchi et al., 2017; Mosadeghrad, 2014), and the data is scattered or inaccessible (Pikkarainen et al., 2019). In previous research, it is also observed that the availability of resources and collaboration among different ecosystem actors ultimately affect the quality of care and patient outcomes (Mosadeghrad, 2014). This research adds to the earlier findings and shows that interaction among ecosystem actors is needed through the lens of digital platform operators to make value co-creation through personal data integration and use a reality in a health service ecosystem. From the perspective of data as a resource, and with the unit of analysis of digital platform operators' business model innovation, interaction among ecosystem actors is required through complementarity in resource integration and data access in a health service ecosystem. Based on the findings of this research, digital platform operators are the

enablers of value co-creation, and for personal data to become an accessible resource in a health service ecosystem, individuals need to consent to the use of their personal data (for example, by using digital platform operators' data-consenting services), and service providers need to provide services that can use the data. In addition, companies that have collected the data are needed to share the data in a format that is usable for the service provider or the individuals to use. The arrows in Figure 3 represent the digital platform operator enabling value co-creation between individuals and service providers in the health service ecosystem by creating and capturing value in a new way. Value co-creation in this case means the mutual value created by individuals and service providers through resource integration (Lusch & Nambisan, 2015), and thus the integration of personal data to be used in a service.

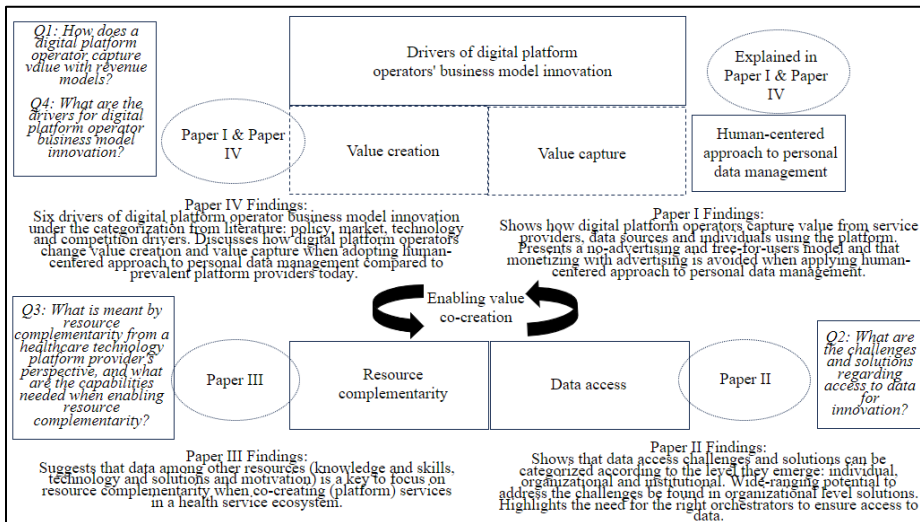


Fig. 3. Conceptual framework of digital platform operators' business model innovation in a health service ecosystem based on the findings of this research.

6.3 Managerial implications

This study develops a conceptual framework for understanding digital platform operators' business model innovation in a health service ecosystem from the perspective of personal data as a resource. The findings of this research can serve as inspiration for practitioners in their work of innovating a new digital platform

operator business model from the perspective of personal data as a resource. It is noteworthy that the data collection in this study was undertaken during 2015–2020, when, according to the findings of this research, the human-centered approach to personal data management was relatively new, and digital platform operators were just starting in the European market (see also Poikola et al., 2015). A recent white paper called “Understanding MyData operators,” written by individuals, organizations, and digital platform operators with experience of human-centered personal data management, identifies 40 digital platform operators, including “potential” digital platform operators in the European market (Langford et al., 2022). The findings of the white paper are that even though some digital platform operators have advanced beyond the initial piloting phase, the scale of service remains limited, and it is still a struggle for many digital platform operators to find a sustainable business model. This struggle includes capturing value from data sources, service providers, and individuals in the ecosystem. This study’s findings show that the interaction and involvement of ecosystem actors, in addition to data access and complementarity in resource integration, are key for digital platform operators in creating and capturing value. For this, managers could benefit from thinking about how to enable “business model innovation for sustainability,” which, in recent business model research, has been defined as a value creation and value capture logic that can partially overcome the recurring barriers to creating value (Massa, 2023).

This study identifies data access and resource integration through complementarity as the crucial elements to unlocking value co-creation with personal data in a health service ecosystem. A second implication for practitioners is that this finding provides an opportunity to reflect on their role in their health service ecosystem, who the other actors in the ecosystem are, and how they can individually and together enable a bigger impact by taking measures to enable the flow of personal data for mutual value. Furthermore, practitioners may reflect on how adopting a human-centered approach to personal data management and taking resource complementarity into account might change the status quo regarding access to data and the ability of themselves and other ecosystem actors to create and capture value and enable value co-creation. To summarize, it is recommended that service provider managers implement a culture and strategy that embraces the use of data from the ecosystem (Schymanietz et al., 2022).

Previous studies have argued that companies that try to offer their digital health services without employing the existing ecosystems of large digital platform providers such as Google, Apple, Facebook, Amazon, and Microsoft will encounter

difficulties (Gleiss et al., 2021; Hermes et al., 2020). An example of the new roles adopted by large platform providers in healthcare is connecting, exchanging, and archiving patients' personal data across health service ecosystem actors, for example, Apple Health Records, which enables hospitals to connect their electronic health records to patients' mobile health applications (Gleiss et al., 2021). Based on the findings of this study, digital platform operators, as small and medium-sized companies doing business in Europe, aim to provide an alternative to the large platform providers by adopting the perspective of human-centered personal data management. Based on the findings of this study, digital platform operators thus aim to challenge the large platform providers in terms of how value is created and captured from the perspective of personal data by introducing revenue models that are based on the transaction of data, service, connection, or membership fees from service providers, data sources, and individuals instead of monetizing personal data through advertising (Gleiss et al., 2021). From the perspective of data and reacting changes in the market, companies are required to develop their ability to implement suitable revenue models for today (Schymanietz et al., 2022).

Third, this study provides an alternative approach to considering business model innovation from the perspective of personal data as a resource. Reflecting on the findings of this study, for current and emerging digital platform operators, this study initiates and conceptualizes a new approach to considering personal data as a resource as part of digital platform operator business model innovation. Furthermore, this study provides service providers with a framework to reflect on how access to more personal data in a human-centered manner will create new opportunities for personalized data-driven digital services creation and development. A recent qualitative study of data-driven service innovation suggests that enabling rapid data exchange across organizational borders can be one way to earn the trust of customers (Schymanietz, et al., 2022).

6.4 Research assessment, limitations, and suggestions for future studies

Research quality can be assessed through reliability and validity (Golafshani, 2003). In qualitative research, the validity of research can be assessed through the examination of truth value, whereas reliability can be assessed through consistency and neutrality (Golafshani, 2003; Noble & Smith, 2015). To enhance validity, researchers may reflect on their own perspectives by documenting decisions and through peer collaboration to uncover biases. On the other hand, reliability can be

enhanced by aiming for auditability, for example, through a clear description of the research process and again by engaging with other researchers and discussing emerging themes (Noble & Smith, 2015). For the research articles that comprise this thesis, reliability and validity have been enhanced by taking the following measures: The data has been collected in collaboration by several researchers in two research projects, and as part of the article writing process, the data and findings were discussed in collaboration with the research team participating in that research article. Despite these measures, this study also has limitations.

This study's limitations can be divided into theoretical, methodological, and contextual limitations. First, regarding the theoretical limitations, this study aims to enhance understanding of digital platform operators' business model innovation in the context of a health service ecosystem from the perspective of personal data. The study operationalizes business model innovation as the activities of digital platform operators creating and capturing of value in a new way (Clauss et al., 2020; Foss & Saebi, 2018; Fehrer et al., 2018), as value creation and value capture are considered the key perspectives for business model innovation (Massa et al., 2017; Climent & Haftor, 2021). Other factors that can be considered part of business models, such as channels or cost-structure (Osterwalder & Pigneur, 2010), are not explored in this study.

Methodological limitations emerge from the generalizability of the research. However, as is typical of qualitative research (Johnson, 1997), this research does not aim to generalize across populations and contexts but to plausibly and with logical reasoning to develop concepts and theory (Walsham, 1995) in the chosen context. Still, the key findings and the conceptual framework can possibly shed light on the value creation and value capture in other service ecosystems where access to and use of personal data plays a crucial role.

The contextual limitation stems from the complexity and emergent nature of the research question. This study increases the understanding of the research question by both developing a conceptual framework to build on the literature but also to provide practitioners with implications for the topic.

To increase understanding of value creation, value capture, and value co-creation with personal data as a resource in the ecosystem context, this study proposes that future studies explore the roles and motivations of other ecosystem actors such as individuals as personal data subjects and integrators, or the service providers that need data to provide personalized data-driven services or to develop services with artificial intelligence as examples. Furthermore, it has been suggested that future service marketing research should explore beyond the customer or

employee to encompass each ecosystem actor's perspective on the service system (Aksoy et al. 2020). In a recent service marketing study, case study findings suggest that innovation can be led by individuals themselves, especially those who own or control the relevant heterogeneous resources and can integrate them, thus creating value (Wu et al., 2022). They call for future research to identify the resources that individuals can possess in different contexts, and that may trigger new individual-led service innovation (Wu et al., 2022). This study used the perspective of personal data as a resource. Based on the study's findings, the other complementary resources that future business model innovation research could focus on are knowledge and skills, technology, and solutions and motivation. Furthermore, future research could explore how the digital platform operators can support the other actors in the capturing of value to ensure continuous value co-creation in the service ecosystem by leveraging integrative capabilities, thus providing reliable, repeatable communication and coordination toward the introduction and modification of resources and capabilities or business models (see Helfat & Raubitschek, 2018).

List of references

- Adams, W. C. (2015). Conducting Semi-Structured Interviews. *Handbook of Practical Program Evaluation*, 492–505.
- Ajah, I. A., & Nweke, H. F. (2019). Big data and business analytics: Trends, platforms, success factors and applications. *Big Data and Cognitive Computing*, 3(2), 32.
- Akhtar, A. (2021). Here's where tech giants like Microsoft and Amazon stand in their race to revolutionize healthcare. *Business Insider*. Accessed 12.30.2023. <https://www.businessinsider.com/how-microsoft-google-apple-amazon-are-investing-in-healthcare-2021-4?r=US&IR=T>.
- Aksoy, L., Alkire, L., Kandampully, J., Kemppainen, L., Kong, L., & McClelland, L. E. (2020). The role of service firms in societal health: the case for symbiotic value. *Journal of Service Management*, 31(5), 1041–1058.
- Al-Debei, M. M., & Avison, D. (2010). Developing a unified framework of the business model concept. *European Journal of Information Systems*, 19(3), 359–376.
- Alhassan, I., Sammon, D., & Daly, M. (2018). Data governance activities: A comparison between scientific and practice-oriented literature. *Journal of Enterprise Information Management*, 31(2), 300–316. <https://doi.org/10.1108/JEIM-01-2017-0007>
- Almunawar, M. N., & Anshari, M. (2022). Digital enabler and value integration: Revealing the expansion engine of digital marketplace. *Technology Analysis & Strategic Management*, 34(7), 847–857.
- Amagai, S., Pila, S., Kaat, A. J., Nowinski, C. J., & Gershon, R. C. (2022). Challenges in participant engagement and retention using mobile health apps: Literature review. *Journal of Medical Internet Research*, 24(4), e35120.
- Amit, R., & Han, X. (2017). Value creation through novel resource configurations in a digitally enabled world. *Strategic Entrepreneurship Journal*, 11(3), 228–242.
- Andries, P., Debackere, K., & Van Looy B. (2006). Effective business model adaptation strategies for new technology-based ventures. Paper presented at the 9th PREBEM Conference on Business Economics, Management and Organization Science, Amersfoort, the Netherlands.
- Asiimwe, R., Lam, S., Leung, S., Wang, S., Wan, R., Tinker, A., ... & Talhouk, A. (2021). From biobank and data silos into a data commons: Convergence to support translational medicine. *Journal of Translational Medicine*, 19, 1–13.
- Aspara, J., Hietanen, J., & Tikkanen, H. (2010). Business model innovation vs replication: Financial performance implications of strategic emphases. *Journal of Strategic Marketing*, 18(1), 39–56.
- Bashir, M., Naqshbandi, M. M., & Farooq, R. (2020). Business model innovation: A systematic review and future research directions. *International Journal of Innovation Science*, 12(4), 457–476.
- Basit, T. (2003). Manual or electronic? The role of coding in qualitative data analysis. *Educational Research*, 45(2), 143–154.
- Bataineh, A. S., Mizouni, R., El Barachi, M., & Bentahar, J. (2016). Monetizing personal data: A two-sided market approach. *Procedia Computer Science*, 83, 472–479.

- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, 13(4), 544–559.
- Beirão G., Patrício L., & Fisk R. P. (2017). Value cocreation in service ecosystems: Investigating health care at the micro, meso, and macro levels. *Journal of Service Management*, 28(2), 227–249.
- Bianchi, C., Bianco, M., Ardanche, M., & Schenck, M. (2017). Healthcare frugal innovation: A solving problem rationale under scarcity conditions. *Technology in Society*, 51, 74–80.
- Boyle, M., & Parry, K. (2007). Telling the whole story: The case for organizational autoethnography. *Culture and Organization*, 13(3), 185–190.
- Brodie, R. J., Ranjan, K. R., Verreynne, M. L., Jiang, Y., & Previte, J. (2021). Coronavirus crisis and health care: Learning from a service ecosystem perspective. *Journal of Service Theory and Practice*, 31(2), 225–246.
- Brousseau, E., & Penard, T. (2007). The economics of digital business models: Framework for analysing the economics of platforms. *Review of Network Economics*, 6(2), 81–114.
- Brunn, P., Jensen, M., & Skovgaard, J. (2002). e-Marketplaces: Crafting a winning strategy. *European Management Journal*, 20(3), 286–298.
- Burmaoglu, S., Saritas, O., Kidak, L. B., & Berber, İ. C. (2017). Evolution of connected health: A network perspective. *Scientometrics*, 112, 1419–1438.
- Casadesus-Masanell, R., & Ricart, J. E. (2011). How to design a winning business model. *Harvard Business Review*, 89(1/2), 100–107.
- Casadesus-Masanell, R., & Zhu, F. (2013). Business model innovation and competitive imitation: The case of sponsor-based business models. *Strategic Management Journal*, 34(4), 464–482.
- Caulfield, B. M., & Donnelly, S. C. (2013). What is connected health and why will it change your practice? *QJM: An International Journal of Medicine*, 106(8), 703–707.
- Chan, S. L., Lu, Y., & Wang, Y. (2018). Data-driven cost estimation for additive manufacturing in cybermanufacturing. *Journal of Manufacturing Systems*, 46, 115–126.
- Chandler J. D., & Vargo S. L. (2011). Contextualization and value-in-context: How context frames exchange. *Marketing Theory*, 11(1), 35–49.
- Ciasullo, M. V., Troisi, O., & Cosimato, S. (2018). How digital platforms can trigger cultural value co-creation? A proposed model. *Journal of Service Science and Management*, 11(2), 161–181.
- Clauss, T., Bouncken, R. B., Laudien, S., & Kraus, S. (2020). Business model reconfiguration and innovation in SMEs: A mixed-method analysis from the electronics industry. *International Journal of Innovation Management*, 24(02), 2050015.
- Clauss, T., Harengel, P., & Hock, M. (2019). The perception of value of platform-based business models in the sharing economy: Determining the drivers of user loyalty. *Review of Managerial Science*, 13, 605–634.
- Climent, R. C., & Haftor, D. M. (2021). Value creation through the evolution of business model themes. *Journal of Business Research*, 122, 353–361.

- Cortimiglia, M. N., Ghezzi, A., & Frank, A. G. (2016). Business model innovation and strategy making nexus: Evidence from a cross-industry mixed-methods study. *R&D Management*, 46(3), 414–432.
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. Third edition. Sage, Los Angeles.
- de Montjoye, Y-A., Wang, S. S., & Pentland, A. S. (2012). On the trusted use of large-scale personal data. *IEEE Data Eng. Bull.* 35(4), 5–8.
- de Reuver, M., Bouwman H., & MacInnes I. (2009). Business model dynamics for startups and innovating e-businesses. *International Journal of Electronic Business*, 7(3), 269–286.
- de Reuver, M., Sørensen, C., & Basole, R. C. (2017). The digital platform: A research agenda. *Journal of Information Technology*, 33(2), 124–135.
- Dhanaraj, C., & Parkhe, A. (2006). Orchestrating innovation networks. *Academy of Management Review*, 31(3), 659–669.
- Dogan, E. (2017). A strategic approach to innovation. *Journal of Management Marketing and Logistics*, 4(3), 290–300.
- Dong, H., Khadeer Hussain, F., & Chang, E. (2010). A human-centered semantic service platform for the digital ecosystems environment. *World Wide Web*, 13, 75–103.
- Dowd, W. N., Cowell, A. J., Regan, D., Moran, K., Slevin, P., Doyle, G., & Bray, J. W. (2018). An exploratory cost-effectiveness analysis of the connected health intervention to improve care for people with dementia: A simulation analysis. *Health Services & Outcomes Research Methodology*, 18(1), 47–62. <https://doi.org/10.1007/s10742-017-0175-y>.
- Duncan, M. (2004). Autoethnography: Critical appreciation of an emerging art. *International Journal of Qualitative Methods*, 3(4), 28–39.
- Earley, S. (2018). The role of a customer data platform. *IT Professional*, 20(1), 69–76.
- Eaton, B., Elaluf-Calderwood, S., Sørensen, C., & Yoo, Y. (2015). Distributed tuning of boundary resources. *MIS Quarterly*, 39(1), 217–244.
- El Khatib, M., Hamidi, S., Al Ameer, I., Al Zaabi, H., & Al Marqab, R. (2022). Digital disruption and big data in healthcare-opportunities and challenges. *ClinicoEconomics and Outcomes Research*, 563–574.
- Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *SAGE Open*, 4(1), 2158244014522633.
- Engel, C., & Ebel, P. (2019). Data-driven service innovation: A systematic literature review and development of a research agenda. ECIS 2019 Proceedings. In Proceedings of the 27th European Conference on Information Systems (ECIS), Stockholm & Uppsala, Sweden, June 8–14, 2019. ISBN 978-1-7336325-0-8 Research Papers.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4.
- European Commission (2015). Questions and Answers: Data protection reform. http://europa.eu/rapid/press-release_MEMO-15-6385_en.htm. Accessed January 9, 2017.

- European Commission (2024). What is personal data? https://commission.europa.eu/law/law-topic/data-protection/reform/what-personal-data_en. Accessed January 14, 2024.
- European Data Protection Supervisor (2024). Personal Information Management System. https://edps.europa.eu/data-protection/our-work/subjects/personal-information-management-system_en. Accessed January 23, 2024.
- European Union (2014). Communication from the commission to the European Parliament, the Council the European Economic and Social Committee and the Committee of the Regions Towards a thriving data-driven economy. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52014DC0442>. Accessed May 1, 2024.
- Fehrer, J. A., Woratschek, H., & Brodie, R. J. (2018). A systemic logic for platform business models. *Journal of Service Management*, 29(4), 546–568.
- Fischer, S., Lohrenz, L., Lattemann, C., & Robra-Bissantz, S. (2020). Critical design factors for digital service platforms: A literature review. Conference paper. ECIS 2020 Proceedings.
- Förster, M., Bansemir, B., & Roth, A. (2022). Employee perspectives on value realization from data within data-driven business models. *Electronic Markets*, 32(2), 767–806.
- 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.
- Foss, N. J., & Saebi, T. (2018). Business models and business model innovation: Between wicked and paradigmatic problems. *Long Range Planning*, 51(1), 9–21.
- Frow, P., & Payne, A. (2011). A stakeholder perspective of the value proposition concept. *European Journal of Marketing*, 45(1/2), 223–240.
- Frow, P., McColl-Kennedy, J. R., Hilton, T., Davidson, A., Payne, A., & Brozovic, D. (2014). Value propositions: A service ecosystems perspective, *Marketing Theory*, 14(3), 327–351, doi: 10.1177/1470593114534346.
- Frow, P., McColl-Kennedy, J. R., Payne, A., & Govind, R. (2019). Service ecosystem well-being: Conceptualization and implications for theory and practice. *European Journal of Marketing*, 53(12), 2657–2691.
- Fruhvirth, M., Rachinger, M., & Prlja, E. (2020a, January). Discovering business models of data marketplaces. In Proceedings of the 53rd Hawaii International Conference on System Sciences.
- Fruhvirth, M., Ropposch, C., & Pammer-Schindler, V. (2020b). Supporting data-driven business model innovations: A Structured literature review on tools and methods. *Journal of Business Models*, 8(1), 7–25.
- Fu, W., Wang, Q., & Zhao, X. (2017). The influence of platform service innovation on value co-creation activities and the network effect. *Journal of Service Management*, 28(2), 348–388.
- Gartner (2023). Gartner survey finds customer data and analytics as top priority for achieving customer service and support goals in 2023. January 9, 2023. <https://www.gartner.com/en/newsroom/press-releases/2023-01-09-gartner-survey-finds-customer-data-and-analytics-as-top-priority-for-achieving-customer-service-and-support-goals-in-2023>. Accessed September 12, 2023.

- Gatautis, R. (2017). The rise of the platforms: Business model innovation perspectives. *Engineering Economics*, 28(5), 585–591.
- Gleiss, A., Kohlhagen, M., & Pousttchi, K. (2021). An apple a day: How the platform economy impacts value creation in the healthcare market. *Electronic Markets*, 31(4), 849–876.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, 8(4), 597–607.
- Gordijn, J., Akkermans, H., & Van Vliet, J. (2001). Designing and evaluating e-business models. *IEEE Intelligent Systems*, 16(4), 11–17.
- Gregory, R. W., Henfridsson, O., Kaganer, E., & Kyriakou, H. (2021). The role of artificial intelligence and data network effects for creating user value. *Academy of Management Review*, 46(3), 534–551.
- Grönroos, C. (2006). Adopting a service logic for marketing. *Marketing Theory*, 6(3), 317–333.
- Grönroos, C., & Helle, P. (2010). Adopting a service logic in manufacturing: Conceptual foundation and metrics for mutual value creation. *Journal of Service Management*, 21(5), 564–590.
- Guba, E. G., & Lincoln, Y. S. (1994) Competing Paradigms in Qualitative Research. In: Denzin N. K., & Lincoln Y. S. (eds.) *Handbook of Qualitative Research*. Thousand Oaks (Calif.), Sage, pp. 105–117.
- Gummesson E., & Mele C. (2010). Marketing as value co-creation through network interaction and resource integration. *Journal of Business Market Management*, 4(4), 181–198.
- Harrison, J. S., Hitt, M. A., Hoskisson, R. E., & Ireland, R. D. (2001). Resource complementarity in business combinations: Extending the logic to organizational alliances. *Journal of Management*, 27(6), 679–690.
- Hein, A., Weking, J., Schreieck, M., Wiesche, M., Böhm, M., & Krcmar, H. (2019). Value co-creation practices in business-to-business platform ecosystems. *Electronic Markets*, 29, 503–518.
- Heinonen, K., Strandvik, T., Mickelsson, K-J., Edvardsson, B., Sundström, E., & Andersson, P. (2010). A customer-dominant logic of service, *Journal of Service Management*, 21(4), 531–548.
- Helfat, C. E., & Raubitschek, R. S. (2018). Dynamic and integrative capabilities for profiting from innovation in digital platform-based ecosystems. *Research Policy*, 47(8), 1391–1399.
- Hermes, S., Riasanow, T., Clemons, E. K., Böhm, M., & Krcmar, H. (2020). The digital transformation of the healthcare industry: Exploring the rise of emerging platform ecosystems and their influence on the role of patients. *Business Research*, 13, 1033–1069.
- Hern, A. (2018). What is GDPR and how will it affect you? *The Guardian*. <https://www.theguardian.com/technology/2018/may/21/what-is-gdpr-and-how-will-it-affect-you>. Accessed December 10, 2023.

- Huhtala, T. (2018). Using personal data to advance preventive healthcare services. *Journal of Service Science Research*, 10, 77–115.
- Huhtala, T. (2022). Data-based value creation in healthcare service delivery networks. Academic Dissertation. University of Oulu. <https://oulurepo.oulu.fi/handle/10024/36895>.
- Huhtala, T., Pikkarainen, M., & Saraniemi, S. (2019). Exploring Potential Changes in the Business Model: The Impacts of Using Human-Centered Personal Data as a Resource. *Journal of Business Models*, 7(2), 53–63.
- Hunt, S. D., Arnett, D. B., & Madhavaram, S. (2006). The explanatory foundations of relationship marketing theory. *Journal of Business & Industrial Marketing*, 21(2), 72–87.
- Hänninen, M., Smedlund, A., & Mitronen, L. (2018). Digitalization in retailing: multi-sided platforms as drivers of industry transformation. *Baltic Journal of Management*, 13(2), 152–168.
- Iivari, M. M., Ahokangas, P., Komi, M., Tihinen, M., & Valtanen, K. (2016). Toward ecosystemic business models in the context of industrial internet. *Journal of Business Models*, 4(2), 42–59.
- Johnson, B. R. (1997). Examining the validity structure of qualitative research. *Education, Winter 1997*, 118(2), Research Library, pp. 828
- Johnson, M. W., Christensen, C. M., & Kagermann, H. (2008). Reinventing your business model. *Harvard Business Review*, 86(12), 57–68.
- Karampela, M., Ouhbi, S., & Isomursu, M. (2019, July). Exploring users' willingness to share their health and personal data under the prism of the new GDPR: Implications in healthcare. 41st annual international conference of the IEEE engineering in medicine and biology society (EMBC) (pp. 6509–6512). IEEE.
- Karhu, K., & Ritala, P. (2021). Slicing the cake without baking it: Opportunistic platform entry strategies in digital markets. *Long Range Planning*, 54(5101988), ISSN 0024-6301, doi: 10.1016/j.lrp.2020.101988.
- Kariotis, T., Ball, M. P., Tzovaras, B. G., Dennis, S., Sahama, T., Johnston, C., ... & Borda, A. (2020). Emerging health data platforms: From individual control to collective data governance. *Data & Policy*, 2, e13.
- Keskimäki, I., Tynkkynen, L.-K., Reissell, E., Koivusalo, M., Syrjä, V., Vuorenkoski, L., Rechel, B., & Karanikolos, M. (2019). Finland health system review. *European Observatory on Health Systems and Policies* 21(2).
- Kim, J. (2016). The platform business model and business ecosystem: Quality management and revenue structures. *European Planning Studies*, 24(12), 2113–2132.
- Koskela-Huotari, K., Edvardsson, B., Jonas, J. M., Sörhammar, D., & Witell, L. (2016). Innovation in service ecosystems: Breaking, making, and maintaining institutionalized rules of resource integration. *Journal of Business Research*, 69(8), 2964–2971.
- Krämer, J. (2021). Personal data portability in the platform economy: Economic implications and policy recommendations. *Journal of Competition Law & Economics*, 17(2), 263–308.

- Kraus, S., Kanbach, D. K., Krysta, P. M., Steinhoff, M. M., & Tomini, N. (2022). Facebook and the creation of the metaverse: Radical business model innovation or incremental transformation? *International Journal of Entrepreneurial Behavior & Research*, 28(9), 52–77.
- Kullak, F. S., Baker, J. J., & Woratschek, H. (2021). Enhancing value creation in social purpose organizations: Business models that leverage networks. *Journal of Business Research*, 125, 630–642.
- Kumar, S. (2018). Understanding Different Issues of Unit of Analysis in a Business Research. *Journal of General Management Research*, 5(2).
- Laihonen, H. (2012). Knowledge structures of a health ecosystem. *Journal of Health Organization and Management*, 26(4), 542–558.
- Lal, S., Suto, M., & Ungar, M. (2012). Examining the potential of combining the methods of grounded theory and narrative inquiry: A Comparative Analysis. *Qualitative Report*, 17, 41.
- Langford, J., Poikola, A., Janssen, W., Lähteenoja, V., & Rikken, M. (2022). Understanding MyData Operators. MyData Global. White paper.
- Lehtiniemi, T., & Ruckenstein, M. (2018). The social imaginaries of data activism. *Big Data & Society*, 6(1), 2053951718821146.
- Lehto, P., & Malkanmäki, S. (2023). The Finnish health sector growth and competitiveness vision 2030. Working paper. <https://www.sitra.fi/en/publications/the-finnish-health-sector-growth-and-competitiveness-vision-2030/>.
- Lim, C., Kim, K. H., Kim, M. J., Heo, J. Y., Kim, K. J., & Maglio, P. P. (2018). From data to value: A nine-factor framework for data-based value creation in information-intensive services. *International Journal of Information Management*, 39, 121–135.
- Liu, Z., Shi, Y., & Yang, B. (2022). Open innovation in times of crisis: An overview of the healthcare sector in response to the COVID-19 Pandemic. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(1), 21.
- Löbner H. (2013). Service-dominant networks: An evolution from the service-dominant logic perspective. *Journal of Service Management*, 24(4), 420–434.
- Lusch, R. F., & Nambisan, S. (2015). Service innovation: A service-dominant logic perspective. *Mis Quarterly*, 39(1).
- Lusch, R. F., & Vargo, S. L. (2014), *Service Dominant Logic: Premises, Perspectives, Possibilities*. Cambridge University Press, New York, NY.
- Lusch, R. F., Vargo, S. L., & Tanniru, M. (2010). Service, value networks, and learning. *Journal of the Academy of Marketing Science*, 38(1), 19–31.
- Maglio, P. P., & Spohrer, J. (2013). A service science perspective on business model innovation. *Industrial Marketing Management*, 42, 665–670.
- Magretta, J. (2002). Why business models matter. *Harvard Business Review*. 80(5), 86–92.
- Makkonen, H.; & Komulainen, H. (2018), Explicating the market dimension in the study of digital innovation: A management framework for digital innovation. *Technology Analysis and Strategic Management*, 1–14.
- Malgieri, G., & Custers, B. (2018). Pricing privacy: The right to know the value of your personal data. *Computer Law & Security Review*, 34(2), 289–303.

- Markides, C. (2006). Disruptive innovation: In need of better theory. *Journal of Product Innovation Management*, 23(1), 19–25.
- Mars, M.M., Bronstein, J.L., & Lusch, R.F. (2012). The value of a metaphor: organizations and ecosystems. *Organizational Dynamics*, 41(4), 271–280.
- Martin, K. E. (2015). Ethical Issues in the Big Data Industry. *MIS Quarterly Executive*, 14(2).
- Massa, L. (2023). Why uncertainty and sustainability will be key drivers of business model innovation. *Journal of Business Models*, 11(3), 24–29.
- Massa, L., & Tucci, C. L. (2013). Business Model Innovation. *The Oxford Handbook of Innovation Management*, 20(18), 420–441.
- Massa, L., Tucci, C., & Afuah, A. (2017). A Critical assessment of business model research. *Academy of Management Annals*, 11(1), 73–104.
- Maxwell, J. A. (2013). *Qualitative Research Design: An Interactive Approach*. SAGE.
- Miklosik, A., & Evans, N. (2020). Impact of big data and machine learning on digital transformation in marketing: A literature review. *IEEE Access*, 8, 101284–101292.
- Minerbo, C., & Brito, L. A. L. (2022). An integrated perspective of value creation and capture: A systematic literature review. *Journal of Business & Industrial Marketing*, 37(4), 768–789.
- Möller, K., & Halinen, A. (2017). Managing business and innovation networks: From strategic nets to business fields and ecosystems. *Industrial Marketing Management*, 67, 5–22.
- Morgan, S. J., Pullon, S. R., Macdonald, L. M., McKinlay, E. M., & Gray, B. V. (2017). Case study observational research: A framework for conducting case study research where observation data are the focus. *Qualitative Health Research*, 27(7), 1060–1068.
- Morse, J. M. (2010). Simultaneous and sequential qualitative mixed method designs. *Qualitative Inquiry*, 16(6), 483–491.
- Mosadeghrad, A. M. (2014). Factors influencing healthcare service quality. *International Journal of Health Policy and Management*, 3(2), 77.
- Mosig, T., Lehmann, C., & Neyer, A. K. (2021). Data-driven business model innovation: About barriers and new perspectives. *International Journal of Innovation and Technology Management*, 18(02), 2040017.
- Nambisan, S., & Sawhney, M. (2011). Orchestration processes in network-centric innovation: Evidence from the field. *Academy of Management Perspectives*, 25(3), 40–57.
- Nielsen, C., & Aagaard, A. (2021). The fifth stage of business model research: The role of business models in times of uncertainty. *Journal of Business Models*, 9(1), 77–90.
- Noble, H., & Smith, J. (2015). Issues of validity and reliability in qualitative research. *Evidence-Based Nursing*, 18(2), 34–35.
- Oshni Alvandi, A., Bain, C., & Burstein, F. (2021). Understanding digital health ecosystem from Australian citizens' perspective: A scoping review. *PLOS One*, 16(11), e0260058.
- Osterwalder, A., & Pigneur, Y. (2002). An eBusiness model ontology for modeling eBusiness. BLED 2002 Proceedings, 2.
- Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. John Wiley & Sons.

- Otto, B., & Jarke, M. (2019). Designing a multi-sided data platform: Findings from the International Data Spaces case. *Electronic Markets*, 29(4), 561–580.
- Padilla, J., Piccolo, S., & Vasconcelos, H. (2022). Business models, consumer data and privacy in platform markets. *Journal of Industrial and Business Economics*, 49(3), 599–634.
- Pateli, A. G., & Giaglis, G. M. (2004). A research framework for analysing eBusiness models. *European Journal of Information Systems*, 13(4), 302–314.
- Pateli, A. G., & Giaglis, G. M. (2005). Technology innovation-induced business model change: A contingency approach. *Journal of Organizational Change Management*, 18(2), 167–183.
- Pekkala, K., Elo, J., & Tuunanen, T. (2023). Functional and Structural Roles of Data in Service Ecosystems. In Proceedings of the Annual Hawaii International Conference on System Sciences. University of Hawai'i at Manoa.
- Pikkarainen, M., Huhtala, T., Kempainen, L., & Häikiö, J. (2019). Success factors for data-driven service delivery networks. *Journal of Innovation Management*, 7(4), 14–46. https://doi.org/10.24840/2183-0606_007.004_0003
- Poikola, Kuikkaniemi, Honko (2015). MyData: A Nordic Model for human-centered personal data management and processing. Ministry of Transport and Communications. White paper. <http://urn.fi/URN:ISBN:978-952-243-455-5>.
- Pop, O. M., Leroi-Werelds, S., Roijackers, N., & Andreassen, T. W. (2018). Institutional types and institutional change in healthcare ecosystems. *Journal of Service Management*, 29(4), 593–614.
- Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5–14.
- Pucihar, A., Lenart, G., Kljajić Borštnar, M., Vidmar, D., & Marolt, M. (2019). Drivers and outcomes of business model innovation: Micro, small and medium-sized enterprises perspective. *Sustainability*, 11(2), 344.
- Pynnönen, M., Hallikas, J., & Ritala, P. (2012). Managing customer-driven business model innovation. *International Journal of Innovation Management*, 16(4), 1250022.
- Rangaswamy, A., Moch, N., Felten, C., Van Bruggen, G., Wieringa, J. E., & Wirtz, J. (2020). The role of marketing in digital business platforms. *Journal of Interactive Marketing*, 51(1), 72–90.
- Rashid, M., Caine, V., & Goetz, H. (2015). The encounters and challenges of ethnography as a methodology in health research. *International Journal of Qualitative Methods*, 14(5), 1609406915621421.
- Richardson, J. (2008). The business model: An integrative framework for strategy execution. *Strategic Change*, 17, 133–144.
- Rieke, N., Hancox, J., Li, W., Milletari, F., Roth, H. R., Albarqouni, S., ... & Cardoso, M. J. (2020). The future of digital health with federated learning. *NPJ Digital Medicine*, 3(1), 119.
- Rindfleisch A., & Moorman C. (2001). The Acquisition and Utilization of Information in New Product Alliances: A Strength-of-Ties Perspective. *Journal of Marketing*, 65(4), 1–18.

- Ritchie J., & Lewis J. (eds.) (2003). *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. SAGE.
- Saarijärvi H., Kuusela H., Kannan P. K., Kulkarni G., & Rintamäki, T. (2016). Unlocking the transformative potential of customer data in retailing. *The International Review of Retail, Distribution and Consumer Research*, 26(3), 225–241.
- Saarikko, T. (2015). Digital platform development: A service-oriented perspective. Complete Research. In 23rd European Conference on Information Systems (ECIS), Münster, Germany, 2015.
- Saldaña, J. (2021). *The Coding Manual for Qualitative Researchers*, pp. 1–440.
- Saxena, D., Muzellec, L., & Trabucchi, D. (2020). BlaBlaCar: Value creation on a digital platform. *Journal of Information Technology Teaching Cases*, 10(2), 119–126.
- Schoonenboom, J., & Johnson, R. B. (2017). How to construct a mixed methods research design. *Kolner Zeitschrift für Soziologie und Sozialpsychologie*, 69(Suppl 2), 107.
- Schrieck, M., Wiesche, M., & Krcmar, H. (2021). Capabilities for value co-creation and value capture in emergent platform ecosystems: A longitudinal case study of SAP's cloud platform. *Journal of Information Technology*, 36(4), 365–390.
- Schweiger, A., Nagel, J., Böhm, M., & Krcmar, H. (2016). Platform business models. *Digital Mobility Platforms and Ecosystems*, 66–77.
- Schymanietz, M., Jonas, J. M., & Möslin, K. M. (2022). Exploring data-driven service innovation: Aligning perspectives in research and practice. *Journal of Business Economics*, 92(7), 1167–1205.
- Shafer, S. M., Smith, H. J., & Linder, J. C. (2005). The power of business models. *Business Horizons*, 48, 199–207.
- Şimşek, T., Öner, M. A., Kunday, Ö., & Olcay, G. A. (2022). A journey towards a digital platform business model: A case study in a global tech-company. *Technological Forecasting and Social Change*, 175, 121372.
- Singh, A., & Pathak, G. S. (2020). The quest for consumer engagement via cause-related marketing: A mixed method study in an emerging economy. *Journal of Retailing and Consumer Services*, 55, 102128.
- Sjödín, D., Parida, V., Jovanovic, M., & Visnjic, I. (2020). Value creation and value capture alignment in business model innovation: A process view on outcome-based business models. *Journal of Product Innovation Management*, 37(2), 158–183.
- Skog, D. A. (2019). The dynamics of digital transformation: The role of digital innovation, ecosystems and logics in fundamental organizational change (Doctoral dissertation, Umeå Universitet).
- Snihur, Y., Thomas, L. D., & Burgelman, R. A. (2018). An ecosystem-level process model of business model disruption: The disruptor's gambit. *Journal of Management Studies*, 55(7), 1278–1316.
- Sorescu, A. (2017). Data-driven business model innovation. *Journal of Product Innovation Management*, 34(5), 691–696.
- Souto, J. E. (2015). Business model innovation and business concept innovation as the context of incremental innovation and radical innovation. *Tourism Management*, 51, 142–155.

- Spiekermann, S., & Novotny, A. (2015). A vision for global privacy bridges: Technical and legal measures for international data markets. *Computer Law & Security Review*, 31(2), 181–200.
- Srivastava, S. C.; & Shainesh, G. (2015). Bridging the service divide through digitally enabled service innovations: Evidence from Indian health care service providers. *MIS Quarterly*, 39(1).
- Stevens, G., Hantson, L., Larmuseau, M., & Verdonck, P. (2022). A human-centered, health data-driven ecosystem. *Discover Health Systems*, 1(1), 10.
- Storbacka, K., Frow, P., Nenonen, S., & Payne, A. (2012). Designing business models for value co-creation. In *Special Issue—Toward a Better Understanding of the Role of Value in Markets and Marketing* (pp. 51–78). Emerald Group Publishing Limited.
- Tashakkori, A., & Creswell, J. W. (2007). The new era of mixed methods. *Journal of Mixed Methods Research*, 1(1), 3–7.
- Täuscher, K., & Laudien, S. M. (2018). Understanding platform business models: A mixed methods study of marketplaces. *European Management Journal*, 36(3), 319–329.
- Tavory, I., & Timmermans, S. (2014). *Abductive Analysis: Theorizing Qualitative Research*. University of Chicago Press.
- Thornton, H. C. (2024). Business model change and internationalization in the sharing economy. *Journal of Business Research*, 170, 114250.
- Timmers, P. (1998). Business models for electronic markets. *Electronic Markets*, 8(2), 3-8.
- Toscher, B. (2021). Resource integration, value co-creation, and service-dominant logic in music marketing: The case of the TikTok platform. *International Journal of Music Business Research*, 10(1), 33–50.
- Trabucchi, D., Patrucco, A. S., Buganza, T., & Marzi, G. (2023). Is transparency the new green? How business model transparency influences digital service adoption. *Technovation*, 126, 102803.
- Truong, N. B., Sun, K., Lee, G. M., & Guo, Y. (2019). GDPR-compliant personal data management: A blockchain-based solution. *IEEE Transactions on Information Forensics and Security*, 15, 1746–1761.
- Tynkkynen, L. K., Pulkki, J., Tervonen-Gonçalves, L., Schön, P., Burström, B., & Keskimäki, I. (2022). Health system reforms and the needs of the ageing population: An analysis of recent policy paths and reform trends in Finland and Sweden. *European Journal of Ageing*, 19(2), 221–232.
- Van Alstyne, M. W., Parker, G. G., & Choudary, S. P. (2016). How platforms are reshaping business: Pipelines, Platforms, and the new rules of strategy. *Harvard Business Review*. 54–62.
- van Putten, B.-J., & Schief, M. (2012). The relationship between dynamic business models and business cases. *Electronic Journal Information Systems Evaluation*, 15(1), 138–148.
- Vargo, S. L. & Lusch, R. L. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17.
- Vargo, S. L., & Akaka, M. A. (2009). Service-dominant logic as a foundation for service science: Clarifications. *Service Science*, 1(1), 32–41.

- Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: An extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, 44, 5–23.
- Vargo, S. L., Maglio, P. P., & Akaka, M. A. (2008). On value and value co-creation: A service systems and service logic perspective. *European Management Journal*, 26(3), 145–152.
- Vaska, S., Massaro, M., Bagarotto, E. M., & Dal Mas, F. (2021). The digital transformation of business model innovation: A structured literature review. *Frontiers in Psychology*, 11, 539363.
- Vaz, N., & Araujo, C. A. S. (2023). Service design activities in health services: A systematic literature review based on ecosystem perspective and transformative approach. *The International Journal of Health Planning and Management*, 38(5), 1250–1267.
- Veile, J. W., Schmidt, M. C., & Voigt, K. I. (2022). Toward a new era of cooperation: How industrial digital platforms transform business models in Industry 4.0. *Journal of Business Research*, 143, 387–405.
- Veit, D., Clemons, E., Benlian, A., Buxmann, P., Hess, T., Kundisch, D., ... & Spann, M. (2014). Business models. *Business & Information Systems Engineering*, 6(1), 45–53.
- Vescovi M., Perentis C., Leonardi C., Lepri B., & Moiso C. (2014). My data store: Toward user awareness and control on personal data. In Proceedings of the 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct Publication pp. 179–182. ACM.
- Vescovi, M., Moiso, C., Pasolli, M., Cordin, L., & Antonelli, F. (2015). Building an ecosystem of trusted services via user control and transparency on personal data. *IFIP International Federation for Information Processing*, 454, 240–250.
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144.
- Vink, J., Koskela-Huotari, K., Tronvoll, B., Edvardsson, B., & Wetter-Edman, K. (2021). Service ecosystem design: Propositions, process model, and future research agenda. *Journal of Service Research*, 24(2), 168–186.
- Voelpel, S. C., Leibold, M., Tekie, E. B. (2004). The wheel of business model reinvention: How to reshape your business model to leapfrog competitors. *Journal of Change Management*, 4(3), 258–276.
- Wallin, A. (2017). Transforming healthcare through entrepreneurial innovations: An institutional view. *International Journal of E-Services and Mobile Applications (IJESMA)*, 9(1).
- Walsham, G. (1995). Interpretive case studies in ISresearch: Nature and method. *European Journal of Information Systems*, 4, 74–81.
- Wang, F., Karppinen, P., & Ahokangas, P. (2023). Exploring factors influencing actor engagement in MyData health platform: A case study from Finland. PACIS 2023. Proceedings 7.
- Wang, J., & Wang, Z. (2014). A survey on personal data cloud. *Sci. World J.* 2014, 13, Article ID 969150. doi:10.1155/2014/969150.
- Weber, R. H. (2015). The digital future: A challenge for privacy? *Computer Law & Security Review*, 31, 234–242.

- Wilson, C., Kuikkaniemi, K., Sepp, S., & Lähteenoja, V. (2023). Towards Network-based Ecosystems. MyData Global. White paper.
- Wirtz, B. W., Schilke, O., & Ullrich, S. (2010). Strategic development of business models: Implications of the Web 2.0 for creating value on the internet. *Long Range Planning*, 43(2), 272–290.
- Wu, Y., Nambisan, S., Xiao, J., & Xie, K. (2022). Consumer resource integration and service innovation in social commerce: The role of social media influencers. *Journal of the Academy of Marketing Science*, 50(3), 429–459.
- Yao, G., & Miao, J. (2021). Service value co-creation in digital platform business: A case of xianyu idle trading platform. *Sustainability*, 13(20), 11296.
- Yin, R. K. (2009). *Case Study Research: Design and Methods* (Vol. 5). SAGE.
- Zeng, J., Tavalaci, M. M., & Khan, Z. (2021). Sharing economy platform firms and their resource orchestration approaches. *Journal of Business Research*, 136, 451–465.
- Zhan, W., Pan, W., & Chen, L. (2021). Construction project productivity evaluation framework with expanded system boundaries. *Engineering, Construction and Architectural Management*, 28(4), 863–885.
- Zhang, W., Daim, T., & Zhang, Q. (2017). Exploring the multi-phase driven process for disruptive business model innovation of e-business Microcredit: A multiple case study from China. *Journal of the Knowledge Economy*, 1–28.
- Zhao, Y., Von Delft, S., Morgan-Thomas, A., & Buck, T. (2020). The evolution of platform business models: Exploring competitive battles in the world of platforms. *Long Range Planning*, 53(4), 101892.
- Zhu, F., & Furr, N. (2016). Products to platforms: Making the leap. *Harvard Business Review*, 94(4), 72–78.
- Ziegler, S., Evequoz, E., & Huamani, A. M. P. (2019). The impact of the European General Data Protection Regulation (GDPR) on future data business models: Toward a new paradigm and business opportunities. *Digital Business Models: Driving Transformation and Innovation*, 201-226.
- Zott, C., & Amit, R. (2007). Business model design and the performance of entrepreneurial firms. *Organization Science*, 18(2), 181–199.
- Zott, C., Amit, R., & Massa, L. (2011). The business model: Recent developments and future research. *Journal of Management*, 37(4), 1019–1042.
- Zutshi, A., & Grilo, A. (2019). The emergence of digital platforms: A conceptual platform architecture and impact on industrial engineering. *Computers & Industrial Engineering*, 136, 546–555.

Original publications

- I Kempainen, L., Koivumäki, T., Pikkarainen, M., & Poikola, A. (2018). Emerging Revenue Models for Personal Data Platform Operators: When Individuals are in Control of Their Data. *Journal of Business Models*, 6(3), 79–105. <https://doi.org/10.5278/ojs.jbm.v6i3.2053>.
- II Kempainen, L., Pikkarainen, M., Hurmelinna-Laukkanen, P., & Reponen, J. (2019). Connected Health Innovation: Data Access Challenges in the Interface of AI Companies and Hospitals. *Technology Innovation Management Review*, 9(12), 43–55. <https://doi.org/10.22215/timreview/1291>.
- III Pikkarainen, M., Kempainen, L., Xu, Y., Jansson, M., Ahokangas, P., Koivumäki, T., Hong Gu, H., & Francis Gomes, J. (2022). Resource Integration Capabilities to Enable Platform Complementarity in Healthcare Service Ecosystem Co-creation. *Baltic Journal of Management*, 17(5), 688–704. <https://doi.org/10.1108/BJM-11-2021-0436>.
- IV Kempainen, L., Pikkarainen, M., Koivumäki, T., & Xu, Y. (2022). Drivers for Platform Business Model Innovation: Individuals in Control over Their Personal Data. *Journal of Innovation Management*, 10(3), 46–74. https://doi.org/10.24840/2183-0606_010.003_0003.

Reprinted with permission from Emerald Group Publishing Limited (III).

Original publications are not included in the electronic version of the dissertation.

127. Väisänen, Marjo (2022) Enabling control in post-acquisition integration
128. Tran, Thuy-Van (2022) The relationships between performance evaluation practices and fairness perceptions
129. Okkonen, Hanna (2022) From planning to unexpected outcomes : a process-relational practice approach to understanding the emergence of strategy
130. Kauppila, Mikko (2022) Whither alpha? Hedge fund performance in voluntary versus regulatory data sets
131. Kaasila-Pakanen, Anna-Liisa (2023) Thinking through encounters : postcolonial essays on difference and otherness in organization studies
132. Lassila, Erkki (2023) Big data in the margins of accounting : the mediating role of calculative practices in a digital environment
133. Tabas, Abdollah Mohammadparast (2023) The role of entrepreneurial ecosystems in health technology SMEs' business and internationalisation in the Finnish context
134. Haarjärvi, Tuure (2023) Organizational humanness : uncovering humanness in sites of organizing
135. Väinämö, Milka (2023) "It makes things so much easier" : exploring brand experience in a digital health context
136. Rani, Pushpa (2023) Dynamics of reversal of strategic change in an emerging market : case study in India
137. Kamara, Samppa (2023) Diaspora networks in micro-sized firms' internationalization : analysis of Finnish firms' expansion across Sub-Saharan Africa
138. Forsten-Astikainen, Riitta (2023) Self-reflection in work competencies evaluation
139. Koivunen, Kati (2023) Co-creating professional brand identity on social media in a career transition
140. Perätalo, Sari (2023) In search of a business model approach for smart cities
141. Aman, Raushan (2024) Highly skilled migrant women entrepreneurs in the host country's entrepreneurial ecosystem
142. Jansson, Kaisu (2024) Organizational hybridity in a university hospital : a social systems theoretical perspective

S E R I E S E D I T O R S

A
SCIENTIAE RERUM NATURALIUM
University Lecturer Mahmoud Filali

B
HUMANIORA
University Lecturer Santeri Palviainen

C
TECHNICA
Senior Research Fellow Antti Kajjalainen

D
MEDICA
University Lecturer Pirjo Kaakinen

E
SCIENTIAE RERUM SOCIALIUM
University Lecturer Henri Pettersson

F
SCRIPTA ACADEMICA
Strategy Officer Mari Katvala

G
OECONOMICA
University Researcher Marko Korhonen

H
ARCHITECTONICA
Associate Professor Anu Soikkeli

EDITOR IN CHIEF
University Lecturer Santeri Palviainen