

JYU DISSERTATIONS 330

Juuli Lumivalo

Explaining Digital Service Users' Pursuit of Value

A Value Co-creation and Co-destruction Perspective



UNIVERSITY OF JYVÄSKYLÄ
FACULTY OF INFORMATION
TECHNOLOGY

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ABSTRACT

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In the era of digital services, services account for approximately 70% of the global economy. Service-dominant logic (SDL), as a lens for understanding services as value co-creation (VCC) processes, serves to elucidate how value can be derived from the use of digital services. However, the prior research in this area has tended to adopt a firm-centric or generic approach to designing and developing systems, paying less attention on the perspective of an individual user. Further, SDL tends to overlook the possibility of negative service outcomes following the use of such systems, that is, value co-destruction (VCD). Therefore, this dissertation investigates the phenomena of VCC and VCD through five qualitative studies. First, we conduct a meta-analysis of laddering interviews ($n = 113$) to examine service users' hedonic and utilitarian drivers in relation to VCC behavior as well as to identify VCC mechanisms for digital service design. Using the interpretive structural modelling (ISM) approach, we show that VCC is contextually dependent and occurs in different ways depending on the digital service in question. Our findings also show that VCC is driven by both hedonic and utilitarian user values. Subsequently, we perform a structured literature review and propose a synthesized framework for the VCD process. The framework comprises two interrelated dimensions (i.e., VCD drivers and VCD interaction components) and their constituents, which occur at three temporal points of the service encounter. Further, we conduct an in-depth case study involving digital service users ($n = 43$) in the augmented reality mobile games context, thereby examining the users' VCD experiences. We employ a hierarchical clustering analysis and propose the reasoning behind users' VCD experiences. Subsequently, we conduct an ISM analysis to reveal the VCD process mechanisms that occur at four hierarchical levels. The proposed models of VCC and VCD contribute to both research and practice by offering new insights into the favorable and unfavorable aspects of services, shedding particular light on individual users' service experiences. Linking the concepts of VCC and VCD, this dissertation extends the SDL framework with insights into the two distinct phenomena. Our findings may be harnessed in the design, development, and provision of digital services, thereby enhancing both the service experience and the derived value.

Keywords: value co-creation, value co-destruction, digital services, digital service design, augmented reality mobile games

TIIVISTELMÄ (ABSTRACT IN FINNISH)

Lumivalo, Juuli

Digitaalisten palvelujen käyttäjät tavoittelemassa arvoa: näkökulmana arvon yhteisluominen ja yhteistuhaneminen

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Palvelukeskeisen logiikan linssillä voidaan tarkastella digitaalisia palveluja prosesseina, joissa arvoa yhteisluodaan palvelujen käytön kautta. Kirjallisuudessa näitä prosesseja ja järjestelmien kehittämistä sekä muotoilua tarkastellaan kuitenkin usein yrityskeskeisestä tai yleisestä näkökulmasta, jolloin arvon yhteisluomisen tarkasteleminen yksittäisen palvelunkäyttäjän tasolla on puutteellista. Palvelukeskeisen logiikan kirjallisuus ei ole myöskään huomioinut kielteisten lopputulemien mahdollisuutta palvelujen käytössä, eli arvon yhteistuhanemista. Tässä väitöskirjassa tarkastellaan sekä arvon yhteisluomista että -tuhanemista laadullisen tutkimuksen menetelmin viidessä tutkimusartikkelissa. Yhtäältä tarkastelemme Laddering-haastatteluaineiston (n=113) meta-analyysin kautta digitaalisten palvelujen käyttäjien hyöty- ja nautintoperäisiä arvoajureita arvon yhteisluomiseen, sekä arvon yhteisluomisen mekanismeja palvelumuotoilun ja -suunnittelun tarpeisiin. Osoitamme selittävän rakennemallinnusmenetelmän (Interpretive Structural Modeling, ISM) keinoin ilmiön mekanismeja erilaisten palvelutyyppeiden kohdalla. Tulokset osoittavat lisäksi käyttäjien hyöty- ja nautintoperäisten arvoajurien sekä näiden yhdistelmien keskeisyyden digitaalisen palvelun tyypistä riippumatta. Toisaalta tarkastelemme arvon yhteistuhanemisen ilmiötä kirjallisuuskatsauksen sekä kenttätutkimuksen keinoin. Kirjallisuuskatsauksen tuloksena esitetään kaksitahoinen viitekehys arvon yhteistuhanemisen prosessista. Lisäksi tarkastelemme ilmiötä syvemmin kenttätutkimuksessa, jossa kerätään haastatteluaineistoa digitaalisen palvelujen käyttäjien (n=43) kokemasta arvon yhteistuhanemisesta laajennetun todellisuuden mobiilipelin käytössä. Esitämme hierarkkista klusterianalyysia hyödyntäen käyttäjäkeskeisen jaottelun arvon yhteistuhanemisen taustatekijöistä. Lisäksi tarkastelemme selittävän rakennemallinnusmenetelmän keinoin arvon yhteistuhanemisen prosessin mekanismeja ja näiden välisiä suhteita. Esitetyt arvon yhteisluomisen ja -tuhanemisen mekanismit luovat uutta syväluotaavaa ymmärrystä ilmiöiden syntyperästä palvelukohtaamisissa laajentaen palvelukeskeisen logiikan linssiä. Väitöskirjan löydöksiä voidaan hyödyntää palvelumuotoilun ja järjestelmäsuunnittelun sekä palvelun tarjoamisen käytänteiden kehittämisessä.

Asiasanat: arvon yhteisluominen, arvon yhteistuhaneminen, digitaaliset palvelut, palvelumuotoilu, järjestelmäsuunnittelu, laajennettu todellisuus

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LIST OF FIGURES

FIGURE 1	Relation between the research questions and the articles	20
FIGURE 2	Dissertation outline	21
FIGURE 3	System value propositions and user value drivers in relation to IS development (adapted from Tuunanen et al. 2010)	30
FIGURE 4	The structured literature review process	40
FIGURE 5	Example of the laddering interview process	46
FIGURE 6	ISM graph for all five digital service systems.....	57
FIGURE 7	Framework for the VCD process	63
FIGURE 8	Mechanisms behind the VCD process	68

LIST OF TABLES

TABLE 1	Description of the data collection and analysis methods used in each article.....	39
TABLE 2	Data units in data set A	45
TABLE 3	Data units in data set B.....	45
TABLE 4	A laddering chain from data set B	47
TABLE 5	Analyses applied in the case studies and the resulting model/categorization	48
TABLE 6	Themes developed during the meta-coding of data set A and their frequencies.....	52
TABLE 7	Themes developed during the meta-coding of data set B and their frequencies.....	52
TABLE 8	Meta-coded value themes across all the cases %(n)	59
TABLE 9	Hedonic value distribution across all the cases %(n).....	59
TABLE 10	Utilitarian value distribution across all the cases %(n).....	60
TABLE 11	Hybrid value distribution across all the cases %(n)	60
TABLE 12	Results of the hierarchical clustering analysis and example reasoning from the data.....	65
TABLE 13	Mechanisms behind VCC (across all the cases in Article I, threshold ≥ 2) and the potential implications for service design, development, and provision.....	83
TABLE 14	Mechanisms behind VCD and the potential implications for service design, development, and provision.....	87
TABLE 15	Future research topics.....	92

CONTENTS

ABSTRACT

TIIVISTELMÄ (ABSTRACT IN FINNISH)

ACKNOWLEDGEMENTS

LISTS OF FIGURES AND TABLES

CONTENTS

1	INTRODUCTION	13
1.1	Background, relevance, and motivation of the research	13
1.2	Scope and objectives of the research.....	16
1.3	Structure of the dissertation.....	20
2	THEORETICAL FOUNDATION AND RESEARCH CONTEXT	22
2.1	Approaches to value and creating value.....	22
2.2	Foundations of the SDL framework	24
2.3	Co-creation of value: understanding the phenomenon.....	25
2.4	VCC in digital services	27
2.5	Designing digital services for VCC.....	29
2.6	The emerging concept of VCD	32
2.7	VCC and VCD in the context of AR mobile games	33
3	RESEARCH APPROACHES AND METHODOLOGY	37
3.1	Research approaches.....	37
3.2	Structured literature review.....	40
3.3	Case studies.....	42
3.3.1	Laddering interviews	43
3.3.2	Analyses	48
3.3.3	Meta-coding (Article II).....	49
3.3.4	Hierarchical clustering analysis (Article IV).....	50
3.3.5	ISM analyses (Articles I and V).....	51
4	FINDINGS.....	55
4.1	Article I: Value co-creation mechanisms for digital service design...55	
4.2	Article II: Unboxing co-creation of value: users' hedonic and utilitarian drivers.....	57
4.3	Article III: Understanding service actors' value co-destruction process: a structured literature review	61
4.4	Article IV: When value co-creation turns to co-destruction: users' experiences of augmented reality mobile games.....	63
4.5	Article V: Value co-destruction mechanisms in augmented reality mobile games	67
5	DISCUSSION	70
5.1	Answers to research questions	70

5.2	Contributions to research and theory	72
5.2.1	Unboxing the process of VCC for DSD	72
5.2.2	Explaining the VCD process	75
5.2.3	Linkages between VCC and VCD	79
5.2.4	Methodological implications.....	80
5.3	Contributions to practice.....	81
5.3.1	Design and development of services for enhancing VCC	81
5.3.2	Acknowledge and redirect – how to prevent VCD	86
5.3.3	Limitations	90
5.3.4	Future research topics	92
	YHTEENVETO (SUMMARY IN FINNISH).....	95
	REFERENCES	98
	ORIGINAL PAPERS	

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- I. Tuunanen, T., Lintula, J., Vartiainen, T., Zhang, Y., and Myers, M. D. Value co-creation mechanisms for digital service design. (Under review.)
- II. Tuunanen, T., Lintula, J., and Auvinen, A. 2019. Unboxing co-creation of value: users' hedonic and utilitarian drivers, in *Proceedings of the 52nd Hawaii International Conference on System Sciences (HICSS)*, pp. 1406-1415, University of Hawai'i at Manoa.
- III. Lintula, J, Tuunanen, T., and Salo, M. Understanding service actors' value co-destruction process: a structured literature review. (Unpublished working paper)
- IV. Lintula, J., Tuunanen, T., Salo, M., and Myers, M. D. 2018. When value co-creation turns to co-destruction: users' experiences of augmented reality mobile games, in *Proceedings of the International Conference on Information Systems (ICIS)*, pp. 1-17, Association for Information Systems (AIS).
- V. Lintula, J., Tuunanen, T., Salo, M., Zhang, Y., and Myers, M. D. Value co-destruction mechanisms in augmented reality mobile games. (Under review.)

In relation to Articles I and II, the candidate is the second author. As such, the candidate significantly participated in the theoretical development of the articles; in the writing of the findings, discussion, and conclusion sections; as well as in establishing the theoretical background sections regarding service-dominant logic and value co-creation. In addition, the candidate coded the data. In terms of Articles III-V, the candidate is the first author and so conducted the majority of the work, from planning the studies to the theoretical development and the writing of the articles. Furthermore, the candidate was responsible for collecting and analyzing the data.

1 INTRODUCTION

This chapter aims to introduce the topic area of the dissertation by presenting the background, relevance, and motivation of the research. Furthermore, the chapter depicts the scope, objectives, and the structure of the dissertation.

1.1 Background, relevance, and motivation of the research

Service, which has been defined as the “direct provision or co-creation of value between a provider and a customer,” has revolutionized the global economy (Rust and Huang 2014, p. 207). For instance, within the European Union, services account for more than 70% of the economy (European Commission 2020), while in the United States of America, 80% of the gross domestic product is services-related (Central Intelligence Agency [CIA] 2019). While the conceptualization of *service* (in singular), refers to the exchange process, where service actors apply resources for the benefit of one another (Vargo and Lusch 2004), *services*, in plural, refer to the types of output of that process (Vargo et al., 2020), such as an Uber ride, a concert, or a bank transaction. On global average, services account for 68.9% of a country’s gross domestic product (World Bank 2019). Thus, the global service economy influences how both organizations and individuals work, as well as what skills are required of them (Buera and Kaboski 2012). The inherent intangibility of services differentiates them from goods. More specifically, services cannot be owned; rather, they can be experienced, created, or participated in (Metters and Marucheck 2007). Accordingly, one key issue that service researchers and practitioners alike seek to understand is how value is created for customers, providers, and other actors who participate in service processes (Ostrom et al. 2015). For example, employing a broader definition of the concept of value, Vargo et al. (2008a, p. 149) regard value as an improvement in well-being for the focal actor participating in the service in question. Developing an understanding of how to create value for service customers could prove useful in relation to service design, development, and provision when it comes to improved value realization.

Service-dominant logic (SDL) emerged in the marketing domain (Vargo and Lusch 2004) as a unified mindset concerning value co-creation (VCC), which serves to overcome the limitations of the traditional goods-oriented view of value creation (Spohrer et al. 2008). A core argument of SDL is that service providers may merely provide customers¹ with value propositions, while value is ultimately co-created in cooperation with the actors² involved in the service process (Vargo and Lusch 2004, 2008a). That is, value is considered to be co-created *in the use* of a given service by two or more resource-integrating actors, thereby resulting in an increase in the well-being of at least one of the involved actors (Maglio et al. 2009).

The SDL approach prompts managers to focus their processes on achieving a service orientation and so moving away from the traditional product orientation (Vargo and Lusch 2008b). As such, SDL has influenced how the creation of value is perceived across related disciplines, such as information systems (IS), service research, marketing, management, and tourism (e.g., Baumann et al. 2017; Edvardsson and Tronvoll 2013; Lusch and Nambisan 2015; Nam and Lee 2010; Polese et al. 2018). However, it must be acknowledged that theoretical ambiguity underlies the concept of VCC (Ranjan and Read 2016). The details of how the VCC process actually unfolds tend to be overlooked, particularly from the individual service customer's perspective (Heinonen et al. 2010). Although some researchers, such as Payne et al. (2008), investigate how individual customers co-create value, the research applying SDL tends to focus on the managerial aspects of VCC, with firms constituting the locus of the investigation.

The prior IS research has tended to adopt insights from the field of business, meaning that it positions instrumental outcomes and the managerial aspects of information technology within services as research priorities (e.g., Bardhan et al. 2010; Sarker et al. 2019). While the discourse in this area has recently started to include users' hedonic value drivers in relation to IS use (e.g., Kahneman et al. 2004; Kari et al. 2020; Van der Heijden 2004), the modeling and determining of IS users' behavior has generally focused on rational and utility-driven aspects (e.g., Bhattacharjee 2001; Venkatesh and Davis 2000). Some IS researchers have used the SDL lens to investigate service ecosystems for innovations (Barrett et al. 2015). However, only a few studies have particularly focused on VCC and the associated design implications for digital services. Tuunanen et al. (2010) adopt the customer perspective and argue that VCC occurs during the interplay between at least two issues, namely the value propositions offered to customers and the value drivers of customers' value-pursuing behavior. Prior studies have also looked into the impacts of digital platforms on service innovation (Yoo et al. 2010), the nature of digital service design (DSD) (Williams et al. 2008), and the various techniques for development projects (Liu et al. 2016).

As enhancing customers' service experience through determining how to apply VCC in relation to digital service design has been declared a key priority

¹ In this dissertation, the *customer* is regarded as an individual user of services in consumer or business contexts.

² Drawing on SDL, the word *actor* is used in this dissertation to refer to all parties to the service process, for example, customers, providers, and other stakeholders.

with regard to service research (Ostrom et al. 2015), there exists a need for an improved understanding of how VCC can actually be implemented in services (Vargo et al. 2008). In the IS literature, the discourse concerning customer-oriented DSD intended to enable and enhance VCC remains rather limited. More specifically, there is a lack of sufficient research-informed guidance regarding the design of digital services in such a way as to enable and enhance VCC in relation to both utilitarian and hedonic value outcomes. As technological innovations continuously change the digital services landscape (e.g., Rust and Huang 2014), the available technological features and their influences ought to be carefully considered in relation to DSD. Linking insights derived from SDL with the design of digital services is particularly important because new technologies enable new means of co-creating value with customers through the interaction between both the social and technical aspects of such services.

The SDL framework has been criticized due to its overly optimistic perspective on services and the concept of value (e.g., Echeverri and Skålén 2011; Plé 2017; Plé and Chumpitaz Cáceres 2010). While SDL posits that value emerges during the process of VCC (Vargo and Lusch 2004), in reality, service interactions between actors may also lead to negative value outcomes for one or more of them (Plé and Chumpitaz Cáceres 2010). Thus, a balanced understanding of how value emerges in digital services ought to take into account the emergence of positive and negative value outcomes. Plé and Chumpitaz Cáceres (2010) suggest that value co-destruction (VCD) can also occur in services, defining it as accidental or intentional resource misuse that leads to the decreased well-being of at least one of the actors involved. Studies have been conducted into the VCD phenomenon, for example, in the domains of marketing, tourism, banking, and IS (e.g., Echeverri and Skålén 2011; Neuhofer 2016; Vartiainen and Tuunanen 2016; Worthington and Durkin 2012), and they have adopted varying stances when it comes to what comprises the concept of VCD.

As a convoluted discourse concerning the concept of VCD has emerged, recent studies in the field of SDL have begun to acknowledge that the outcomes of VCC may be either positively or negatively valenced (Vargo et al. 2020). In partial contrast with this view, studies concerning the VCD concept have adopted inconsistent positions with regard to whether VCD is merely the flipside of VCC or whether it is a distinct yet an interconnected phenomenon. Moreover, some studies appear to interchangeably regard VCD as a process, an outcome, and both of the above. Prior investigations have tended to focus on face-to-face services, and they have been conducted across various empirical settings and disciplines. Further, the literature is plagued with inconsistency in terms of the employed terminology and understanding of the VCD phenomenon, which implies a lack of scientific consensus regarding the VCD concept.

We believe that in order to attain an in-depth understanding of how value may emerge in digital services, it is crucial to understand how and why both positive and negative value outcomes emerge for system users. Thus, it is necessary to bring together current insights on VCD as well as to conceptualize the phenomenon using the lens of SDL. Such a unified understanding of both VCC and VCD within the SDL framework could be harnessed in relation to the design, development, and provision of digital services as tools for preventing and

steering unwanted service outcomes, for example, customer dissatisfaction and negative word of mouth (Smith 2013).

Investigating the VCD concept and the unfolding of the VCD process is particularly important with regard to digital services, as the relevant actors' interactions are not merely enabled but also constrained by technology. In addition, new digital technologies, such as augmented reality³ (AR), pose new risks in terms of VCD in both the digital and physical spheres. For instance, when playing the AR mobile game Pokémon GO, gamers can enjoy catching Pokémon on their mobile phones while driving a motor vehicle, which has resulted in traffic accidents (Faccio and McConnell 2018). Thus, by fusing the physical and virtual worlds, AR mobile games may enhance digital VCC through interactions between gamers and the game, while VCD may occur in the physical world through interactions between gamers and their physical surroundings.

The present dissertation aims to scrutinize the VCC and VCD phenomena in relation to digital services as well as to conceptualize the VCD process within the SDL framework. Further, the dissertation will offer new insights for understanding the VCC process, thereby complementing current and emerging guidelines concerning the co-creation of value through DSD in an effort to enhance customers' service experience. By investigating and highlighting integrated insights into the distinct yet interrelated phenomena of VCC and VCD across divergent digital service contexts in five individual articles, this dissertation is rooted in the theoretical intersection between IS and service research. Moreover, implications relevant to the design, development, and provision of services will be derived for practitioners.

1.2 Scope and objectives of the research

As digital services are now ubiquitous in our daily lives, understanding how to apply VCC to enhance customers' service experiences through leveraging service design has become a key research priority in the service field (Ostrom et al. 2015). Recently, the SDL lexicon has been adopted by IS researchers investigating, for example, practices and technology within service ecosystems for innovation (Barrett et al. 2015). However, the design of digital services for the purpose of VCC has not yet been sufficiently addressed, and there is a lack of research-based practical guidance for the design of digital services intended to enable and enhance VCC. Such guidance could depict practical ways and potential tools for involving customers or users in the process of innovating, designing, developing, and implementing digital services, and offering value propositions that complement customers' values and goals in service use. We address this gap in

³ "Augmented reality (AR) is a user interface technology in which a camera-recorded view of the real world is augmented with computer-generated content such as annotations, graphics, animations, and three-dimensional (3-D) models" (Laine and Suk 2016, p. 550). Further, Azuma et al. (2001) suggest that AR technology is not solely limited to visual augmentation, as it may be related to all human senses in the real environment.

the literature by defining DSD and depicting how it differs from traditional IS design. Informed by the tenets of DSD, we examine five divergent digital service cases in a critical realist study. Here, we employ an interpretive structural modelling (ISM) analysis to derive the causal mechanisms that explain the VCC process in relation to digital services from the user perspective. The implications of the identified mechanisms provide us with an answer to the dissertation's first research question (Article I):

RQ1 How can digital services be designed to enable and enhance VCC?

Tuunanen et al. (2010) highlight the utilitarian and hedonic values as well as the goals of system use in their attempt to theorize VCC with regard to the development of IS. In a similar vein, Van der Heijden (2004) argues that two types of motivation, namely extrinsic and intrinsic motivation, underlie the use of systems. In this context, an extrinsically motivated user is driven by utilitarian values (i.e., an expected reward or benefit external to the system-user interaction). An intrinsically motivated user, in turn, has hedonic value drivers and so uses the system "for no apparent reinforcement other than the process of performing the activity per se" (Davis et al. 1992, p. 1112). As Tuunanen et al. (2010) note, understanding users' values and goals is vital when it comes to co-creating value with system users. However, the discourse on the possible hedonic aspects of system use has only emerged in recent years, with IS research having traditionally focused on firms interacting with other entities as well as the organizational use of systems. Therefore, there is shortage of VCC research with an individual service user focus. We address this research gap by investigating VCC in five distinct digital service systems⁴ and examining users' hedonic and utilitarian drivers of system use. In this endeavor, we depict and compare users' value structures (hedonic, utilitarian, and a combination of the two) in the investigated digital service contexts, thereby answering the dissertation's second research question (Article II):

RQ2 How do service systems differ in terms of users' hedonic and utilitarian value drivers?

To understand VCC in relation to different service actors, we also need to understand the instances when positive value outcomes remain unachieved and negative outcomes emerge. While VCC leads to positive value outcomes, that is, increased well-being on the part of the service beneficiaries (Vargo and Lusch 2004, 2008a), research examining how the VCD process leads to negative value outcomes remains scarce and lacks scientific consensus. For instance, using a mobile phone application as a payment method in physical store may provide efficiency and ease of use for the customer, but it could at the same time encourage excessive shopping behavior, potentially leading to negative value outcomes for the customer. Plé and Chumpitaz-Cáceres's (2010) definition of VCD as accidental or intentional misuse of resources appears to explain only part of the negative value outcomes emerging in the scattered literature. Furthermore, some researchers treat VCD as a process, others regard it as an outcome of a

⁴ Service systems are defined as "value-co-creation configurations of people, technology, value propositions connecting internal and external service systems, and shared information" (Maglio & Spohrer 2008, p. 18)

service interaction. Additionally, some studies interchangeably discuss VCD as a process and an outcome. Moreover, a number of studies treat the outcome of VCD as merely negative/controversial value, whereas other scholars also discuss the diminishing of value. As the relevant concepts and terminology have been applied inconsistently across earlier studies in this area, it is evident that there is a lack a consensus regarding the VCD phenomenon. Therefore, we conduct a structured literature review concerning the emerging VCD concept in an effort to synthesize the current knowledge. In doing so, we outline the present consensus and provide an in-depth understanding of the VCD process, thereby answering the dissertation's third research question (Article III):

RQ3a Based on prior literature on VCD, how does VCD occur between actors?

RQ3b What are the most central and recurring components that explain VCD?

Having reviewed the prior research concerning VCD, we aim to extend the current knowledge by revealing the underlying reasons for VCD from the service user perspective. Thus, our study responds to the call for more investigations into the emerging concept of VCD (Kuppelwieser and Finsterwalder 2016; Lintula et al. 2017; Plé 2017) by studying digital service users' VCD experiences in the AR mobile games context. AR mobile games represent a particularly interesting context for exploring VCD because, by nature, they fuse the virtual world of the game with the surrounding physical environment, thereby providing novel means of interactions between service actors. AR mobile games have become popular among millions of people worldwide and so have helped to shape the video games market. In addition to the gaming industry, AR technology could offer substantial business opportunities to multiple industries, including retail, real estate, and health care, by creating new markets and potentially disrupting the prevalent ones (Goldman Sachs 2016).

Thus, we investigate a particularly well-known and high-grossing AR mobile game, namely Pokémon GO (Nelson 2017). Previous research has showcased instances where Pokémon GO gamers have co-created value, for instance, in the form of improved physical and psychological well-being (Althoff et al. 2016; Baranowski 2016; Joseph and Armstrong 2016; Kari et al. 2017; Yang and Liu 2017). However, VCD may occur simultaneously to VCC (Vartiainen and Tuunanen 2016), and some studies indicate the implications of gamers' potential to experience VCD. For instance, gaming may have exposed Pokémon GO users to traffic accidents and assaults (Ayers et al. 2016; Raj et al. 2016). The majority of prior research in this context has, however, focused on the positive side of gaming. Therefore, our study seeks to develop a more in-depth understanding of the VCD phenomenon by investigating and explaining users' VCD experiences in the AR mobile games context. As our aim is to identify the reasons behind such experiences, our focus is on situations in which attempted beneficial resource integration and VCC has turned to VCD. With this investigation, we delve deep into gamers' perceived VCD experiences and so answer the dissertation's fourth research question (Article IV):

RQ4 Why does VCD occur in AR mobile games?

Having scrutinized the VCC mechanisms and value drivers relevant to digital services, in addition to having explored why VCD occurs for service users, it remains unclear how the process of VCD actually unfolds. We argue that it is equally important to understand the processes of VCC and VCD in relation to digital services, as that way the evident imbalance between the understandings of the two phenomena ought to be addressed. We employ the conceptual framework proposed in our earlier work (Lintula et al. 2017) as a lens and continue to study the AR mobile games context by investigating how the VCD process unfolds from the perspective of gamers. Through conducting an ISM analysis of the interview data, we reveal the causal mechanisms between the emerging focal VCD constructs during different phases of the VCD process. We then connect these findings and the newly developed knowledge of the VCD process with the SDL framework perspective on VCC in order to derive implications for theory and research. Thus, our study extends the current knowledge of the VCD concept with an in-depth understanding of the VCD process and its mechanisms. Moreover, the developed understanding provides practitioners with in-depth insights into unfavorable service experiences as perceived by service users. These new insights may be harnessed when developing service design, development, and provision practice. Further, the study answers the dissertation's fifth research question (Article V):

RQ5 How does VCD occur in AR mobile games?

The five research questions set out above have been addressed in the five articles included in this dissertation. Figure 1 presents the relation between each research question and the corresponding article and the level of investigation. Further, the figure indicates how the inputs of this dissertation vary from constructing in-depth understanding process mechanisms to conducting broader, exploratory investigations into the emerging VCD phenomenon. We start with an investigation into VCC across divergent digital service contexts by conducting an ISM analysis to derive the mechanisms of VCC in relation to DSD. Subsequently, we consider the underlying drivers of VCC, namely hedonic, utilitarian, and hybrid motivation, with regard to different types of IS. Thereafter, we establish the need for an in-depth understanding of negative value outcomes in such service scenarios in order to construct a balanced and holistic understanding of how value emerges for service actors. Thus, we synthesize the prior literature concerning VCD, and on the basis of that synthesis, propose a conceptualization of the VCD process. Next, we classify the motivations and reasoning for the VCD process by investigating users' service experiences in a case study in the context one particular service type, namely AR mobile games. Finally, we establish the mechanisms behind the VCD process through an ISM analysis of the VCD experiences of AR mobile game users.

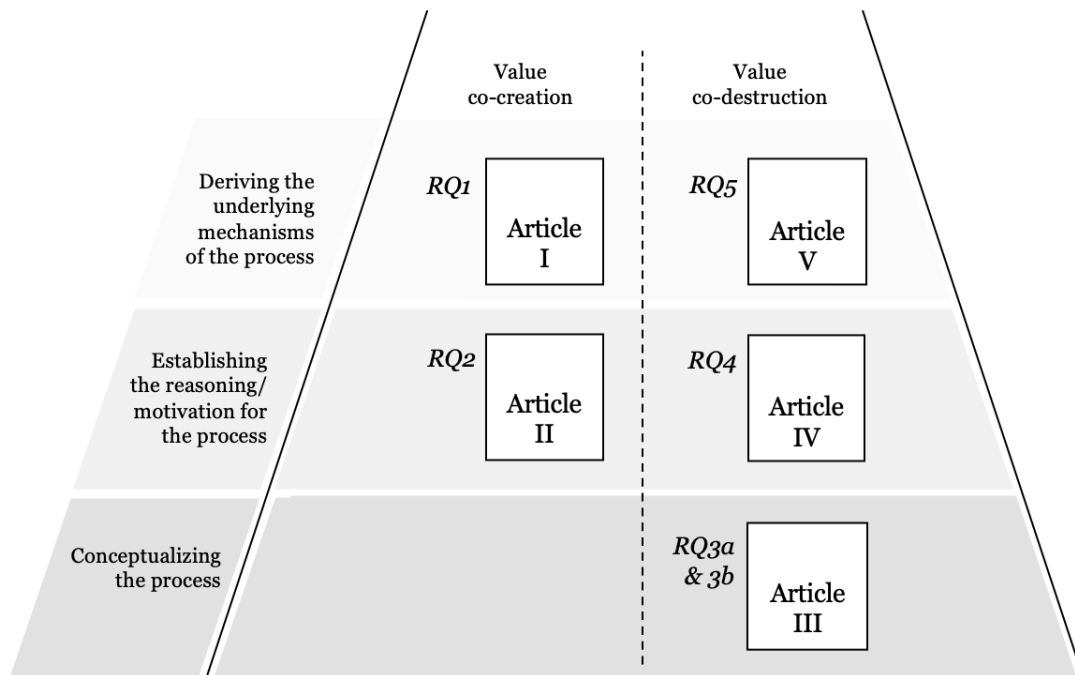


FIGURE 1 Relation between the research questions and the articles

1.3 Structure of the dissertation

The remainder of the dissertation is structured as follows. Chapter 2 describes the theoretical background to the research, focusing on current understandings of SDL, VCC, and the emerging concept of VCD. Moreover, the applications of these concepts are discussed in the context of digital services. Chapter 3 depicts the research approaches and the methodologies employed in the included articles. Subsequently, Chapter 4 presents an overview of the findings derived in each included article. Finally, Chapter 5 sets out the theoretical and practical contributions of the dissertation. It concludes by discussing the limitations of the research and offering suggestions for future research directions. Figure 2 summarizes the outline of the dissertation by depicting the contents and their relationships.

Thereafter, Articles I-V are appended. Article I uses an ISM approach to investigate the mechanisms behind VCC in five divergent digital service cases, thereby answering RQ1. Article II investigates the same five digital service cases and presents an analysis of users' hedonic, utilitarian, and hybrid value drivers of system use, which answers RQ2. Next, Article III presents a structured literature review and synthesis concerning the VCD concept, and it proposes a framework for the VCD process. Article IV examines digital service users' reasoning in relation to the VCD process in the context of the AR mobile games. Finally, Article V scrutinizes AR mobile game users' negative service experiences through an empirical investigation and then proposes an ISM-derived model for the VCD process in AR mobile games.

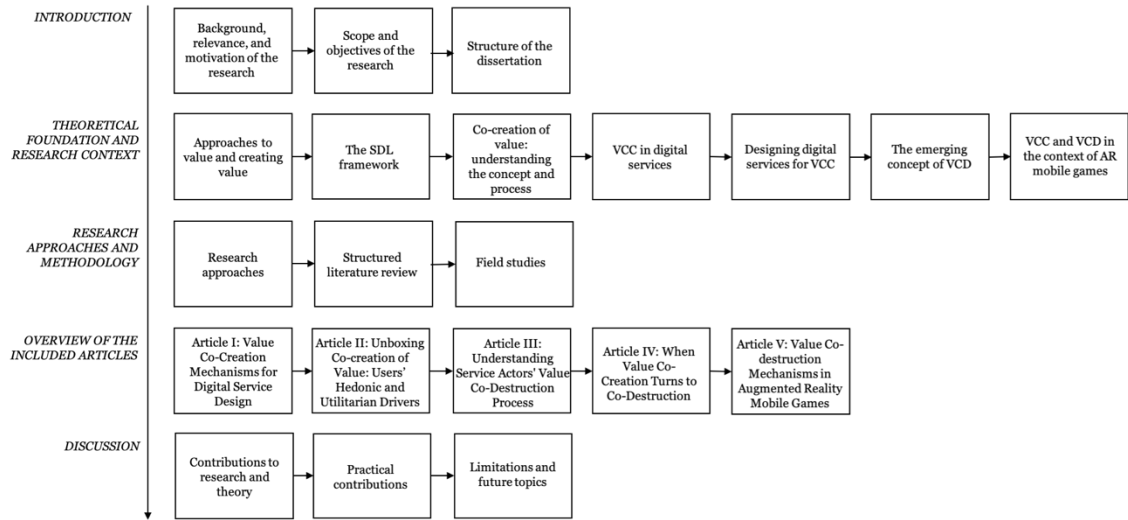


FIGURE 2 Dissertation outline

2 THEORETICAL FOUNDATION AND RESEARCH CONTEXT

In this chapter, we first discuss the concept of the creation of value and the related considerations. Subsequently, we present the foundations of the SDL framework, which originated in the marketing domain but has since evolved toward being a metatheoretical framework for understanding the co-creation of value. Next, we discuss current understandings of the VCC process and its applications in the context of digital services. Thereafter, we consider the design and development of digital services for enhancing VCC. Finally, we present the foundations of the emerging concept of VCD, current understandings of the VCD process, and the implications of the process for a particular digital service context, namely AR mobile games.

2.1 Approaches to value and creating value

Service, whether delivered face-to-face, technology-enabled, or purely digital, has long been a subject of inquiry for both IS and service research scholars (e.g., Bitner et al. 1994; Ostrom et al. 2015; Pitt et al. 1995). One key concern of such research has been the desire to understand how value can be created for service users and customers. The traditional business school view on the nature of value focuses on the economic aspects (e.g., Dodds and Monroe 1985). The goods-dominant approach to creating value involves two steps: first, value is created in a firm's manufacturing processes, and second, the created value is then consumed by the customer, whereupon the firm receives value in exchange, for example, economic value (Grönroos 2006; Vargo and Lusch 2008b). Further, customer value has typically been regarded as an outcome-based trade-off between the pursued benefits and the sacrificed resources (Zeithaml 1988).

The broadly accepted trade-off approach to determining value has been criticized for being a narrow and insufficient conceptualization (Holbrook 1999; Leroi-Werelds et al. 2014). In the marketing domain, another view on the assessment of value concerns the value "perceived" by customer (Sánchez-

Fernández and Iniesta-Bonillo 2007). Such perceived value is determined based on a subjective judgement in which the customer considers not only benefits and sacrifices but also other related notions (Holbrook 1999), such as the individual customer's personal values (Sánchez-Fernández and Iniesta-Bonillo 2007). Holbrook (1999, p. 5) approaches such personal values through a typology of extrinsic/intrinsic value, reactive/passive value, and internal/external orientation, and he defines value as the "interactive relativistic preference experience" perceived by customers."

In a similar vein, studies have underscored the salience of the service experience in relation to creating value through service (e.g., Jaakkola et al. 2015; Prahalad and Ramaswamy 2004a, 2004b). More specifically, it is believed that customer value may also emerge from mental and emotional experiences (Heinonen et al. 2010). For instance, Vargo and Lusch (2008a, p. 7) characterize value as "idiosyncratic, experiential, contextual, and meaning-laden." Further, interactive customer-provider involvement may induce the collective creation of value in service, which may be perceived in a unique manner by each beneficiary (Prahalad and Ramaswamy 2004a, 2004b). Such a shift in the business research views on value has resulted in a move away from the solely economic and goods-dominant approaches and toward a more holistic and experiential approach (Russell-Bennett et al. 2009; Vargo and Lusch 2004). Vargo and Lusch (2008b, p. 26) further characterize value as "intangible, heterogeneously experienced, co-created, and potentially perishable," remarking that the determination of value is phenomenological. Such an approach to value underscores the importance of the service experience, wherein value may be determined in divergent ways depending on the individual service user and the use context (Akaka and Vargo 2014; Chandler and Vargo 2011; Edvardsson et al. 2011). Vargo and Lusch (2011) regard value as an improvement in an actor's viability or well-being. Similarly, Grönroos (2008) regards an improvement in well-being to lead to the actor being *better off* after using the service. Vargo et al. (2008) regard that such well-being may be measured as the focal actor's ability to adapt or fit into its surrounding environment – a definition that emphasizes the holistic influence of value on the individual and its relation to the surrounding world.

Resembling the traditional goods-dominant approach to creating value, the traditional IS research adopted a product focus when it came to delivering IS to customers (Mason 1978). Accordingly, there is a strong tradition of measuring IS success through variables focused on the product itself (DeLone and McLean 1992). However, it has been established that the provision of IS is, in fact, a service-like process (Pitt et al. 1995), while IS service quality, as perceived by users, is a key indicator of IS success (Pitt et al. 1995). As the majority of IS scholars are affiliated in business schools, it follows that the majority of IS research has tended to focus on supporting firms' values and their profit-maximization efforts through the use of IS (Sarker et al. 2019). Accordingly, the prevailing research tendency has emphasized organizational and utilitarian values, such as cost-efficiency and efficacy, as the desired outcomes of system use, thereby overlooking potential pleasure-oriented (i.e., hedonic) user goals as well as the humanistic effects of IS (e.g., Lowry et al. 2011; Sarker et al. 2019).

More recently, the shift away from organization-targeted and stationary systems and toward wireless, consumer-oriented, and ubiquitous IS has required IS scholars to reconsider some of their fundamental assumptions concerning IS use and research (e.g., Lyytinen and Yoo 2002a, 2002b; Tuunanen et al. 2010). Accordingly, the user experience and the usage itself, as a goal of IS use, have emerged as valuable drivers of IS use (Lowry et al. 2011; Van der Heijden 2004; Wu and Lu 2013). For instance, the use of exergames – “digital games that combine gaming with exertion” (Kari et al. 2020, p. 600) – may be simultaneously driven by the pursuit of hedonic goals (e.g., experience of fun and enjoyment) and utilitarian goals (e.g., enhancing physical health) (e.g., Berkovsky et al. 2010). The design of such games aims to foster immersion and provide gamers with the experience of flow, that is, a state in which gamers become highly motivated and perhaps even prone to losing track of time (Laine and Suk 2016).

Lowry et al. (2011), in turn, investigate the adoption of hedonic-oriented IS, such as games, and note that users’ experience of joy predicts users’ intention to use such systems more strongly than the utilitarian-oriented, more traditional predictor that is the perceived usefulness of IS. Further, Wu and Lu (2013) find that in the context of utilitarian systems, the extrinsic (i.e., utilitarian) motivators outweigh the intrinsic (i.e., hedonic) motivators of IS use, while controversially, in the context of hedonic-oriented systems, the intrinsic motivators act more generally as drivers of IS use. Kari et al. (2020) discuss hedonic- and utilitarian-oriented use as part of the situational context of IS use in relation to exergames, and they find that utilitarian-driven or utilitarian-hedonic combined use may herald the continuance of IS use when compared with purely hedonic-driven use. As technological advancements continue to transform the services landscape, more research is required to understand how value is created for IS users, particularly in relation to understanding the multitude of divergent value drivers of IS use, such as hedonic and utilitarian motivation (Tuunanen et al. 2010; Wu and Lu 2013).

2.2 Foundations of the SDL framework

Following the recent shift toward an experiential view of value determination, business researchers have begun to regard customers as collaborators in the creation of value and experience alongside with service providers (Prahalad and Ramaswamy 2004b; Vargo and Lusch 2004). Further, the interaction between these participating entities can be regarded as the key to such co-creation (Prahalad and Ramaswamy 2004c, 2004b). Thus, the value of a given service or good does not exist by itself but is instead derived from the customers’ perceptions of the contextual experiences it enables (e.g., Prahalad and Ramaswamy 2004b; Woodruff and Flint 2006). Drawing on this notion, Vargo and Lusch (2004) propose the SDL framework for understanding the co-creation of value by focusing on the exchange of services rather than goods.

Originally a new perspective for viewing marketing, SDL challenged the goods-oriented view of value and firms’ interactions with their stakeholders

(Vargo and Lusch 2004). The incremental development of the SDL framework (Vargo et al. 2020; Vargo and Lusch 2004, 2008a, 2016) involved extensions from eight foundational premises (FPs) to 11 FPs, of which five have been assigned axiom status (Vargo and Lusch 2016). In the first axiom and FP, service is stated to be the fundamental basis for exchange. Further, SDL considers all economies to be service economies (FP 5), regardless of the product/service orientation of the system in question (Vargo and Lusch 2016).

SDL regards service as an action whereby actors (i.e., stakeholders partaking in the service) aim to benefit either themselves or one another through a process in which they integrate and utilize their own and each other's resources for VCC (Vargo and Lusch 2004). Thus, the second axiom and sixth FP of SDL posits that "[v]alue is cocreated by multiple actors, always including the beneficiary" (Vargo and Lusch 2016, p. 8). Foundationally, actors cannot deliver value alone, although they may offer value propositions to others engaged in the VCC process (FP 7). The participating actors are connected to each other through such value propositions (Vargo et al. 2010). In the modern world, resource integration can involve any social or economic actors (FP 9), including individual customers, firms, brand communities, or any other configurations of actors participating in a service process (Saarijärvi et al. 2013).

Accordingly, SDL regards VCC as a service-for-service exchange entailing resource input and integration on the part of the involved actors. The resources applied by the actors in such an exchange are categorized as either *operand resources*—that is, tangible and substantial resources that are acted upon—or *operant resources*—for example, knowledge and skills. Within this division, operant resources are considered to be "the fundamental source of strategic benefit" (FP 4) (Vargo and Lusch 2016, p. 8). Thus, while services may be delivered either with or without the assistance of substantial matters such as goods, the presence of physical goods is considered optional. More specifically, goods are considered to be distribution mechanisms for service provision (FP 3), meaning that they have no embedded value per se. Moreover, the use of operand resources during service provision (i.e., indirect exchange) is said to mask the fundamental basis of exchange (FP 2) (Vargo and Lusch 2016).

While two or more actors are required in relation to the resource integration and thus the co-creation of value, the perspective employed within the SDL framework is inherently beneficiary-oriented and relational (FP 8). Further, it is established that the value that emerges through the service exchange is determined uniquely and phenomenologically by each beneficiary (FP 10) (Vargo and Lusch 2008a). Therefore, a subjective actor perspective is required for taking steps toward a deeper understanding of the VCC process.

2.3 Co-creation of value: understanding the phenomenon

In developing a holistic perspective on VCC, SDL provides a lens for viewing all transactions within all economies, breaking free from the traditional dyad of service providers and customers, and consequently, escaping from the mere

context of services (Vargo et al. 2020). Service is, therefore, referred to in singular terms as a process (vs. in plural terms as the “services” context), which can take place in any social or economic context (Vargo and Lusch 2016). Further, Vargo and Lusch (2016, pp. 10-11) embrace the concept of a service ecosystem, which they define as a “relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange.” The SDL approach suggests that (partially) shared institutional arrangements comprise the context for VCC, thereby guiding the emergence of either positive or negative value for participating actors (Vargo et al. 2020). Further, the concept of service ecosystems can be employed to better understand the systemic and institutionally oriented nature of the SDL approach (Chandler and Vargo 2011).

The emergence of SDL – and of the notion of actors engaging in VCC – has helped to shape the manner in which services are designed and value propositions constructed, which has ultimately influenced how value is understood by practitioners and researchers alike. As SDL continues to develop as a metatheoretical framework for VCC, scholars across multiple disciplines have adopted its premises, particularly in relation to steering managerial activities ranging from development, design, and production to service use and experience. Accordingly, SDL and the concept of VCC have both been applied, for example, in the fields of service marketing and management, sports management, tourism, and IS. For instance, IS scholars have applied SDL to investigate and explain digital service innovation (Lusch and Nambisan 2015) and the development of IS (Tuunanen et al. 2010), and they have also investigated VCC between software business stakeholders (Sarker et al. 2012). Furthermore, the service science research domain regards SDL as the foundation for studying “service systems, which are dynamic value co-creation configurations of resources (people, technology, organizations, and shared information)” (Maglio and Spohrer 2008, p. 18).

The growing body of literature concerning SDL and the concept of VCC involves various approaches and a range of different ideas as to what constitutes the concept as well as how its process unfolds. While the discourse in this regard could be characterized as nuanced and complex (Saarijärvi et al. 2013), a broad array of research efforts have contributed to the current understanding of various aspects of VCC. These aspects include actors’ expectations (e.g., Oliver 2006), roles (e.g., Breidbach and Maglio 2016), motivations (e.g., Aarikka-Stenroos and Jaakkola 2012), co-creation practices (Echeverri and Skålén 2011; Marcos-Cuevas et al. 2016), and resources (e.g., Baron and Warnaby 2011; Singaraju et al. 2016), in addition to the managerial aspects of VCC (e.g., Kalaignanam and Varadarajan 2006; Payne et al. 2008; Prahalad and Ramaswamy 2004a). Moreover, prior studies have dissected the different types of positive value outcomes that result from co-creation (e.g., Agrawal and Rahman 2015), the potential frameworks for the VCC process (e.g., De Oliveira and Cortimiglia 2017; Payne et al. 2008), and the mechanisms of VCC (e.g., Saarijärvi 2012; Storbacka et al. 2016).

In an attempt to clarify the concept of VCC for practical applications, Saarijärvi et al. (2013) identify three key issues within the literature: For whom is what value co-created? What are the integrated resources (i.e., who are the

involved parties)? Through what kind of mechanism is value co-created? The authors claim that qualifying these three issues in practice allows managers to develop a conceptual understanding of VCC. In a literature review, Oliveira and Cortimiglia (2017) synthesize the prior literature, stating that the VCC process occurs in three stages. They suggest that antecedents, such as actors' motivations, precede the VCC process (e.g., actors' resource integration and VCC mechanisms) and, as a result, innovation, profit, and knowledge may be derived (Oliveira and Cortimiglia 2017). Furthermore, the process is affected by a number of barriers and enablers, for example, role ambiguity, incentives, technological infrastructure, trust, and governance (Oliveira and Cortimiglia 2017).

However, the SDL framework has been criticized for being ambiguous due to its theoretical roots spawning across various areas, including co-creation, co-production, co-design, and customer experience, as explained above (Heinonen et al. 2010; Heinonen and Strandvik 2015). While previous studies have addressed firm-centered practices and provider–customer interaction (Bitner et al. 1990; Grönroos and Voima 2013; Payne et al. 2008) with regard to facilitating value creation, such works have overlooked the individual customer's perspective on service use. Further, the SDL approach tends to focus on a generic, societal level of investigation (Vargo and Lusch 2016). Although managing VCC and the service provider's view are important aspects of investigation, the customer's perspective is essential in terms of understanding VCC and developing markets in practice (Heinonen and Strandvik 2015). More specifically, in relation to developing and understanding services, the lens of the customer should be the focus of the investigation (Edvardsson et al. 2005). Further research is required to develop the understanding of how VCC actually unfolds, with a particular emphasis on the customer who is using the service (e.g., Grotherr et al. 2018; Kleinaltenkamp 2015; Vargo et al. 2008, 2020).

2.4 VCC in digital services

Technological advancements have played an important role in the emergence of the “service revolution,” that is, the expansion of the service sector and the penetration of services into more traditional, goods-oriented business sectors (Rust and Huang 2014). Accordingly, Lusch and Nambisan (2015) argue that digital technologies serve as catalysts for the co-creation of value during the interplay between the customer(s) and the service. Indeed, one nuanced stream of discourse concerning VCC relates to the role played by technology in the service exchange. On the one hand, technology—as a conventional tool—is considered to be an operand resource that is acted upon as a means to an end.

On the other hand, emerging views consider technology to potentially trigger or initiate the service exchange, in addition to possessing the ability to impact a service actor's choices (Lusch and Nambisan 2015). More specifically, technology could be regarded as an operant resource due to its ability to influence institutions and, subsequently, human actions (Akaka and Vargo 2014). For instance, social media algorithms appropriate the stimuli and information

that individual users are subjected to, meaning that they can alter users' behavior by influencing their perceptions, preferences, and values (Kaartemo et al. 2019). Ergo, a third view considers technology to be either an operand or an operant resource depending on the features of the relevant technological application (Lusch and Nambisan 2015). This view is in line with Orlikowski's (1992) suggestion that technology is the product of human actions as well as being responsible for facilitating and constraining human actions.

As technology allows for service ubiquity and the interconnectedness of the virtual and physical worlds, the context of service delivery and experience has, in many cases, fundamentally changed (Ostrom et al. 2015). For instance, the AirBnB platform has transformed the traditional hospitality industry by allowing for the sharing of physical resources and for guests to co-create their personalized experiences with hosts (Guttentag 2015). Digitally assisted co-creation has also provided new opportunities for the early phases of service design and development, or for prompting customers to engage in more interactions with service providers. For example, service innovation may be orchestrated virtually, while service prototypes may be virtually tested by potential customers via digital simulation (Abade et al. 2014; Kohler et al. 2009). Further, ideas may be sourced from customers through online innovation contests (Gebauer et al. 2013), and brand engagement may be facilitated by online content sharing (Ertimur and Venkatesh 2010). Service providers may also employ digital services to create trust, for instance, through online review websites (Baker and Kim 2019; Pera 2014).

Therefore, as technology enables a multitude of ways of experiencing and creating value, understanding VCC has become a complex challenge involving context-specific efforts regarding the coordination of technology and the collaboration of the involved actors, networks, and settings (Ostrom et al. 2015). Such an understanding is required at the conceptual and higher level of abstraction as well as in particular contexts and at the individual level (Tuunanen et al. 2010). Aspects such as personalization and the active involvement of customers are of particular relevance with regard to digital services (Rust and Huang 2014; Williams et al. 2008). For example, e-government services have been only sparsely adopted, which may partially be due to the heterogeneity of citizens leading to diversity in users' expectations toward public services (Dwivedi et al. 2011). Thus, further research is required into how VCC actually unfolds, particularly in empirical contexts (Vargo et al. 2010).

Goods-providing sectors and more traditional services are becoming increasingly digitally assisted, and the implications of such a development include the design and provision of better services to customers, the deepening of customer relationships, and increased profitability (Rust and Huang 2014). Therefore, addressing the emerging shift in the context of service delivery and experience, leveraging service design, and understanding the co-creation of both value and the service experience are among the key priorities for service researchers (Ostrom et al. 2015). While it has been established that the technology-enabled context allows for more autonomy in terms of the creation of service experiences, the very same shift poses challenges in relation to service design, for example, "How can services be designed for flexibility and cocreation,

instead of focusing on predefined service scripts?" (Ostrom et al. 2015, p. 137). Thus, a deepened understanding of VCC and the customer experience has become a focal target of digital services-related research and practice.

2.5 Designing digital services for VCC

Due to the mediating role played by technology in digital service transactions, prior service research has advocated for active user interactions, particularly in relation to the design of digital services (Williams et al. 2008). Service design is an activity that considers customers and service providers, as well as their contexts and social practices, and then translates the acquired information into the development of services (Holmlid and Evenson 2008). In general, the service design literature has underscored the importance of understanding both customers' service experiences and the interactions that occur between customers and the service in question (Morelli 2002). Two common foci have emerged in the service design literature: evaluating the design process itself (e.g., design techniques) and evaluating the design-related outcomes (e.g., user experience) of that process (Liu et al. 2016). As a result, practical applications have tended to emphasize particular practices, such as the collaborative evaluation of the design outcomes (e.g., Goh et al. 2013) or the selection of suitable methods and techniques for involving customers in the design process in particular situations (Maguire 2001; Zomerdijk and Voss 2010). However, in the field of digital services, technological advancements enable constant and progressive updates and feature launches (Yoo et al. 2010), which emphasize the continuous salience of users' involvement, a smooth experience, and individual goals in terms of service development and use (Tuunanen et al. 2010).

The literature concerning IS development and user analysis has traditionally focused on activities related to requirements acquisition, aiming to provide an overview of service users' preferences (Davis 1982; Neill and Laplante 2003; Peffers et al. 2003). Some studies have advocated for requirements prioritization with the aim of meeting organizational goals regarding IS development and use (Tuunanen and Peffers 2018). Further, the socio-technical perspective on IS design (i.e., considering both social and technical factors with regard to the functionality and usage of IS) has provided a set of means for better addressing organizational goals when designing, developing, and evolving IS (Baxter and Sommerville 2011).

Furthermore, the participatory design of IS and the more active role of users have been discussed (Bano et al. 2017; Bjercknes et al. 1987; Dearden and Rizvi 2008; Kujala 2003; Schuler and Namioka 1993). The benefits of involving users in development projects include improved system quality as well as improved security risk awareness and overall attitudes toward the system on the part of users (Engvall 2019). Participatory design methods involve, for example, engaging users in core design and development activities, whereas user-centered design approaches design problems from the usability perspective (Kujala 2003). However, involving users in the process may pose certain challenges, and prior

studies have also discussed the extent to which and in which situations user involvement is appropriate (Gasson 2003). The continuous development of users throughout a given development project has been suggested as a fruitful approach (Bano et al. 2017), although the applications of such an approach have been somewhat limited in practice (Baxter and Sommerville 2011; Bjerknes and Bratteteig 1995; Holmlid 2009). Moreover, user involvement may be negatively perceived by the users themselves, particularly if their involvement seems inefficient or poorly managed (Bano et al. 2017; Martikainen et al. 2020). Indeed, it has been noted the suboptimal perceptions of users that are adopted by the development team may influence how users perform or approach the collaboration (Massanari 2010). Thus, careful consideration of users' experience of the collaboration and its perceived effectiveness are important in relation to co-creating value.

Notably, the SDL approach has been applied to investigate the design of technology-enabled services and innovations (e.g., Kohler et al. 2011; Lusch and Nambisan 2015; Tuunanen et al. 2010). Adopting the individual user perspective, Tuunanen et al. (2010) investigate VCC in consumer IS development, and they argue that VCC can be enhanced by facilitating the interplay between system value propositions and users' value drivers (Figure 3). Proposing a framework for VCC in consumer IS, the authors claim that while IS offer value propositions to system users, it is the users' perceived experience, involvement, and values or goals that drive their use behavior (Tuunanen et al. 2010). The authors also suggest a set of three system value propositions that herald factors capable of enhancing users' requirements for VCC in IS (Tuunanen et al. 2010). Drawing on the work of Lamb and Kling (2003), Tuunanen et al. (2010) posit in the first system value proposition that enabling social aspects in IS design is vital with regard to enhancing VCC for individual users. Further, users may possess, and construct, identities in relation to their IS use, and such contingencies may drive their use of IS (Lamb and Kling 2003). Thus, the second system value proposition relates to the construction of identities. Aligned with the contextual approach of SDL, Tuunanen et al. (2010) emphasize the salience of the context of the system use as the third system value proposition, which may reflect users' requirements for the system as well as their use of IS (Myers and Tan 2002; Orlikowski et al. 1995; Tuunanen and Kuo 2015).

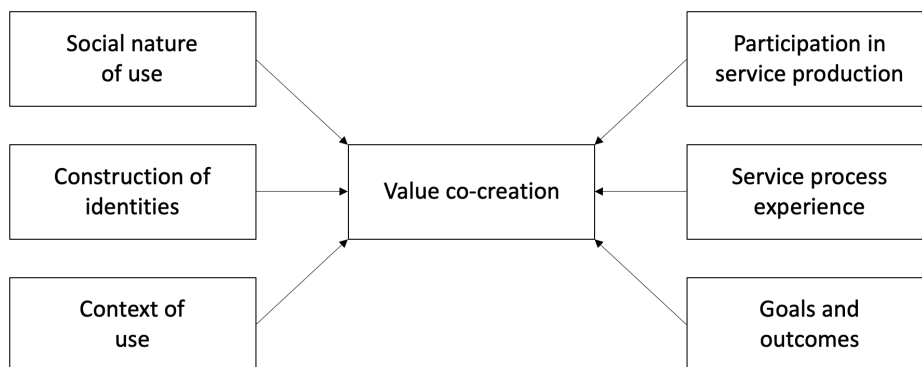


FIGURE 3 System value propositions and user value drivers in relation to IS development (adapted from Tuunanen et al. 2010)

Moreover, Tuunanen et al. (2010) argue that value is co-created through the interplay between the above-mentioned system value propositions and a set of three user value drivers, namely users' participation in service production, service process experiences, and individual goals and desired outcomes regarding service use. Accordingly, IS developers ought to consider and apply co-production activities, such as engaging users in the design and/or development of IS (Von Hippel and Katz 2002). Further, the system use experience ought to be polished so that users experience hedonic benefits (Kahneman et al. 2003) or flow (Agarwal and Karahanna 2000). Moreover, particular attention ought to be paid to users' preferred outcomes with regard to system use. For example, individual users may desire particular system features (Jacobs and Ip 2003) or usefulness as outcomes of system use (Venkatesh et al. 2003). However, such desired outcomes may also be of a hedonic nature, that is, the system use *itself* may be the desired outcome rather than any utilitarian aspects, such as productivity (Van der Heijden 2004).

Based on the above, a focus on customers' needs and wants is recognized to be key in terms of facilitating VCC in digital services, as digital technologies continuously provide new ways for firms to co-create value with their customers (Grenha Teixeira et al. 2017). Such progressiveness may be enabled through, for instance, a layered modular approach to IS development, whereby a system may be reprogrammed to allow for fluidity in accordance with users' changing goals and individual values (Yoo et al. 2010). The service design literature has called for fresh views to enhance both systems analysis and IS design using traditional service design approaches (Ostrom et al. 2015). Such interdisciplinary insights may help researchers and practitioners to better enable VCC for the users of technology-mediated digital services (Ostrom et al. 2015). Reciprocally, such new views may complement the socio-technical perspective that underlies the IS discipline (Sarker et al. 2019), thereby providing IS researchers and practitioners with insights into the interplay between service actors and technology.

In fact, IS researchers have long promoted user participation, especially in relation to the requirements elicitation and analysis phases of IS development projects (e.g., Davis 1982). However, such research would benefit from involving customers in requirements elicitation, while more insights are needed with respect to how such activities could be implemented (Hartwick and Barki 1994; Tuunanen and Peffers 2018). In a similar vein, a more holistic view of VCC is required to attain an understanding of how all the involved actors can co-create value in digital services (Grotherr et al. 2018) as well as how users experience IS use through such co-creation activities (Tuunanen et al. 2010). Furthermore, pursuant to developing the SDL approach toward the construction of a metatheory for VCC, Vargo et al. (2008, 2020) call for the closer scrutiny of the mechanisms available for implementing VCC.

2.6 The emerging concept of VCD

While the pursuance and emergence of positive value is inherent within the SDL perspective on VCC (Plé 2017), service interactions may also have outcomes other than the desired or positively perceived ones (Prahalad and Ramaswamy 2004c). In real-life service scenarios, negative value may also be derived by actors (Grönroos 2008). Service researchers have long investigated the failure and recovery of services, customer misbehavior, and other unwanted stakeholder behaviors and managerial risks (e.g., Harris and Daunt 2013; Malhotra and Malhotra 2011; Maxham and Netemeyer 2002). Furthermore, value imbalances between customers and service providers have been discussed, as have the devaluation processes that potentially result in value diminishment (e.g., Verleye et al. 2017; Woodruff and Flint 2006).

IS scholars have, in turn, addressed the negative outcomes of collaboration, for instance, by investigating theft, sabotage, and deception during IS projects (Rost and Glass 2009, 2011) as well as technology misuse by users (D'Arcy et al. 2014). However, there has been a noticeable lack of thorough investigations into the negative consequences of IS design in relation to the VCC process involving system users (Vartiainen and Tuunanen 2016). Nam et al. (2018) investigate the emergence of the negative value of *distrust* when VCC is attempted by actors. Conducting an empirical study of users' contributions on review websites, they find that users' disconfirmation and dissatisfaction may result in the creation of negative word of mouth and distrust in the focal website. Although the implications of potential VCD—for example, opportunistic or deviant behavior or technology misuse—have been showcased, the impact of collaboration between service actors on the negative value outcomes remains unclear.

Recently, discussion on negative value outcomes in services and the concept of VCD has emerged in divergent domains, generally arguing that the SDL approach adopts an overly optimistic perspective on the value derived from services (e.g., Echeverri and Skålén 2011; Plé 2017; Plé and Chumpitaz Cáceres 2010). According to Plé and Chumpitaz Cáceres (2010), it is only logical that the interaction process that takes place between service actors may result in either VCC or VCD. Echeverri and Skålén (2011) propose that such an interaction process evolves dynamically and can culminate in either VCC or VCD, depending on the practices adopted by the actors involved. Prior studies have applied varied conceptual and empirical approaches when exploring the VCD phenomenon, conceptualizing it within the SDL framework and mapping the potential reasoning behind it (e.g., Echeverri and Skålén 2011; Järvi et al. 2018; Plé and Chumpitaz Cáceres 2010; Robertson et al. 2014; Smith 2013; Worthington and Durkin 2012). Moreover, the negative outcomes of VCD—such as increased costs, customer loss, negative word of mouth, and customer dissatisfaction—have been highlighted (e.g., Smith 2013; Echeverri and Skålén 2011).

An array of authors regard VCC and VCD as two opposing sides of the same phenomenon (Echeverri and Skålén 2011; Kaufmann et al. 2016; Neuhofer 2016; Robertson et al. 2014; Stieler et al. 2014). However, other researchers argue that VCC and VCD may actually co-exist as distinct phenomena (e.g.,

Chowdhury et al. 2016; Plé 2017). For instance, Plé (2017) suggests that VCC and VCD may occur simultaneously within a complex process, alternating between one or more actors. In support of this notion, Stieler et al. (2014) highlight how value does not need to be co-created in order for it to be co-destroyed. They find that in the case of silent protests in a sports stadium, value may be co-destroyed for some of the participating spectators without the requirement of it having been co-created. Further, while VCC may occur with respect to one value dimension, VCD may occur in relation to another value dimension of the focal actor (Stieler et al. 2014; Vartiainen and Tuunanen 2016). In other words, an actor may experience positive value, such as enjoyment, while simultaneously suffering from negative value outcomes, such as disappointment. Clearly, VCD should not fundamentally be regarded as merely the opposite of VCC (Prior and Marcos-Cuevas 2016; Stieler et al. 2014). Therefore, both frameworks and theoretical understandings of the concept and process of VCC may not be directly applicable when seeking to investigate and explain the concept and process of VCD.

However, the foundations of SDL may serve as a useful lens for investigating VCD from the perspective of the actors involved in an interactive resource integration process. Moreover, when positive value (i.e., increased well-being) is not achieved during the process, the involved actors may subjectively and contextually experience a decrease in well-being (Lintula et al. 2017). Smith (2013) argues that individual customers' resources and resource conservation are central to understanding the occurrence of VCD processes. Järvi et al. (2018) suggest a three-dimensional model that showcases the underlying reasons behind VCD in service collaboration. Further, VCD may occur in retroactive loops—that is, ongoing or previous service encounters may influence the emergence of VCD in subsequent or future encounters (Smith 2013).

While recent studies concerning VCD provide insights into VCD (i.e., the loss of well-being) in services, particularly the processual nature of the phenomenon (i.e., how the VCD process unfolds) remains unexplained. Further, a more in-depth of the phenomenon is needed to truly understand the customer's perspective. There remains a lack of understanding of the phenomenon, particularly when compared with the extensive knowledge base concerning the concept of VCC (Kuppelwieser and Finsterwalder 2016; Plé 2017). To obtain an equally in-depth understanding of the VCD phenomenon, the process of VCD ought to be thoroughly investigated (Kuppelwieser and Finsterwalder 2016; Plé 2017). Moreover, as VCC and VCD can be distinguished as two separate yet *interrelated* phenomena (Stieler et al. 2014), conceptual clarifications are required to delineate the VCD process from the VCC process within the SDL framework.

2.7 VCC and VCD in the context of AR mobile games

With the aim of understanding why and how VCD unfolds in actual service encounters, this dissertation investigates the phenomenon from service users' perspective in the empirical context of AR mobile games. AR can be regarded as a "medium in which digital information is overlaid on the physical world that is

in both spatial and temporal registration with the physical world and that is interactive in time” (Craig 2013, p. 20). AR represents an important context of investigation, as such technology provides substantial business opportunities for multiple industries, including video games, health care, retail, and real estate, in addition to creating new markets and shaping existing ones (Goldman Sachs 2016; Javornik 2016). The gaming industry can be seen as a pioneering market when it comes to developing with AR technology (Goldman Sachs 2016), providing various avenues for research concerning user behavior (e.g., Javornik 2016). AR mobile games supplement the physical world with virtual objects, such as animations, sounds, and other information (Azuma 2001), which may play a substantial role in a game’s VCC process. Such virtual augmentations run in real-time, and they are aligned with the actions taken in the physical world by the user (Azuma 2001).

We investigate a particularly well-known and high-grossing AR mobile game, namely Pokémon GO (Nelson 2017). Pokémon GO was deemed to be an interesting and suitable case for investigation due to its representativity of AR mobile games. In 2020, more than 300 million gamers worldwide played the Pokémon GO game (Statista 2020), seeking to catch, collect, and train animated Pokémon characters, which are displayed on their smart phones as they navigate around their real-life physical surroundings (Baranowski 2016). Thus, the Pokémon GO game, similar to other AR services, differs from the above-mentioned digital services due to fusing the virtual and physical worlds. By employing AR technology, the Pokémon GO game supplements physical reality with animated add-ons, which appear in relation to time and space and allow gamers to interact with them in real-world settings.

We employ the SDL framework as a lens for viewing how value is created through the Pokémon GO service. Drawing on the SDL approach, all the actors are considered co-creators of value, meaning that the Pokémon GO game provider or application cannot develop or provide value for its users (i.e., gamers) on its own. The derived value is instead co-created by the participating actors, such as the gamers, the game provider, and all the other social or economic actors involved in the process, including onlookers (i.e., people who pass by and witness an individual gamer engaging with Pokémon GO). These actors accept each other’s value propositions, and they integrate operand and operant resources with the aim of benefiting themselves and/or each other.

For example, Pokémon GO gamers walk substantial distances in an attempt to capture the characters that appear, hatch Pokémon eggs, and participate in collaborative events with peers, thereby potentially obtaining physical health benefits (Baranowski 2016). Further, among the various positive impacts, Pokémon GO has been found to increase users’ psychological well-being (Tateno et al. 2016), cultural and historical awareness, sense of social unity and social capital (Arjoranta et al. 2020; Serino et al. 2016; Yang and Liu 2017), and experience of desired escapism (Serino et al. 2016). Thus, it is evident that gamers are able to derive positive value outcomes from playing Pokémon GO. Drawing on SDL, we conceptualize the Pokémon GO AR mobile game as follows. The game provider, Niantic Inc., aims to offer gamers a variety of value propositions, including fun and social unity, which can be realized by integrating resources

with the AR mobile game application. Gamers may accept the value propositions offered by Niantic Inc. and integrate their resources—such as time, knowledge, and/or money—with the AR mobile game. From the users’ perspective, values such as fun, physical well-being, and social unity may be co-created as an outcome of the resource integration process.

On the one hand, Pokémon GO gamers integrate resources during the VCC process by installing the application on an applicable device, creating an avatar, selecting a “buddy” for themselves, allowing the application to access their personal Global Positioning System (GPS) data and smart phone camera, searching for Pokémon characters and hatching eggs by traveling significant distances by foot or vehicle, and staying rigorously alert for recurring Pokémon characters, events, or other surprises that the application may display at any time. On the other hand, the Pokémon GO game provider integrates resources through the AR mobile game application by developing and providing progressive updates, gathering gamers’ feedback, and launching new events, features, and characters in the game. Further, the Pokémon GO application *itself* integrates resources with gamers by suggesting events and nearby Pokémon characters, thereby encouraging gamers to continue playing.

Thus, the Pokémon GO application can be considered an operand resource that is being employed by the game provider to deliver the technological solutions of the game. However, the application may also be regarded as an operant resource, for example, due to the location data-based resource integration it performs with gamers. In fact, the application may be able to influence gamers’ actions. For instance, gamers may go out to play regardless of unpleasant weather if the application alerts them that there are Pokémon characters nearby—an action that the gamers might not implement without the influence of the application. Therefore, the application, and more specifically, the algorithms within it, are not merely tools used by the service provider for the delivery of the service to gamers, since they are also operant resources in themselves, as discussed in relation to the place of technology within the SDL framework (Akaka and Vargo 2014; Lusch and Nambisan 2015).

While previous studies have discussed the positive influences that Pokémon GO may have on gamers’ physical activity and well-being (e.g., Althoff et al. 2016; Baranowski 2016; Joseph and Armstrong 2016), the implications of negative value outcomes have also been presented. For example, gamers have trespassed, been exposed to increased mobile costs, and even faced physical violence (Serino et al. 2016). Pokémon GO gamers have also been involved in accidents and assaults stemming from incautious playing while in traffic (Ayers et al. 2016; Raj et al. 2016).

Such negative occurrences may be regarded as possible instances of VCD. For instance, Raj et al. (2016) describe how the employed AR technology may both enable and constrain the emergence of positive value in relation to Pokémon GO. On the one hand, the authors suggest that capturing intangible Pokémon characters represents a positive outcome, while on the other hand, the tangible risks of the game (i.e., physical accidents and other dangers) represent negative outcomes of gaming (Raj et al. 2016). Therefore, the service outcomes for an individual AR mobile game user may emerge in both the physical and virtual

worlds, thereby posing the risk of more multifaceted VCD than purely physical or digital services.

Thus, we consider the investigation of VCD to be particularly important in services that fuse physical and virtual service dimensions by employing new technologies such as AR. When attempting to prevent negative service outcomes, understanding how such scenarios emerge and then addressing them in service design, development, and provision is particularly important. However, current understandings of VCD are vague, and as established above, the concept lacks scientific consensus. To the best of our knowledge, the underlying process behind VCD has not previously been studied in the context of AR mobile games in general and the Pokémon GO game in particular. This dissertation addresses the identified research gaps by scrutinizing VCD as perceived by gamers as well as the mechanisms behind the VCD process in a qualitative investigation involving active Pokémon GO gamers. Doing so, the dissertation develops an in-depth understanding of the VCD process, and connects the newly derived insights with understandings of the SDL framework.

3 RESEARCH APPROACHES AND METHODOLOGY

This chapter presents the selected research approaches and the methods applied in the present dissertation in an effort to answer the research questions. First, the research approaches selected for use in each study are introduced and the underlying philosophical assumptions discussed. Thereafter, we describe the methods used for collecting evidence with regard to the structured literature review (Article III) and the field studies (Articles I and II as well as IV and V), and then we discuss how the collected data were analyzed.

3.1 Research approaches

IS research involves diverse paradigmatic research approaches. Generally, particular methods of enquiry are emphasized in relation to particular philosophical positions. For example, positivist studies tend to employ surveys and experiments in their enquiries, whereas interpretivist studies tend to favor qualitative case studies and ethnographies (Klein and Myers 1999; Orlikowski and Baroudi 1991). The pluralist view welcomes paradigmatic diversity and regards different approaches and methods to be best suited to different research questions and situations (Mingers 2001; Robey 1996). In this dissertation, a pluralist view is adopted and two divergent approaches are applied in the different studies. Interpretivism is employed in Articles II, III, and IV, in which we seek to explain why certain events—that is, VCC or VCD—occur for individuals, while critical realism is employed in Articles I and V, in which we attempt to identify the underlying explanations for a sequence of events—that is, the VCC and VCD processes. Across all the studies, this dissertation aims to develop theoretical knowledge that can be used to explain and predict (Gregor 2006) the investigated phenomena of VCC and VCD.

The ontological domain considers “the form and nature of reality,” whereas the epistemological domain considers “the nature of the relationship between the knower and the would-be knower and what can be known” (Guba and Lincoln 2013, p. 108). The interpretivist ontology assumes the existence of a socially

constructed, subjective world (Orlikowski and Baroudi 1991). Thus, the development of knowledge of such a world is based on social constructions such as “language, consciousness, shared meanings, documents, tools, and other artifacts” (Klein and Myers 1999, p. 69). Here, it is believed that the behaviors of interest (within a given phenomenon) are constituted by the subjects’ states of minds, which can be revealed through subjective meanings and descriptions that can, in turn, be observed and interpreted by researchers (Orlikowski and Baroudi 1991).

In the epistemological domain, the interpretive view holds that the phenomena of interest should be investigated in their natural settings – that is, contextually – and from the perspective of the participating parties – that is, subjectively (Orlikowski and Baroudi 1991). Thus, the interpretivist generation of knowledge is typically field study-based and *inductive* (i.e., from observations to theory), meaning that the research approach is a theory-creating approach (Järvinen 2004, p. 7). As such, the interpretivist approach allows the researcher to develop an in-depth understanding of a given phenomenon by employing the perceptions and experiences of the individuals participating in that particular phenomenon (Thanh and Thanh 2015) through investigating the subjective meanings assigned by the participants to the phenomenon within a particular context (Klein and Myers 1999; Orlikowski and Baroudi 1991). Therefore, in this dissertation, the interpretivist approach was considered suitable for exploring and explaining the subjective motivations and reasoning perceived by the participating individuals in events manifesting as VCC or VCD.

While the interpretivist ontology relies on individuals’ perceptions, critical realism acknowledges a realist ontology that exists independently of individuals’ knowledge (Bhaskar 1978, 1979, 1986, 1989). One of the key factors differentiating critical realism from interpretivism is the focal role played by causality, which manifests in the application of critical realism (Wynn and Williams 2012). According to Gregor (2006), understanding causal relationships may prove fundamental in relation to being able to explain phenomena. The critical realist methodology is *retroduction*, which is similar to abduction, that is, “piecing together all the evidence and coming up with a probable solution” (Myers 2019, p. 53). A critical realist study aims to identify the *generative mechanisms* that occur within the domain of real producing social events, which may be perceived by individuals within the domain of the actual (Fletcher 2017). Such perceptions of the events may be observed by researchers within the domain of the empirical (Myers 2019). The generative mechanisms enable the occurrence of events, which then generate activities with particular outcomes (Smith 2010; Wynn and Williams 2012). Further, the interdependencies that exist between the generative mechanisms can explain “event causality” (Mingers and Standing 2017, p. 180).

The epistemological domain of critical realism is said to be relativist, meaning that the search for answers to research questions focuses on creating (potentially fallible) explanations rather than predictions (Mingers et al. 2013). Thus, similar to interpretivism, the approach is a theory-creating approach according to the categorization proposed by Järvinen (2004). Within the IS discipline, critical realism is an emerging approach that has been adopted, for instance, in studies investigating IS adoption (e.g., Dobson et al. 2013;

Zachariadis et al. 2013), innovation (Bygstad et al. 2016), and implementation (Volkoff and Strong 2013). The critical realist approach has been acknowledged to be “very useful in teasing out what role (if any) IT plays in observed IT uses and consequences” (Markus and Silver 2008, p. 613). Therefore, this approach was considered to be a good fit in this dissertation in terms of acquiring an in-depth understanding of how the VCC and VCD processes unfold for digital service users.

The methodological aspects of the five studies included in this dissertation are depicted in Table 1. Qualitative methods are regarded as an appropriate means of collecting data concerning social phenomena (Orlikowski and Baroudi 1991) from different sources, including interviews, observations, or archival materials (Conboy et al. 2012). In Articles I, II, IV, and V, we collected data using a qualitative case study approach (Klein and Myers 1999) involving the users of digital services. Case studies are particularly appropriate in relation to exploratory enquiries involving “how” and “why” questions because “[...]such questions deal with operational links needing to be traced over time, rather than mere frequency or incidence” (Yin 2009, p. 9). Furthermore, in Article III, a structured literature review concerning the emerging VCD phenomenon was conducted to identify the focal components of the VCD process as well as to create an agenda for future research (Webster and Watson 2002). These research approaches complement the critical realist and interpretivist aims of obtaining rich information and explanations (Easton 2010; Klein and Myers 1999) regarding the phenomena of interest, as the researcher intensively engages with the investigated research context (Maxwell 2004). The remainder of this chapter describes the methods used for data collection and analysis in more detail.

TABLE 1 Description of the data collection and analysis methods used in each article

Article	Approach	Data collection	Analyses
Article I	Creating theoretical knowledge, Critical realist	<ul style="list-style-type: none"> • Case study • Laddering interviews (Data set A, N = 113) 	<ul style="list-style-type: none"> • Meta-coding established laddering coding (Reynolds and Gutman 1988) • Interpretive structural modelling (Guo et al. 2012)
Article II	Creating theoretical knowledge, Interpretivist	<ul style="list-style-type: none"> • Case study • Laddering interviews (Data set A, N = 113) 	<ul style="list-style-type: none"> • Laddering coding (Reynolds and Gutman 1988) • Meta-coding established laddering coding (Reynolds and Gutman 1988)
Article III	Creating theoretical knowledge	<ul style="list-style-type: none"> • Structured literature review (N = 67) 	<ul style="list-style-type: none"> • Concept-centric analysis (Webster and Watson 2002)
Article IV	Creating theoretical knowledge, Interpretivist	<ul style="list-style-type: none"> • Case study • Laddering interviews (Data set B, N = 43) 	<ul style="list-style-type: none"> • Laddering coding (Reynolds and Gutman 1988) • Hierarchical clustering analysis, Ward’s method (Aldenderfer and Blashfield 1984)
Article V	Creating theoretical knowledge, Critical realist	<ul style="list-style-type: none"> • Case study • Laddering interviews (Data set B, N = 43) 	<ul style="list-style-type: none"> • Meta-coding established laddering coding (Reynolds and Gutman 1988) • Interpretive structural modelling (Guo et al. 2012)

3.2 Structured literature review

A structured literature review was conducted to synthesize the prior literature (Webster and Watson 2002) concerning VCD and to develop a framework for the VCD process (in Article III). The review was conducted in seven steps (see Figure 4), with the aim of identifying prior studies that contribute to understandings of VCD or, alternatively, the negative outcomes of VCC. The keywords used for the review were selected on this basis. The keyword selection process included a trial search of Google Scholar using the keywords “value” and “co-destruction” in all the text. The results of the trial search included many publications with no evident connection to service, VCC, or VCD in the context of SDL (e.g., papers published in the fields of astronomy and geophysics). Therefore, the set of keywords was modified to include “service,” “value,” and “co-creation” (in all

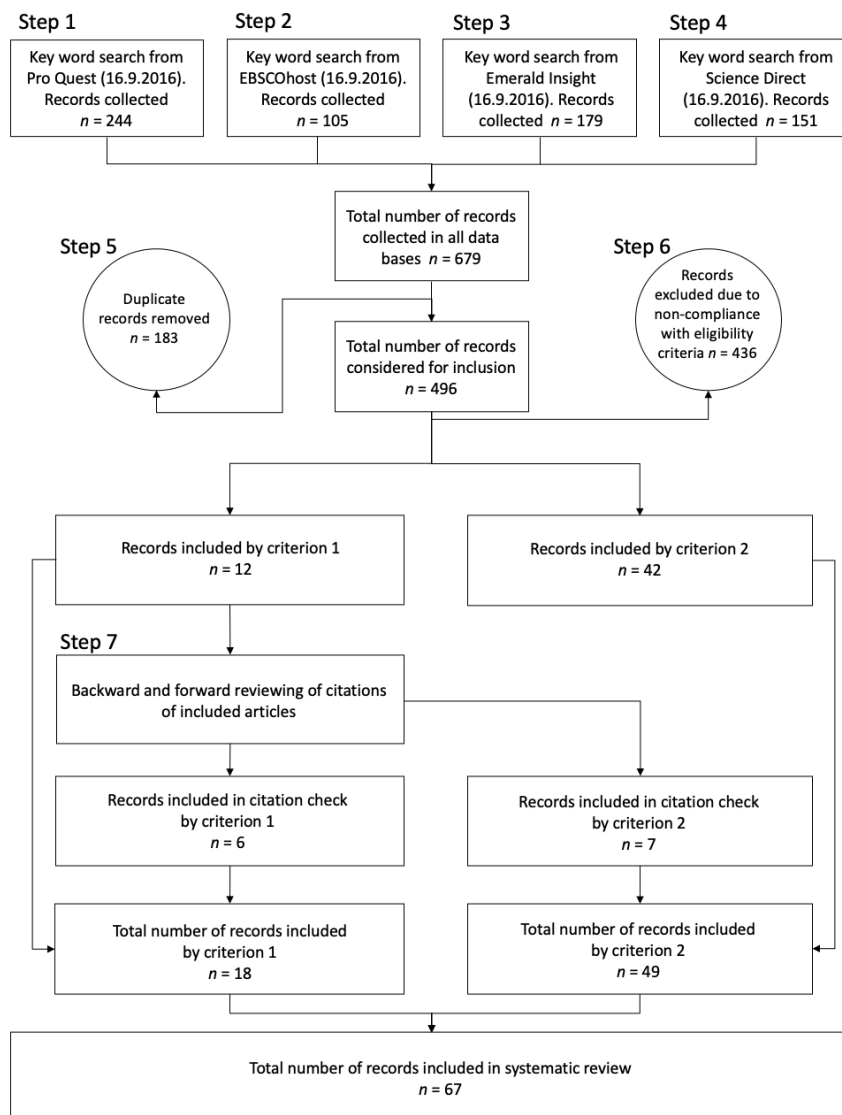


FIGURE 4 The structured literature review process

the text), while “co-destruction” or “negative” (in the abstract) were added in an effort to generate findings focused on VCD and the service domain. These iterations also effectively excluded any search findings that merely mentioned the concept of VCD as a side note without contributing to the knowledge base concerning the phenomenon per se.

Alternative keywords were also discussed among the authors of Article III. In particular, we considered other closely related phenomena, including service failure and recovery, customer satisfaction, customer misbehavior, and value imbalance. However, we found that these closely related bodies of literature tended to adopt a one-sided perspective on services (e.g., provider-supplier), meaning that they adopted a unilateral view on potential VCD. Our objective was to focus on the VCD process and so to adopt a SDL view of collaborations between generic actors, thereby providing an interactional view of the value processes that take place between the parties (Prior and Marcos-Cuevas 2016). Thus, terminology from the aforementioned closely related bodies of literature was not included in the keywords for the literature search.

All relevant research was reviewed and included in the subsequent steps. First, we conducted keyword searches in four interdisciplinary databases, namely ProQuest, EBSCOhost, Emerald Insight, and Science Direct (steps 1–4). These databases were chosen based on their high degree of relevance for business research and closely related fields. Articles containing relevant insights into the VCD phenomenon were found in the fields of service science, marketing, management, IS, tourism, and sports management. Using the final keyword set, we retrieved a total of 679 relevant articles that included discussions about VCD or the co-creation of negative value.

All the relevant articles were tabulated, and 183 duplicate records were removed (step 5). The assessment of the retrieved articles was based on two inclusion criteria: (1) the article must focus on investigating VCD (primary articles), or (2) the article must claim to discuss an occurrence of VCD (secondary articles). The aim of the assessment was to identify articles that focus on the VCD phenomenon or the negative outcomes of VCC. Articles included on the basis of criterion 1 were found to generally contribute to the understanding of the VCD phenomenon by proposing an approach and/or components that could help in explaining it. These articles were carefully analyzed by tabulating any proposed focal VCD components within a concept-centric matrix. Articles that demonstrated or discussed the implications of the VCD phenomenon or negative VCC were included in the review on the basis of criterion 2. Such articles tended to focus on discussing VCC and reporting findings concerning negative value outcomes. After assessing all the records, a total of 436 articles were excluded from the literature review due to non-compliance with the inclusion criteria (step 6). At this stage, a total of 12 articles were included on the basis of inclusion criterion 1, while 42 were included on the basis of inclusion criterion 2.

The search results were verified by means of backward and forward citation checks using Google Scholar (Step 7). In this way, we were able to search for further relevant articles that might meet the inclusion criteria. At this stage, six more articles were included on the basis of criterion 1 and seven on the basis of

criterion 2. Thus, after steps 1-7 had been completed, a total of 67 articles were included in the literature review.

The unit of analysis in the literature review was the assessed articles, as analyzed according to the emerging key VCD components. A concept-centric analysis (Webster and Watson 2002) was considered suitable for the review because it focused on a newly emerging literature topic. When analyzing the data, we first focused on the primary articles (included on the basis of criterion 1). We recorded the contexts, theories, methods, findings, and key components arising from the presented explanations, predictions, and outcomes of VCD. We made extensive notes in a spreadsheet format and then discussed the emerging focal components. The secondary articles (included on the basis of criterion 2) were used to back up the analysis with respect to the emerging focal VCD components. We determined the emerging focal components of the VCD process by employing the concept-centric analysis alongside our notes, handwritten memos, and discussions. We tabulated each record in a matrix with the aim of positioning each emerging component within each record on a timeline of a single service encounter during a service process (more details are available in Article III). Ultimately, two distinct approaches emerged from the data: (1) an interaction and resource integration-driven approach, and (2) an experiential and subjective approach. As we determined that the components were interrelated yet conceptually twofold divided, two overlapping dimensions of the VCD process emerged, namely VCD drivers and VCD interaction components. Finally, as we arranged the components temporally on the basis of their emergence in the data throughout the duration of a service encounter, we were able to propose a framework for the VCD process in Article III.

3.3 Case studies

Qualitative case studies (Klein and Myers 1999) were conducted in Articles I, II, IV, and V to collect data concerning actual digital service use experiences. A laddering interview method was employed across all the studies. Two distinct data sets consisting of interviews with digital service users were collected in the articles. In both data sets, the unit of analysis was the digital service users. Data set A (n = 113) was previously collected in five distinct studies/theses that investigated the users of five divergent digital services, averaging 23 interviews per case. The focus in data set A was on users' perceived VCC in relation to digital service use. Data set B (n = 43) was collected by this dissertation's author. Here, the focus was on investigating users' VCD experiences, and the data were collected from among users of one particular digital service case. In the following sections, the interview technique and the implementation of the case studies are described from the recruitment and sampling of informants to the construction of the interviews and the coding of the interview data. Finally, the analyses conducted in each study are discussed (Articles II, II, IV, and V).

3.3.1 Laddering interviews

The laddering interview technique was used for the data collection in all the case studies included in this dissertation. The technique is founded on the personal construct theory (PCT) proposed by Kelly (1955), which investigates how and why people see the world in different ways. PCT allows researchers to infer how individuals observe and interpret both things and events by developing an understanding of the personal values of individuals as well as of how individuals fundamentally perceive those values to be impacted by the relationships between the states of the universe and the consequences of those states. PCT employs *personal constructs*, which describe not only the properties and operations of the connected things and events, but also their consequences and their effects on the individual's values. As such, personal constructs can be regarded as multi-dimensional constructs describing the attributes (i.e., the features and actions) of objects and events, their consequences, and subsequently, their impacts on the individual's values. Through operationalizing personal constructs, the laddering interview technique provides researchers with a set of means for investigating how subjects' values drive their technology use behavior (Peffer et al. 2003; Reynolds and Gutman 1988).

In the service and marketing research, the attributes of a given product are regarded as relevant to consumers due to the consequences they lead to in terms of consumer behavior and the fact that those consequences are relevant with respect to consumers' personal values (Gutman 1982). Therefore, laddering interviews are used to explore consumers' means-end structures with regard to a given product, and more specifically, their personal values in relation to the attributes of a given product and the consequences stemming those attributes in relation consumers' behavior (Reynolds and Gutman 1988). A complete sequence of such relations, that is, a means-end chain, depicts particular attribute, consequence, and value associations in one record. Thus, laddering interviews produce data sets consisting of a multitude of chains, which provide in-depth details of informants' value structures and reasoning processes related to particular attributes or features of the product or service of interest. In the present dissertation, the laddering interview technique was employed to derive insights regarding informants' value structures with positive (in data set A) and negative (in data set B) outcomes. Thus, the interview technique is used to probe for structures leading to informants' perceived VCC as well as to understand the structures that lead to service occurrences that could potentially be perceived as VCD. The informants' experienced VCC occurrences were examined in Articles I and II, whereas their VCD occurrences were studied in Articles IV and V.

3.3.1.1 Sampling of informants

When collecting the data for data set A, we focused on VCC as perceived by digital service users. The required data were collected in five independent yet interconnected studies/theses (Hänninen 2014; Huttu 2014; Kaaronen 2014; Korpinen 2014; Vartiainen and Tuunanen 2013). Theoretical sampling (Patton 2002, p. 230) was applied so as to include both business-to-business (B2B) and customer-to-

customer (C2C) digital services (cases) within the inquiry, in collaboration with local industry and organizations. A total of five cases was deemed to be a suitable sample due to the notable divergence between the included digital services and user groups. Within each case, the sampling of informants was performed on the basis of the inclusion criterion that participants should be potential lead users of the system (Tuunanen and Peffers 2018), that is, users who tend to adapt new technologies earlier than most (Hippel 1986). Here, theoretical sampling and the snowball sampling technique were applied (Tuunanen and Peffers 2018).

The first study included in data set A investigated an intelligent *cyber-physical* system for mining. The collaborating company provided the researchers with an initial set of ten lead users of the system subject to investigation. After conducting the ten interviews, the snowball sampling technique was applied to recruit additional participants on the basis of hints provided by the initial leads (Tuunanen and Peffers 2018). In the second study, users of an online customer relationship management (CRM) system were interviewed. Again, the researchers worked with the client company to identify a set of ten internal lead users of the system. Afterwards, 11 more participants were recruited from the firm's client base. In the third study, users of an online event organizing and planning system were interviewed. Here, the sampling was performed using the snowball sampling technique with the aim of recognizing the lead users within event planning firms in Finland. In both the online CRM system and the event planning system studies, the interviewees were selected from multiple firms, with a maximum of two informants representing an individual firm. This approach was adopted in order to avoid biases and perspectives skewed toward a given company.

While the first three studies included in data set A were B2B-related studies, the remaining two studies were C2C-oriented. The fourth study in data set A involved a metal-detecting system that was used as a hobby by individual consumers. Similarly, the fifth study involved geocaching⁵ hobbyists. Here, the snowball sampling technique was employed to recruit informants similarly to in the B2B studies. Most informants were active hobbyists or players, although in the metal-detecting case, there were also some professionals, namely archaeological museum staff, included among the informants. Demographic details concerning the informants across each study included in data set A are available in Article I. In total, 113 interviews were conducted across the five cases. There were an average of 23 interviews conducted per case, and each interview produced an average of 15 laddering interview chains (data units). The numbers of included laddering interview chains and interviewees per study are presented in Table 2.

Data set B focused on VCD as perceived by users of a particular digital service, namely the AR mobile game Pokémon GO. The study participants were recruited from public Pokémon GO Facebook groups in Finland. To identify participants with an active user status, we posted notices on particular Finnish Facebook groups that were previously known by the dissertation author to have

⁵ Geocaching is an outdoor treasure hunting game that utilizes GPS technology (Vartiainen and Tuunanen 2016).

a high number of active Pokémon Go players. Furthermore, we aimed to achieve the recruitment of participants with actual VCC experience as well as to avoid the recruitment of users who were no longer using the service. Some 88 informants volunteered to be interviewed by replying to an online pre-survey regarding their positive and negative experiences of playing Pokémon Go. The majority of those informants who reported multiple positive and negative experiences reported themselves to be enthusiastic regarding the game, while their game usage could be characterized as VCC-oriented. As our aim was to focus on gaining insights into VCD in particular, we opted to observe VCD in the data as a phenomenon deviating from VCC. For example, if a given respondent reported that s/he used the Pokémon Go app for going out and exercising but experienced being mocked by her/his friends for doing so, such an occurrence could manifest as a co-creation attempt resulting in at least partial VCD.

Purposeful sampling (Patton 2002, p. 230) was applied to ensure that information-rich cases were included in data set B. The inclusion criteria were that the participants needed to have reported at least two experiences of both positive and negative playing instances. We believed that collecting rich data concerning both positive and negative experiences offered the potential to observe the unfolding of both VCC as well as VCD as a deviating phenomenon. Of the 88 Pokémon Go players, 48 were initially included on the basis of the inclusion criteria, while 43 of the invited participants were actually interviewed. In total, 382 laddering interview chains (data units) were collected in data set B (cf. Table 3), with an average of nine chains being collected per interview. Demographical details concerning the respondents are available in Articles IV and V.

TABLE 2 Data units in data set A

Case	Laddering chains N =	Interviews
Online CRM	287	21
Intelligent cyber-physical system for mining	266	20
Event organizing and planning system	321	22
Metal-detecting system	478	24
Geocaching	336	26
<i>Total</i>	<i>1688</i>	<i>113</i>

TABLE 3 Data units in data set B

Case	Laddering chains N =	Interviews
AR mobile game Pokémon Go	382	43

3.3.1.2 Conducting the interviews

This dissertation’s author conducted the interviews in data set B, while the data set A interviews were conducted by the lead authors of the included studies/theses. In each interview, we followed the process associated with the laddering interview technique, as described by Reynolds and Gutman (1988), Peffers et al. (2003), and Tuunanen and Peffers (2018). The actual interview process is illustrated in Figure 5. The laddering interview protocol begins by introducing the informants to a choice of categories, that is, the stimuli collection. The stimuli collection describes a use case concerning particular products or services, which is intended to suggest ideas about possible service applications (Peffers et al. 2003). A unique stimuli collection was constructed for each study. For example, for the study in data set B, the stimuli collection comprised use cases of the AR mobile game Pokémon Go. Here, the use cases were designed in light of pre-survey answers describing negative playing occurrences. For each study in data set A, a stimuli collection involving positive use case scenarios was constructed.

In each study, after ranking the two most important or most negative stimuli, the informants selected the most appealing stimuli for further discussion. This meant that each ranked use case scenario was found to be somehow personally appealing to the informant (in data set A) or particularly negative (in data set B). Thus, in data set A, the informants selected those stimuli that were positively appealing, whereas in data set B, the interviewer instructed the informants to select the use cases that appealed to them in a negative manner and, therefore, were perceived to be negative. An example stimuli collection as used in data set A is appended in Article I.

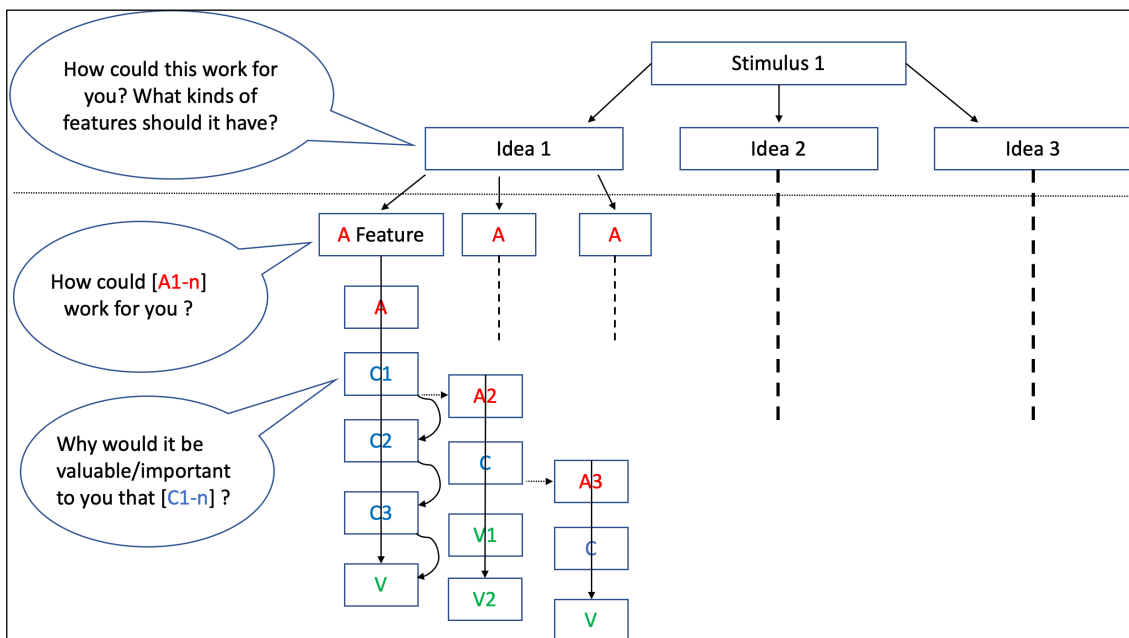


FIGURE 5 Example of the laddering interview process

Having familiarized the informants with the stimuli collection, the interviewer asked them to describe applications of the highest-ranked stimuli one at a time on the basis of their own experience. The informants were instructed to describe applications that were particularly important to them (in data set A), or that were particularly negative for them (in data set B), including the features (i.e., attributes) of the service that were assumed to impact the described applications. To elicit concrete system attributes, the interviewer asked the informants to explain their choices by describing what service features (noted as attributes) impacted their decision (Modesto Veludo-de-Oliveira et al. 2006). For instance, the informants were asked: “What might there be about the system that would make you think that it would do that?” Afterwards, the interviewer questioned the informants regarding the reasons *why* these attributes were important (or negative), that is, the relevant consequences they derived from the service or product use (Reynolds and Gutman 1988). The probing and “why” questioning continued with the aim of uncovering in-depth reasons until the informants described outcomes that could be regarded by the interviewer as their final personal values. These emerging final values represented personal goals or values satisfied through the consumption or use of the service or product in question. At the point at which no further reasons could be provided (i.e., the ultimate personal goal of the informant had been found), this section of the interview ended and the researcher moved on to asking questions about another stimulus. More details concerning the interviews and interview preparations can be found in Articles I (for the studies in data set A) and V (for data set B).

The data were recorded during the questioning as chains of attribute, consequence, and value ladders (Tuunanen and Peffers 2018). As data set A dealt with VCC, the laddering chains consisted of positive features, reasons, and ultimate personal values or goals. In data set B, we performed “negative” laddering, meaning that we collected system features and reasons for service occurrences that resulted in an ultimately negative value outcome for the digital service user in question. Table 4 offers an example of an original “negative” laddering chain from data set B. In the example, the attribute ladders represent the trigger or initial circumstance behind a negative service experience. The informants’ reasoning statements for such perceptions were recorded as consequence ladders. Across all the studies, several consequences were typically laddered as a result of the probing. The ultimate underlying positive (in data set A) or negative (in data set B) outcomes, which could not be reasoned with further explanations, were recorded as value ladders.

TABLE 4 A laddering chain from data set B

Code	Laddering chain
A (attribute)	The app said there was a wild Pokémon nearby
C (consequence)	I went for a walk outside to catch it
C (consequence)	It got dark and I could not see my surroundings
C (consequence)	I was frightened of strange people and wild animals
V (value)	I did not feel safe

Each interview section that originated from one stimulus led to several chains, and the chains often branched into sub-chains as new issues emerged. Figure 5 also illustrates how the laddering interview chains tended to branch out into multiple threads spawning from an initial attribute. In such cases, the interviewer followed up the branches in accordance with their chronological appearance in the interviews. Moreover, the chains branched not only from the attribute ladders but also from the consequence or value ladders. We believe that the way new threads branched out reflected the structuring of the informant’s personal constructs as well as the way the informant modelled the world around him/her.

3.3.2 Analyses

The analyses conducted within the studies involved the initial coding of the data, the meta-coding of the data, a hierarchical clustering analysis, and an ISM analysis. Table 5 sets out the data sets and analysis methods included in Articles I–II and IV–V. In the following sections, we discuss each analysis method applied to the laddering interview data.

TABLE 5 Analyses applied in the case studies and the resulting model/categorization

Article	Data set	Applied analyses	Results of analysis
I	A	1. Initial coding of data 2. Meta-coding of data 3. ISM analysis	ISM graphs indicating mechanisms of VCC across and within the investigated digital service contexts
II	A	1. Initial coding of data 2. Meta-coding of data	Categorization of hedonic, utilitarian, and hybrid value drivers for IS use across and within the investigated digital service contexts
IV	B	1. Initial coding of data 2. Hierarchical clustering analysis	An analytical framework for users’ reasoning behind VCD in AR mobile games
V	B	1. Initial coding of data 2. Meta-coding of data 3. ISM analysis	ISM graph indicating mechanisms of VCD in the context of AR mobile games

In each study, following the data collection, the laddering interview chains were tabulated into a matrix wherein the rows represented the chains and the columns represented the individual attribute, consequence, and value ladders. Next, the interviews were coded within each study, chain by chain. The aim during the coding phase was to develop codes that consistently represented a cluster of data units.

To achieve an appropriate balance between specificity and abstraction while avoiding excess information loss, the prior laddering research recommends that two researchers perform the coding process (Klenosky et al. 1994; Peffers et al. 2003). While the coders work independently, the aim is to achieve a high degree of agreement within the developed codes (Peffers et al.

2003). Therefore, the coding in the study in data set B was carried out in three phases by two coders. First, the present dissertation's author and another researcher individually coded each chain by developing suitable attribute (A), consequence (C), and value (V) code for each one (Peffer et al. 2003). Both coders first tabulated their initial (A) codes in a spreadsheet, followed by their initial (C) codes, and finally, their initial (V) codes. Second, the initial (A), (C), and (V) codes were compared during face-to-face meetings between the two coders, during which any inconsistencies between the corresponding codes were discussed and noted on the spreadsheet. Details of the agreement levels between the coders are available in Article IV. All the initial differences were reconciled by consensus between the coders, and the conclusive (A), (C), and (V) codes were transcribed on the spreadsheet. For data set A, the interviewing researchers individually coded their own studies by developing suitable (A), (C), and (V) codes for each chain (Peffer et al. 2003). Finally, in the case of both data sets, the dissertation author's principal supervisor, who has vast experience with the laddering interview technique, analyzed the codes and determined that the conclusive codes were sufficiently consistent and representative.

In each study, the laddering interview chains were coded to the greatest extent allowed by the data. The studies occasionally included ambiguous chains, which meant that the coders were not able to code all the chains with conclusive A, C, and/or V codes. In such cases, the code in question was recorded as not available (N/A). However, the majority of chains were coded using all three codes. Further, in some chains, multiple meaningful codes emerged. In such cases, the chain in question was duplicated into multiple threads, which were then coded as independent data units with different codes. Details concerning the coding processes are available in Article I (for data set A) and Article V (for data set B).

3.3.3 Meta-coding (Article II)

In Article II, our aim was to delve deeper into the abstract concept of VCC by investigating digital service users' hedonic and utilitarian drivers in relation to their actual VCC behavior. To this end, we conducted a two-phase meta-analysis of data set A: first, the original coding was systematically revised and re-coded, and second, we classified the resulting concluded value codes into three types, namely hedonic, utilitarian, and hybrid. As the original coding was performed in each study in data set A by a single coder, the reviewing and re-coding process was conducted by two coders, this dissertation's author and another researcher. By using two independent researchers, we complied with the laddering interview guidelines (e.g., Klenosky et al. 1994; Peffer et al. 2003; Reynolds and Gutman 1988), which ensured that the re-coding was consistent and balanced across the data set. First, both researchers independently checked all the codes related to the data set and suggested changes where necessary. Thereafter, the researchers discussed their suggestions during face-to-face meetings. Any conflicting changes proposed by the researchers were discussed until the issue was resolved via consensus. Most of the concluded changes (64%-79%) were suggested by both coders in a similar fashion. Finally, the suggested changes to

the codes were again evaluated by the principal supervisor of the dissertation author. This assessment determined that the inconsistencies between the change propositions were insubstantial and that the proposed final codes were representative of the data.

To analyze each of the five studies in an aggregated format, we standardized the data on one spreadsheet. As our aim was to compare digital service users' divergent value drivers, we classified the (V) codes into three categories, namely hedonic, utilitarian, and hybrid values. When classifying the (V) codes, rich information could be retrieved from the laddering interview chain in question when required. In some cases, it was necessary to classify a single (V) code in multiple categories on the basis of the relevant context and details. Some of the values represented a mixture of both the hedonic and utilitarian types. To make sense of such cases, we established the hybrid value classification. This hybrid value type was employed in cases in which the (V) code could not be directly assigned to the hedonic or utilitarian classification, as both views emerged within the data unit. After all the data units were classified, we were able to derive findings concerning the emerging user value driver types for each distinct digital service system as well as for particular system types (i.e., B2B or C2C).

3.3.4 Hierarchical clustering analysis (Article IV)

While in Article II, digital service users' positive value drivers were investigated, in Article IV, we focused on the drivers or reasons behind negative value outcomes from the digital service user perspective. Here, the coded data set B was analyzed to investigate the informants' personal constructs (Kelly 1955) as emerging from the Pokémon Go players' observations and interpretations of occurrences of VCD. Our aim was to classify the players' reasons for the perceived VCD within their gaming experiences. First, we constructed a binary matrix database containing the earlier coded (A), (C), and (V) codes, and then we employed a hierarchical clustering analysis method. We employed Ward's method to aggregate the data units into clusters of minimum variance (Aldenderfer and Blashfield 1984, pp. 43-44).

As the study focused on the reasons reported by the informants, our analysis was based on constructs derived from the (C) codes. While the (C) codes reflected the consequences of the system attributes reported in the (A) ladders, they also represented the reasons leading to the ultimate values and goals as reported by the informants. Thus, we were able to derive an understanding of users' underlying reasons for VCD in Pokémon Go on the basis of the (C) codes. When performing the analysis, multiple clustering options were tested and reviewed. We determined a seven-cluster solution to be most appropriate for the analysis due to the evident thematic coherence among the emerging clusters. Thereafter, the most emphatic constructs (highest frequency of occurrence within the data) were selected from each cluster and then used as examples when reporting of our findings.

3.3.5 ISM analyses (Articles I and V)

The analyses in Articles I and V were conducted in the same way. In both studies, we utilized laddering interview data that had been readily collected and coded within earlier studies. Article I employed data set A (i.e., the conclusive codes that were revised for the analysis in Article II), while Article V employed data set B (i.e., the codes developed for the analysis in Article IV). In both studies (Articles I and V), we developed meta-codes for the coded data. Based on the emerging meta-codes, we derived themes concerning VCC (Article I) and VCD (Article V). Afterwards, we conducted an ISM analysis to determine the causal relationships between the developed themes.

The meta-analyses involved the meta-coding of the data sets. The aim of the meta-coding was to attain a unified means of investigating the phenomena of interest, that is, VCC (in Article I) and VCD (in Article V), over the entire data set. Thus, in both analyses, a theoretical lens was employed to develop the meta-codes. Tuunanen et al. (2010) argue for system value propositions and user value drivers to serve as the focal constructs enabling VCC in IS. Due to its high degree of relevance, we applied the above-mentioned framework (cf. Figure 3) as a lens when developing the meta-codes in Article I. The previously developed initial codes were, therefore, classified on the basis of six constructs derived from the work of Tuunanen et al. (2010), namely (1) social nature of use, (2) construction of identities, (3) context of use, (4) participation in service production, (5) service experience, and (6) goals and outcomes.

Similar to Article V, we derived meta-codes for classifying the initial codes into constructs. To do so, we applied the framework developed in Article III. The framework depicted the focal constructs with regard to understanding the VCD process, and thus, provided the study with the foundation necessary to derive the interrelationships between the VCD process constructs emerging within the ISM analysis. The previously developed initial codes were classified on the basis of nine constructs derived from the work of Lintula et al. (2017), namely (1) intentions and goals, (2) misuse of resources, (3) loss of resources, (5) lack of resources, (6) expectations, (7) insufficient perceived value, (8) contradictions of value, and (9) attempts to restore resources. Moreover, in both studies (Articles I and V), we anticipated that new ad-hoc meta-codes would be developed when necessary from the data during the meta-coding processes.

In Articles I and V, the meta-coding was performed independently by two researchers. As the laddering interview technique implies, the use of two independent researchers during the coding process may help to establish consistent and balanced coding (e.g., Klenosky et al. 1994; Peffers et al. 2003; Reynolds and Gutman 1988). With respect to data set A, two researchers reviewed the data set and then meta-coded each (C) code and (V) code on an item-by-item basis over the course of a three-day workshop. Data set B was meta-coded independently by both the dissertation author and another researcher. First, the two researchers independently reviewed all the codes relevant to the data set and then meta-coded each data unit. When necessary, detailed information was retrieved from the laddering chains to allow for informed meta-coding results. Once the researchers had individually labelled the data units with

meta-codes, the suggested meta-code labels were discussed during face-to-face meetings. Any conflicting meta-code placements were discussed until resolved via consensus between the two researchers. Finally, the meta-coded data set was evaluated by the principal supervisor of the dissertation author, who concluded that the proposed meta-coding was concise and representative of the data units.

As anticipated, in both studies, ad-hoc constructs were required in addition to the constructs derived using the employed theoretical frameworks. Further, in certain instances, the meta-coding required tracing back to the original chains in order to provide more elaborate insights in the use contexts of the reviewed codes. For data set A, the meta-coded data consisted of 11 emerging themes (i.e., meta-code constructs), which comprised five unchanged constructs derived from the consumer IS framework as well as one that was divided in two. Additionally, four new constructs were developed on an ad-hoc basis. The emerging themes for data set A are presented in Table 6. For data set B, the meta-coded data consisted of a total of 14 emerging themes (i.e., meta-code constructs), which comprised ten unchanged constructs derived from the employed VCD framework, one construct that was divided in two, and three newly developed constructs. The emerging themes for data set B are presented in Table 7.

TABLE 6 Themes developed in the meta-coding of data set A and their frequencies

Theme	N =	Theme	N =
Social nature of use	275	Hedonic values	126
Construction of identities	51	Decision making and support	107
Context of use	74	Reliability and credibility	80
Participation in service production	195	Customer orientation	77
Service experience	63	Access to information	307
Utilitarian values	167		

TABLE 7 Themes developed in the meta-coding of data set B and their frequencies

Theme	N =	Theme	N =
Conflicts in resource integration	234	Non-integration of resources	38
Negative impact on resource availability	200	Change of goals/intentions	28
Tasks competing for resources	153	Lack of resources	25
Contradictions of value	125	Goals/intentions	24
Awareness of possible challenges	115	Co-creating value	7
Loss of resources	102	Expectations	3
Insufficient perceived value	80	Attempt to restore resources	1

Next, we utilized the ISM analysis method to analyze both meta-coded data sets. The aim of the ISM analysis was to model how the VCC (in Article I) and VCD (Article V) processes unfold from the perspective of digital service users. ISM is a qualitative method that reveals the structures within the complex relationships among the elements of a system (Malone 1975). The method develops a structural model of constructs and their interconnections based upon the correspondence between a binary matrix and a graphical representation of a given network of pairwise connections (Malone 1975). Thus, it provides an illustration of the contextual relations of the constructs within a given system. According to Malone (1975), ISM is particularly suitable for situations in which logical and systematic thinking regarding a complex phenomenon is required:

The objective is to expedite the process of creating a digraph, which can be converted to a structural model, and then inspected and revised to capture the user's best perceptions of the situation. The entire process has been implemented for use in a man/machine interactive environment in such a manner that the user can concentrate on substantive concerns in order to make subjective judgements regarding the presence or absence of the relation between pairs of elements, and the computer is assigned the task of bookkeeping and routine calculations (p. 399).

The ISM method begins with the definition of a set of constructs that affect the system. Thus, in Articles I and V, we followed the approach of Guo et al. (2012) and derived the ISM constructs from the meta-coded laddering interviews. The themes emerging within the meta-coding were translated into constructs affecting the phenomenon of interest (i.e., either VCC or VCD). Subsequently, we established the contextual relationships among the defined constructs by tabulating a pairwise comparison of the constructs in both studies. We then developed adjacency matrices, which could be tested using different thresholds. As each entry in the matrix indicated the frequency of the relationship between one construct (in a row) and another (in a column), manipulating the threshold of the matrix returned the relationships with frequencies equal to or above the given threshold. At this stage, weaker relationships could be removed through the choice of threshold.

For theory building purposes, as well as to uncover the emerging hierarchical relationships, we particularly focused on relevant connections with relatively high frequencies, which were tested using several thresholds while the weaker connections were removed. By applying an appropriate threshold, we were able to ensure that the resulting ISM hierarchy was not overly cluttered, and further, that a suitable level of detail remained. By testing and selecting appropriate thresholds, we received particular adjacency matrices, which were later transformed into a reachability matrices using RStudio. A reachability matrix depicts the relationships emerging between constructs via other constructs. By running the RStudio calculation

$$(A+I) \neq [(A+I)]^2 \neq (A+I)^3 \neq \dots \neq (A+I)^{(n-1)} = (A+I)^n,$$

we derived the reachability matrices for the two studies. Finally, we performed a level partition on the reachability matrix of one or multiple iterations. In this way, the hierarchical tiers were attained, and finally, graphs of the ISM could be generated. In Article V, we compared and combined the graphs derived with

thresholds 14 and 27. Here, we further derived a graph that followed the four-level hierarchical structure emerging with threshold 14, and complemented this with the stronger directional relationships emerging at the third hierarchical level with the threshold 27. The detailed steps involved in the ISM are set out in Article I. Having conducted the ISM analyses, we were able to identify 3006 relationships between the constructs emerging in data set A as well as 912 connections between the constructs in data set B. Based on the hierarchical tiers, we were able to depict the causal relationships between the emerging constructs at different levels, and consequently, to propose models of VCC and VCD in Articles I and V, respectively.

4 FINDINGS

This chapter provides overviews of each of the included articles. First, the motivation for the focal study is presented, followed by the goals and applied methodology. Next, the key findings are presented. Each section concludes with a recapitulation of the focal study's response to the corresponding research question and a discussion of how the study contributes to the dissertation as a whole.

4.1 Article I: Value co-creation mechanisms for digital service design

Tuunanen, T., Lintula, J., Vartiainen, T., Zhang, Y., and Myers, M.D. Value co-creation mechanisms for digital service design. (Under review.)

Prior studies in the fields of service research and IS development have provided insights into service users' elicitation and prioritization of requirements (e.g., Davis 1982; Neill and Laplante 2003; Peffers et al. 2003; Tuunanen and Peffers 2018), service innovation and design (e.g., Grenha Teixeira et al. 2017; Lusch and Nam-bisan 2015; Maguire 2001; Zomerdijk and Voss 2010), and design outcome evaluation (e.g., Goh et al. 2013). However, there has been a noticeable lack of research into the design of digital services for enabling VCC. Such research is necessary to integrate insights from the IS design and development research with the findings of the service research literature (Ostrom et al. 2015). Further, we consider that previous IS and service research has provided insufficient theory-informed guidance with regard to the *design of digital services for enabling and enhancing VCC between a service provider and its customers*. One particularly pressing need for such new insights relates to the constant emergence of new technological innovations, which continue to transform the digital services landscape (Grenha Teixeira et al. 2017; Ostrom et al. 2015). Based on qualitative laddering interview data (n = 113) (Reynolds and Gutman 1988) obtained from five distinct digital service contexts, the study aimed to identify the mechanisms of VCC in relation to digital services. Our investigation covered both B2B and C2C digital service

contexts, thereby allowing for contrasting differences that emerged between service types. A total of 1697 data units (ladder chains) were analyzed using a two-step methodology. First, the thematic coding and clustering of the data units were performed at the individual study level according to the approach of Tuunanen and Kuo (2015). Second, applying a critical realist approach (Mingers 2004), we analyzed the coded data. We adopted the system value propositions and customer value drivers proposed by Tuunanen et al. (2010) as a lens when meta-coding the VCC process constructs. Further, we employed an ISM (Guo et al. 2012) analysis to develop the causal connections between the emerging constructs, which represent mechanisms for explaining how the VCC process unfolds both across and within the investigated digital service contexts.

By uncovering the mechanisms that enable and enhance VCC in digital services, our analysis resulted in ISM graphs of the VCC process at the distinct digital service level as well as dynamic models at the aggregated B2B and C2C levels and overreaching these two contexts. Our analysis revealed that the context of a given digital service impacts the VCC mechanisms across and within distinct digital services. The aggregated level of analysis is shown in Figure 6. Here, the VCC mechanisms were linked to users' utilitarian and hedonic values and goals. More specifically, we determined that the social nature of use influenced the construction of identities, while the construction of identities influenced the perceived reliability/credibility. Further, customer participation influenced customer orientation, while access to information influenced service experiences, decision making/support, reliability/credibility, and customer orientation. Finally, we found that context of use, service experiences, decision making/support, reliability/credibility, and customer orientation all influenced utilitarian values and goals as well as hedonic values and goals, which were also interrelated.

Our analysis revealed differences in VCC with regard to different types of digital services as well as within particular types. On the one hand, the ISM graphs showed divergent mechanisms for VCC in relation to seemingly similar digital service types, namely C2C services. On the other hand, we identified similarities in the VCC mechanisms across the B2B digital service contexts. The aggregated level findings (cf. Figure 6) revealed VCC mechanisms for DSD, thereby contributing to the conceptualization and theorization of VCC in the context of digital services (Grotherr et al. 2018). Arguing that DSD differs from traditional IS design due to its focus on (1) digital services vs. IS products, (2) external customers vs. internal IS users, and finally, (3) digital service experience vs. IS use, our study has laid the foundations for developing a new approach to DSD. Further, our aggregated findings concerning the VCC process across the investigated digital services have provided a pathway for developing a new theory of the VCC mechanisms with regard to DSD. As such, the uncovered mechanisms could be harnessed by firms seeking to enhance their digital services by focusing on those VCC mechanisms that are perceived as most important by their customers.

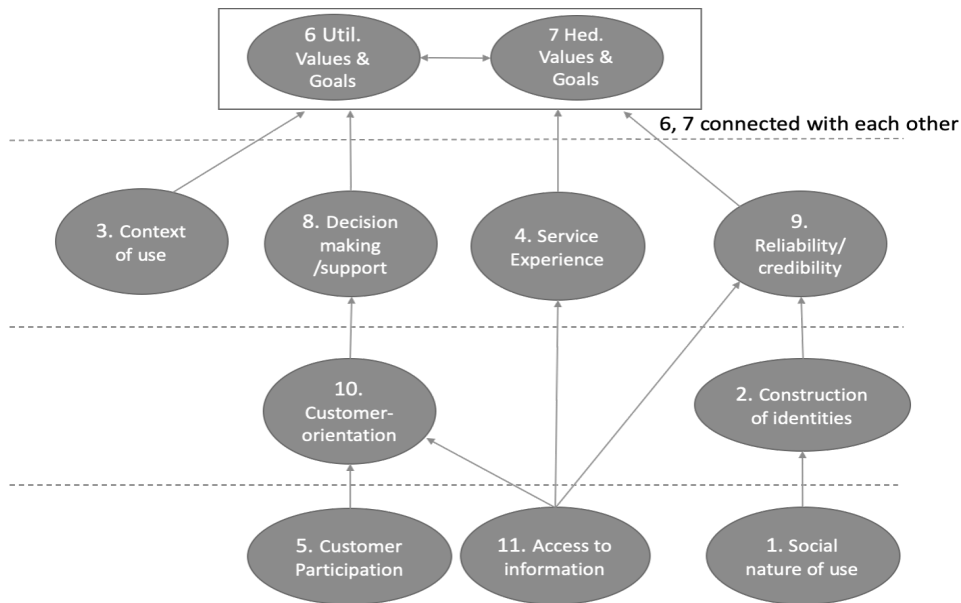


FIGURE 6 ISM graph for all five digital service systems

This article sought to answer RQ1: *How can digital services be designed to enable and enhance VCC?* By developing an in-depth understanding of the underlying mechanisms behind the VCC process in relation to DSD, this article extended previous understandings of VCC within the SDL framework. The developed understanding and conceptualization are benchmarked in Article V, which aims to develop an equally deep understanding of the distinct yet interrelated concept of VCD.

4.2 Article II: Unboxing co-creation of value: users' hedonic and utilitarian drivers

Tuunanen, T., Lintula, J., and Auvinen, A. (2019). Unboxing co-creation of value: users' hedonic and utilitarian drivers, in *Proceedings of the 52nd Hawaii International Conference on System Sciences (HICSS)*, University of Hawaii at Manoa, Washington, DC: IEEE Computer Society Press, pp. 1406–1415.

With its roots in organizational systems, the IS research literature has tended to focus on utilitarian and rationality-driven system use (e.g., DeLone and McLean 1992). More recently, a distinction has been drawn between hedonic and utilitarian value drivers as well as between extrinsic and intrinsic IS use motivations (Kahneman et al. 2004; Van der Heijden 2004). In this context, intrinsic motivation is based on performing an activity “for no apparent reinforcement other than the process of performing the activity per se” (Davis et al. 1992, p. 1112). Therefore, user-IS interaction can itself be seen as a sufficient motivation for using the system in question (Valkonen et al. 2015). Further, Tuunanen et al. (2010) argue that for users, VCC represents the interplay between

at least two issues and also highlights the utilitarian and hedonic value and goals of system use (cf. Figure 3). However, the prior IS literature has failed to inspect the co-creation of value with a focus on the individual user level. Further, while Tuunanen et al. (2010) recognize that users' goals may be hedonic or utilitarian, they do not detail how these types of goals might impact the users' depicted value drivers and system value propositions. To fill the identified research gap, the aim of this study was to unbox VCC for service systems, that is, "configuration[s] of people, technologies, and other resources that interact with other service systems to create mutual value" (Maglio et al. 2009, p. 395). We conducted a qualitative investigation into the hedonic and utilitarian value drivers of individual IS users in five distinct digital service contexts. After analyzing 113 laddering interviews (Peppers et al. 2003; Reynolds and Gutman 1988; Tuunanen and Kuo 2015; Tuunanen and Peppers 2018), we meta-coded 1697 data units (laddering chains) based on the lens of system value propositions and user value drivers (Tuunanen et al. 2010). Further, we assigned the meta-coded data units hedonic, utilitarian, or hybrid (a combination of the two) value emphases. This allowed us to investigate and depict the users' value structures both within and across the selected B2B and C2C digital service systems.

Our analysis showed that although some of the investigated digital services were perceived to be highly utilitarian, the value drivers for system use varied across the cases (cf. Table 8). The distributions of hedonic-, utilitarian-, and hybrid-oriented value drivers across all the investigated cases are presented in Tables 9-11. While some of the investigated systems were perceived to be hedonic in nature, they had a strong utilitarian undercurrent as drivers of system use. Whereas the investigated B2B service systems were more strongly driven by utilitarian-oriented VCC, the leisure-oriented systems (i.e., metal detecting and geocaching) were more strongly driven by hedonic-oriented VCC. The metal-detecting study is particularly interesting because, regardless of the leisure-oriented nature of the digital service, hedonic and utilitarian value drivers appeared to a nearly equal extent in the use of the system. The other leisure-oriented system, namely geocaching, served mainly hedonic-driven system use.

Thus, while we foresaw that there could be differences in value types between the B2B and C2C service systems, we found unexpected differences in the value type emphases between similar types of service systems. The differing value emphases were established in the use of each investigated digital service. As such, our findings suggest that services should be designed according to value structures rather than system types, which supports Tuunanen and Kuo's (2015) argument that system features should be prioritized on the basis of the value structures of users. Consequently, the study shone a new light on VCC at the service system level from the individual user perspective. Our findings revealed that all the investigated service systems were differently structured in terms of how users perceived the unfolding of VCC. Further, our assessment highlighted how the applied research methodology is well suited to helping researchers and practitioners to identify those aspects of VCC emphasized by system users, thereby allowing for development and design efforts to be appropriately directed.

TABLE 8 Meta-coded value themes across all the cases %(n)

Case/ Value theme	Social nature of use	Construc- tion of identities	Context of use	Participati- on in service production	Service process experiece	User values and goals	Total
Online CRM	3% (9)	33% (98)	5% (15)	24% (70)	14% (42)	21% (61)	295
Intelligent cyber-physi- cal system for mining	4% (11)	25% (70)	21% (58)	0% (0)	47% (131)	3% (8)	278
Event plan- ning and or- ganizing sys- tem	11% (35)	29% (92)	10% (26)	15% (47)	19% (60)	17% (54)	314
Metal-detect- ing hobby	3% (24)	16% (112)	11% (83)	22% (158)	19% (136)	29% (209)	722
Geocaching hobby	4% (13)	11% (40)	19% (65)	9% (30)	36% (128)	21% (75)	351
<i>Total</i>	5% (92)	21% (412)	13% (247)	16% (305)	25% (497)	21% (407)	1,9 60

TABLE 9 Hedonic value distribution across all the cases %(n)

Case/ Value theme	Social nature of use	Construction of identities	Context of use	Participation in service production	Service process experience	User values and goals	Total
Online CRM	0	31% (4)	0	8% (1)	46% (6)	15% (2)	13
Intelligent cyber- physical system for mining	0	0	0	0	0	0	0
Event planning and organizing system	4% (1)	38% (10)	12% (3)	12% (3)	23% (6)	12% (3)	26
Metal-detecting hobby	4% (12)	19% (61)	6% (19)	23% (73)	22% (70)	25% (80)	315
Geocaching hobby	4% (11)	9% (25)	18% (48)	8% (21)	40% (108)	21% (57)	270
<i>Total</i>	4% (24)	16% (100)	11% (70)	16% (98)	30% (190)	23% (142)	624

TABLE 10 Utilitarian value distribution across all the cases %(n)

Case/ Value theme	Social nature of use	Construction of identities	Context of use	Participation in service production	Service process experience	User values and goals	Total
Online CRM	3% (9)	33% (94)	5% (15)	24% (69)	13% (36)	21% (59)	282
Intelligent cyber-physical system for min- ing	4% (11)	25% (70)	21% (58)	0% (0)	47% (130)	3% (8)	277
Event planning and organizing system	11% (28)	29% (75)	8% (21)	16% (41)	19% (51)	18% (47)	263
Metal-detecting hobby	3% (12)	13% (42)	16% (54)	19% (65)	15% (53)	33% (110)	336
Geocaching hobby	0	0	17% (1)	0	50% (3)	33% (2)	6
<i>Total</i>	5% (60)	24% (281)	13% (149)	15% (175)	23% (273)	19% (226)	1,164

TABLE 11 Hybrid value distribution across all the cases %(n)

Case/ Value theme	Social nature of use	Constructio n of identities	Context of use	Participation in service production	Service process experience	User values and goals	Total
Online CRM	0	0	0	0	0	0	0
Intelligent cyber-physical system for mining	0	0	0	0	100% (1)	0	1
Event planning and organizing system	24% (6)	28% (7)	8% (2)	12% (3)	12% (3)	16% (4)	25
Metal-detecting hobby	0	13% (9)	14% (10)	28% (20)	18% (13)	27% (19)	71
Geocaching hobby	3% (2)	20% (15)	22% (16)	12% (9)	22% (17)	22% (16)	75
<i>Total</i>	5% (8)	18% (31)	16% (28)	19% (32)	20% (34)	23% (39)	172

This article sought to answer RQ2: *How do service systems differ in terms of users' hedonic and utilitarian value drivers?* By investigating individual users' hedonic, utilitarian, and hybrid value drivers both within and across particular service systems, this study developed novel insights that serve to extend the findings of Article I. More specifically, as Article I involved an in-depth investigation of the VCC process in relation to DSD and showcased that hedonic and utilitarian value outcomes are interrelated, Article II provided elaborated knowledge regarding

the emphases of these two outcome constructs, and a hybrid value, with respect to particular VCC themes across divergent digital service systems. Thus, Article II mapped particular outcome constructs in terms of IS use, showcasing which themes were particularly connected with hedonic, utilitarian and hybrid value drivers, extending the hierarchical insights of the VCC mechanisms developed in Article I. The implications of such an elaborate understanding of the occurrence of the value drivers complement current understandings of users' motivations and goals with regard to the use of IS. In accordance with the findings of Article I, this study concluded that the design and development of IS ought to consider users' value drivers as they occur within the particular service system, regardless of the type of digital service. Moreover, in highlighting how user value drivers differ between different service systems, this study further extended the findings of Article I, which proposed that hedonic and utilitarian user values are intertwined within the VCC process.

4.3 Article III: Understanding service actors' value co-destruction process: a structured literature review

Lintula, J., Tuunanen, T., and Salo, M. Understanding service actors' value co-destruction process: a structured literature review. (Unpublished working paper.)

To promote VCC, it is important to consider both the positive and negative sides of the value emerging from a given service (Vargo et al. 2017). While the concept and process of VCC has given rise to a rich stream of research regarding its nuanced aspects, prior studies have tended to overlook the fact that negative value may also emerge in services (Echeverri and Skålén 2011; Plé and Chumpitaz Cáceres 2010). Plé and Chumpitaz Cáceres (2010, p. 431) introduce the notion of VCD into the SDL framework as "an interactional process between service systems that results in a decline in at least one of the systems' well-being." Following this, the discourse has spawned empirical studies showing evidence of VCD occurring in divergent contexts (e.g., Farquhar and Robson 2017; Lefebvre and Plé 2011; Neuhofer 2016; Yin et al. 2019). However, the literature in this regard remains sparse, and the notion of VCD has not yet been consistently understood across the still-emerging stream of knowledge in this area (Echeverri and Skålén 2011; Stieler et al. 2014; Vartiainen and Tuunanen 2016). Further, the prior literature concerning the topic is plagued by inconsistent terminology and conceptualizations. Additional research is required to clarify the concept of VCD as well as to distinguish between its processes and outcomes (Kuppelwieser and Finsterwalder 2016). This study aimed to address this requirement by developing an in-depth understanding of the VCD process. A structured literature review was conducted with the aim of reviewing and synthesizing studies discussing VCD. The literature was reviewed in seven steps, and ultimately, 67 relevant articles were

included in the review. Further, by means of a concept-centric analysis, a framework was developed to explain the dimensions of the VCD process in a service encounter within a service process.

This study found that the VCD process involved two key dimensions, namely the VCD drivers and the VCD interaction components. VCD was defined as *a process between two or more actors whereby the VCD interaction components (lack of resources, conflicts in resource integration, loss of resources, and attempts to restore resources) connect with individual actors' VCD drivers (i.e., goals and intentions, expectations, and value perceptions) before, during, and/or after a service encounter, resulting in insufficient or negative perceived value or contradictions in the perceived value as determined by the focal actor.* A framework for the VCD process was proposed (see Figure 7). Here, the VCD drivers refer to individual actor-specific VCD components, while the VCD interaction components focus on the collaborative interactions that take place between actors. The study found that the components within the two emerging dimensions are interrelated, and further, that they can occur in linear and interdimensional patterns throughout the duration of a service encounter. Further, the study established that VCD occurs when at least one of the VCD interaction components manifests alongside at least one of the VCD drivers, thereby resulting in a negative value outcome as determined by the focal actor. For instance, if insufficient information is provided by a service provider to a customer prior to the service encounter (lack of resources), it can prompt disproportionate expectations (expectations) on the part of the customer, which can cause the customer to perceive that the service provider is being neglectful in delivering a value proposition during and/or after the service encounter (conflict in resource integration), leading the customer to experience poor service (insufficient or negative perceived value). Further, the analysis revealed that VCD during ongoing or prior encounters influences the emergence of negative value outcomes in subsequent or future encounters. Moreover, the study provided researchers with insights that can help to distinguish between VCD and value destruction, which has provided challenging in previous studies.

This article sought to answer both RQ3a (*Based on the prior literature concerning VCD, how does VCD occur between actors?*) and RQ3b (*What are the most central and recurring components that explain VCD?*). By synthesizing the emerging body of knowledge, this study provided an in-depth understanding of what underlies the concept of VCD. The synthesis and framework (cf. Figure 7) proposed as a result of the structured literature review provided the foundation for Articles IV and V. These studies applied the framework in empirical investigations in the context of AR mobile games. As such, the study represents an integral part of the present dissertation, providing a foundation for Articles IV and V, while the research agenda proposed in it paves the way for further research into the VCD phenomenon.

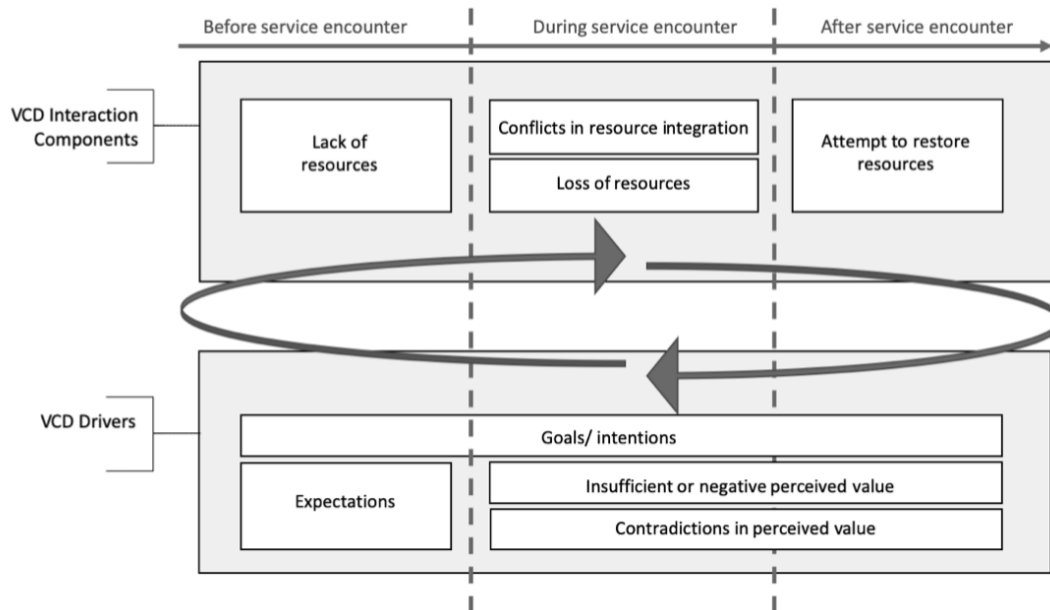


FIGURE 7 Framework for the VCD process

4.4 Article IV: When value co-creation turns to co-destruction: users' experiences of augmented reality mobile games

Lintula, J., Tuunanen, T., Salo, M., and Myers, M. D. 2018. When value co-creation turns to co-destruction: users' experiences of augmented reality mobile games, in *Proceedings of the International Conference on Information Systems (ICIS)*, Atlanta, GA: Association for Information Systems, pp. 1-17.

While research concerning the SDL framework has addressed the multi-faceted nature of VCC, the prior literature has tended to disregard the fact that VCD may also occur during service interactions (Echeverri and Skålén 2011; Plé and Chumpitaz Cáceres 2010). Plé and Chumpitaz Cáceres (2010) introduced this notion, defining VCD as accidental or intentional resource misuse leading to the decreased well-being of at least one of the involved actors. Recently, a number of studies have supported the notion, investigating occurrences of VCD in domains such as marketing, tourism, banking, and IS (e.g., Echeverri and Skålén 2011; Neuhofer 2016; Worthington and Durkin 2012; Vartiainen and Tuunanen 2016). However, research regarding VCD remains scarce, although there have been calls for more investigations into the concept (Kuppelwieser and Finsterwalder 2016; Lintula et al. 2017; Plé 2017). This study paid particular attention to the emergence of VCD in relation to AR mobile games, specifically the Pokémon GO game. AR technology fuses the virtual and physical worlds through interactive real-time augmentations (Azuma 2001), thereby providing multi-dimensional venues for potential VCC and VCD. Notably, Pokémon GO gamers have faced physical hazards, such as assaults and traffic accidents, whilst gaining positive value in the virtual dimension of the game (Ayers et al. 2016; Raj et al. 2016). Thus, we

believe that while services utilizing AR technology may enable new ways of co-creating value, they also pose risks in terms of unprecedented occurrences of VCD.

Therefore, such services represent a particularly important context for investigating VCD. Yet, no previous study has addressed VCD in the context of AR mobile games, while most prior research involving the Pokémon GO game has focused on the positive impacts of gaming. With regard to developing an understanding of the VCD concept, it is important to investigate the implications of VCD for different actors involved in the service process (Kuppelwieser and Finsterwalder 2016). This study addressed the identified research and knowledge gaps by investigating gamers' actual negative service occurrences with the aim of revealing the underlying reasons for VCD from the user perspective. We employed the laddering interview technique (Reynolds and Gutman 1988; Peffers et al. 2003) and conducted 43 qualitative interviews with Pokémon GO gamers in Finland. For our data analysis, we utilized Ward's method (Aldenderfer and Blashfield 1984) to classify the coded data units (laddering chains) into hierarchical clusters. The resulting clusters of constructs represented different reasons for the perceived VCD. Drawing on our analysis, we established an analytical framework for users' reasoning in respect of VCD in AR mobile games.

Based on the results of the hierarchical clustering analysis, the study proposed seven clusters of reasons for the potential VCD experienced by AR mobile gamers, namely (1) value contradiction, (2) unmet expectations, (3) technical challenges, (4) personal or social norm conflict, (5) effect of constant mobile use, (6) absence or loss of resources, and (7) insufficient perceived value. Each category provided a cluster of explanations that helped to explain users' experienced VCD in relation to Pokémon GO. We depicted three to five focal constructs for each cluster in accordance with their frequency in the data, and we provided examples illustrating those constructs (cf. Table 12).

Altogether, our analysis categorized 25 focal constructs. The proposed classification elucidated the VCD phenomenon from a user-centric viewpoint, thereby providing novel insights for both research and practice. We demonstrated how users' VCC attempts may lead to VCD due to seven distinct types of reasoning, highlighting the service interaction components critical to preventive actions in service design and development. Our analysis provided novel considerations in terms of the prior literature concerning the reasons behind VCD, such as the effect of conflicting personal norms, non-users (onlookers), and a lack of information. Furthermore, an enhanced understanding of users as active participants in both VCC and VCD was attained in this study. Supporting the emerging notion of VCD (Echeverri and Skålén 2011; Plé and Chumpitaz Cáceres 2010), our findings suggest that scholars ought to look at both VCC and VCD when investigating services, their design, and their development. Moreover, our study was pioneering in that it applied the SDL lens and the VCD concept in the AR mobile games context and also complemented previous studies regarding Pokémon GO, which have mainly focused on the impacts of the game on individuals' physiological and psychological well-being (e.g., Ayers et al. 2016; Raj et al. 2016; Serino et al. 2016) as well as its influence on

society (e.g., Faccio and McConnell 2018). Such studies have failed to consider why negative occurrences might happen from the user perspective.

This article addressed the RQ4; *Why does VCD occur in AR mobile games?* Extending the findings of Article III, the proposed classification provided a more in-depth understanding of the occurrence of VCD in a particular context, AR mobile games. As such, the study supported the constructs depicted as focal in the VCD process in Article III. Further, the study showcased that the framework for the VCD process (Lintula et al. 2017; a further developed version proposed in Article III) is well-suited as a lens in investigating the VCD phenomenon in the context of a particular service system, such as the focal service user.

TABLE 12 Results of the hierarchical clustering analysis and example reasoning from the data

Cluster name	Cluster description	Most emphatic constructs (occurrences in the data)	Example reasons for value destruction/co-destruction by users
Value contradiction	Value is co-created for the actor while a different value is co-destroyed during or after the service	Wanting to take care of responsibilities (3) Luck defines success too much (3) Play takes time away from other things in life (3) Playing excludes others (3) Setting a bad example for kids (3)	Having fun through gaming and being mentally engaged in pursuing in-game goals contradicts focal values, such as being an attainable friend: co-created value "fun" contradicts with co-destroyed value "friendship"
Unmet expectations	The actor's preconceptions remain unfulfilled during or after the service regardless of the attempted co-creation	Increased meaning of teams and sociality in the game (3) Social conflicts with peers (4) The game evolves slowly (4)	Expecting to meet new people and forming new friendships while gaming, when in reality, gamers tend to play alone and ignore each other
Technical challenges	The actor cannot co-create value during the service as resource integration is restrained due to a technical failure, damage, or shortcoming (e.g., in the employed hardware, the software, or the environment)	Mobile device fails to function/collapses (3) Achieving of goals in game: no goals left to achieve (3) Bad weather for playing outside (5)	A gamer's personal device fails to function; intra-game issues, such as a lack of challenges in the game; or exterior issues, such as stormy weather

Personal or social norm conflict	A self- or socially positioned norm conflicts with the actor's service activity causing, for example, self- and/or social disapproval during or after the service	Having to use the car to travel far for the game (7) Personal values conflict with playing (7) Players behaving badly/disrespectfully (7) Being assessed by others and put in a box (7) Need to control a child's playing (8)	A gaming parent struggles to take parental control over a child's excessive gaming; the self-positioned norm "a mature adult" conflicts with the parent him/herself gaming; or a professional would not want to be assessed by his/her subordinates as "someone who plays mobile games": the social norm "a formal, businesslike professional" conflicts with the professional using the game
Effect of constant mobile use	Co-creation requires the actor's constant attendance to the technology and the service, which reflects unwanted harmful effects on the actor and/or the actor's relationships/environment during or after the service	Dependence on technology and peers (9) Being an outsider (7) Negative effects on health (9)	A gamer develops an unwanted dependence on other gamers or an addiction to the service use, which can lead to the health issues or the gamer being left out of a group of friends
Absence or loss of resources	The actor experiences a lack or loss of resources (e.g., time, effort, information, or reputation) before, during, or after the service	Outsiders' negative preconceptions of the game (14) Psychological presence suffers (13) Playing becomes more difficult over time (17)	The gamer experiences a loss of acceptance and recognition by non-gamers; the gamer perceives the loss of effort/time going to waste; or the gamer experiences the misplacement of his/her psychological presence when gaming in social circumstances
Insufficient perceived value	Co-created value is perceived as insufficient by the actor when compared with the (required) invested resources during the service	Sole concentration in game (20) Requires too much resource investment (37) Playing is useless/senseless/childish (16)	The perceived value may decrease in service use as the challenge level increases; or the amount of invested resources may exceed the value gained as perceived by the gamer

4.5 Article V: Value co-destruction mechanisms in augmented reality mobile games

Lintula, J., Tuunanen, T., Salo, M., Zhang, Y., and Myers, M. D. Value co-destruction mechanisms in augmented reality mobile games. (Under review.)

Vargo et al. (2017) state that to promote VCC, service providers ought to consider users' potential value dimensions as well as both the positive and negative sides of the emerging value. In accordance with the extensive body of knowledge concerning the concept and process of VCC (e.g., Aarikka-Stenroos and Jaakkola 2012; Agrawal and Rahman 2015; Baron and Warnaby 2011; Breidbach and Maglio 2016; De Oliveira and Cortimiglia 2017; Echeverri and Skålén 2011; Kalaignanam and Varadarajan 2006; Marcos-Cuevas et al. 2016; Oliver 2006; Payne et al. 2008; Prahalad and Ramaswamy 2004a; Saarijärvi 2012; Singaraju et al. 2016; Storbacka et al. 2016), this study was motivated by the emergent need to develop an equally detailed understanding of how negative value may emerge for the involved service actors. While the discourse concerning the concept of VCD has started to heat up (e.g., Echeverri and Skålén 2011; Neuhofer 2016; Plé 2017; Plé and Chumpitaz Cáceres 2010; Stieler et al. 2014; Vartiainen and Tuunanen 2016), previous studies have not addressed *how* VCD processes actually unfold. Thus, this study sought to extend current knowledge regarding the emerging concept of VCD by uncovering the underlying process mechanisms behind VCD from the service user perspective. Adopting a critical realist approach (Mingers et al. 2013), this study focused on the empirical context of AR mobile games alike Article IV. Findings were derived from 43 in-depth laddering interviews (Reynolds and Gutman 1988) with Pokémon GO gamers who related actual VCD experiences. The data were coded as chains of attributes, consequences, and values (Peppers et al. 2003). The analysis employed the framework for the VCD process proposed in our earlier work (Lintula et al. 2017) as a lens for deriving the focal VCD process constructs to be applied as meta-codes for the interview data. Through an ISM (Guo et al. 2012) analysis of the meta-coded data, we derived mechanisms indicating the causal relationships between the emerging focal constructs during different phases of the VCD process.

The analysis resulted in an ISM graph that depicted the hierarchical structure of the mechanisms underlying the VCD process in the context of AR mobile games. Figure 8 illustrates the ISM graph derived from our analysis. The graph captures the dynamic nature of the VCD process as it evolves through the depicted mechanisms, which range from the initiation at the focal actor level to the levels of co-creation attempt and actor-to-actor interactions, and finally, to the outcome at the service experience level. Our findings suggest that the conscious choices made by a single actor may give rise to VCD. At the actor-to-actor interaction level, the findings revealed that the "conflicts in resource integration" construct forms the focal mechanisms behind the VCD process, connecting with the "tasks competing with other resources" construct at the lower hierarchical

level as well as with all the VCD process constructs at the levels of actor-to-actor interaction and actor experience. Thus, the “conflicts in resource integration” construct influences the “negative impact on resource availability” and “loss of resources” constructs, while all three of these constructs influence the “contradictions of value” and “insufficient perceived value” outcome constructs.

Pioneering in terms of explaining how the VCD process unfolds, our study discussed the implications of the mechanisms that occur within and at the intersections of each dimension of the ISM graph. The suggested VCD mechanisms provide a novel approach when it comes to understanding the overall VCD process in practice, as prior studies have mainly discussed VCD in the form of frameworks, reasoning, or conditions based on dyadic, organizational, and/or community perspectives (e.g., Echeverri and Skálén 2011; Järvi et al. 2018; Plé and Chumpitaz Cáceres 2010; Robertson et al. 2014; Smith 2013; Worthington and Durkin 2012). The proposed model could be used as a tool for further investigations into negative value outcomes in services as well as for identifying the concrete VCD mechanisms linked to particular service features relevant to service design and development.

This article sought to answer RQ5: *How does VCD occur in AR mobile games?* By facilitating an in-depth understanding of the VCD mechanisms underlying the service occurrences experienced by AR mobile gamers, this study deepened the insights developed in Articles III and IV regarding the VCD phenomenon. In particular, the developed new insights built on the findings proposed in Article IV. Article IV found that VCD occurs in AR mobile games due to divergent types of reasoning, and Article V extended the proposed reasoning by developing mechanisms through which VCD occurs. The AR mobile games context ought to be noted when considering the potential generalizability of the proposed VCD mechanisms, but we suggest that these contextual findings may also be generalizable in other similar digital or AR services. Further research is invited to address the VCD mechanisms in divergent service contexts.

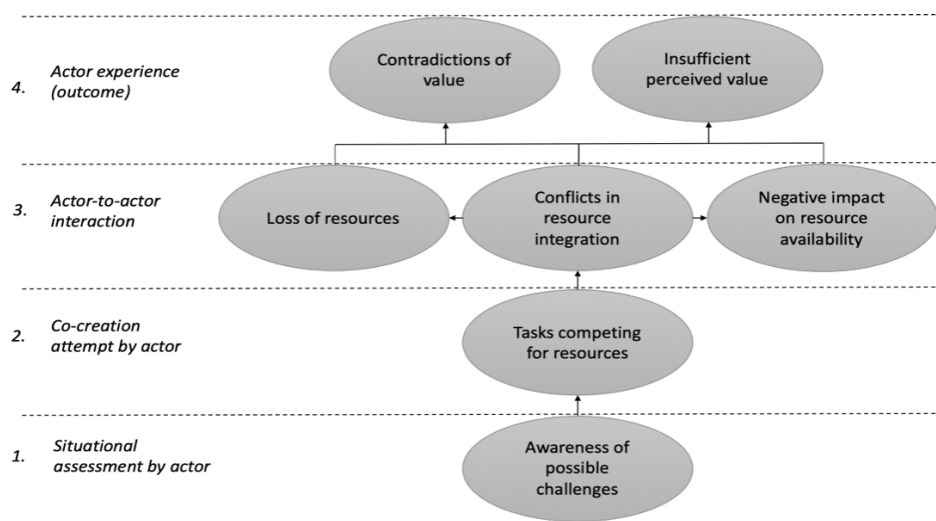


FIGURE 8 Mechanisms behind the VCD process

Furthermore, by adopting a critical realist perspective, the study developed an equally profound understanding of the VCD process as that established in relation to the VCC process in Article I. As such, the findings of Articles I and V give rise to a mutually complementary understanding of both VCC and VCD, thereby allowing for implications beyond the proposed models of each distinct phenomenon. In line with the aims of the present dissertation, the studies create synergies for establishing the conceptual linkages between the VCC and VCD processes within the SDL framework, which leads to novel implications for both research and practice.

5 DISCUSSION

The present dissertation addressed five research questions across Articles I–V. In this chapter, we first depict the answers to each RQ. Subsequently, we discuss the contributions made by the dissertation. We start by presenting the key contributions to research and theory, and thereafter, discuss the practical contributions. The chapter concludes with a discussion of the limitations of the research and suggestions for future research topics.

5.1 Answers to research questions

First, Article I presented the VCC mechanisms relevant to DSD and discusses their implications. The VCC process is depicted at the level of all five investigated digital service contexts, at the level of a particular digital service context type (i.e., B2B or C2C), and at a particular investigated digital service level. At the aggregated level of investigation, as mechanisms, the social nature of use influenced the construction of identities, while the construction of identities influenced the perceived reliability and credibility of the system. Further, customer participation influenced customer orientation, while access to information influenced service experiences, decision making and support, reliability and credibility, and customer orientation. All these VCC mechanisms were ultimately linked to users' utilitarian and hedonic values and goals. Additionally, the context of the system was found to separately influence users' utilitarian and hedonic values and goals in relation to system use. The derived mechanisms highlight which factors service providers ought to emphasize in service design, development, and provision in an effort to enhance the VCC process with service users. Thus, Article I answered the following RQ:

RQ1 How can digital services be designed to enable and enhance VCC?

Second, investigating the value drivers of the users of five divergent digital services, Article II found that the value drivers differ across different and similar digital service types. The analysis showed how the use of utilitarian-focused

digital services varied across the investigated cases from the utilitarian, hedonic, and hybrid perspectives. Further, while the two investigated C2C systems were perceived to be hedonic in nature, they had a strong utilitarian undercurrent as drivers of system use. While hedonic and utilitarian values drivers appeared to a nearly equal extent in the use of one of the C2C systems, the other C2C system was associated with mainly hedonic-driven system use. Thus, while the prevalent value types expectedly differed between the B2B and C2C service systems, unexpected differences were also found in the value type emphases across similar types of service systems. Moreover, the study revealed that all the investigated service systems were differently structured in terms of how users perceived the unfolding of VCC. Thus, Article II answered the following RQ:

RQ2 How do service systems differ in terms of users' hedonic and utilitarian value drivers?

Third, Article III found that the key components of VCD occur in two dimensions, namely VCD drivers and VCD interaction components. It was determined that VCD is a process that occurs between two or more actors whereby the VCD interaction components (lack of resources, conflicts in resource integration, loss of resources, and attempts to restore resources) connect with individual actors' VCD drivers (i.e., goals and intentions, expectations, and value perceptions) before, during, and/or after a service encounter, leading to insufficient or negative perceived value or contradictions in the perceived value as determined by the focal actor. Thus, Article III answered the following RQ:

RQ3a Based on the prior literature concerning VCD, how does VCD occur between actors?

RQ3b What are the most central and recurring components that explain VCD?

Fourth, through a hierarchical clustering analysis, Article IV found that AR mobile game players experienced potential VCD in seven different reasoning categories, namely (1) value contradiction, (2) unmet expectations, (3) technical challenges, (4) personal or social norm conflict, (5) effect of constant mobile use, (6) absence or loss of resources, and (7) insufficient perceived value. Each reasoning category involved 3–5 reasoning constructs suggested by the study informants on the basis of their actual use experiences with the AR mobile game Pokémon GO. Thus, Article IV answered the following RQ:

RQ4 Why does VCD occur in AR mobile games?

Finally, Article V explained how the VCD process unfolds by deriving the causal mechanisms that occur within and at the intersections of the four hierarchical VCD process dimensions, namely (1) situational assessment by actor, (2) co-creation attempt by actor, (3) actor-to-actor interaction, and (4) actor experience. The findings highlight how conscious choices made by a single actor at the intersection of the “awareness of possible challenges” and “tasks competing for resources” mechanisms may lead to VCD at the level of actor-to-actor resource integration. Further, the “conflicts in resource integration” mechanism serves as a focal mechanism for the VCD process, connecting with the “tasks competing with other resources” construct as well as with all the

mechanisms at the levels of actor-to-actor interaction and actor experience. Thus, the “conflicts in resource integration” construct influences the “negative impact on resource availability” and “loss of resources” constructs, while all three of these constructs influence the “contradictions of value” and “insufficient perceived value” VCD outcome constructs at the level of actor experience. The study models the emerging mechanisms in a canonical graph representing how VCD unfolds through causal mechanisms in the AR mobile games context. Thus, Article V answers the following RQ:

RQ5 How does VCD occur in AR mobile games?

5.2 Contributions to research and theory

This dissertation has contributed to the IS and service research literature by offering new insights into the phenomena of VCC and VCD. The aim was to develop theoretical knowledge for explaining both VCC and VCD (Gregor 2006). In Articles I and II, we proposed a model of the mechanisms behind VCC and also dissected service users’ value drivers for VCC, thereby addressing RQ1 and RQ2, respectively. In Article III, we developed a synthesized understanding of the VCD process and then proposed an extended definition of the concept, thereby addressing RQ3. In Articles IV and V, we categorized AR mobile game users’ reasoning in relation to VCD and developed a model of the mechanisms behind the VCD process, thereby addressing RQ4 and RQ5, respectively. Further, as an overreaching contribution of the dissertation, we connected the two distinct yet interrelated concepts of VCC and VCD within the SDL framework. In the following sections, we discuss how the dissertation has contributed to the research literature by developing an in-depth and dynamic understanding of the VCC process and its hedonic-, utilitarian-, and hybrid-oriented drivers. Additionally, we discuss how our conceptually and empirically derived findings concerning VCD contribute to current understandings of the concept and related research. Finally, we discuss the linkages between the two phenomena as well as our methodological contributions.

5.2.1 Unboxing the process of VCC for DSD

By depicting the differences between service design and IS development, this dissertation contributed, first, by conceptualizing DSD at the crossroads of the IS and service research literature. We defined DSD as *an activity that seeks to enable and enhance VCC between a digital service provider and its customers/users*. In contrast to the traditional means of designing IS, we argued that the emphasis of DSD should be on understanding the VCC behavior of customers rather than mere users of IS. Further, we argued that the focus of DSD ought to be on realizing customers’ co-creation experience from their digital service use. Accordingly, understanding and enabling the co-creation of value represent the foundation of DSD, and this dissertation focused on developing that very understanding.

Second, this dissertation extended the prevalent understandings of VCC as processes and activities underlying actors' resource integration in service, facilitated in multifold actor roles (Lusch and Nambisan 2015). Our findings explicate the connections between the VCC process mechanisms, thereby providing concrete means for inspecting and analyzing how VCC unfolds for users in relation to particular socio-technical aspects of a given digital service. As such, the proposed model paves the way for the development of a theory concerning the mechanisms behind VCC, which answers the call by Vargo et al. (2020) for the extension of current SDL-based understandings of VCC.

Previous studies have highlighted several important aspects of VCC. A number of topics, such as actors' roles, motivations, practices, and resource integration, have been discussed (Aarikka-Stenroos and Jaakkola 2012; Baron and Warnaby 2011; Breidbach and Maglio 2016; Echeverri and Skålén 2011; Marcos-Cuevas et al. 2016; Singaraju et al. 2016). Some studies have dissected the different types of positive value outcomes resulting from co-creation (e.g., Agrawal and Rahman 2015), the frameworks of the VCC process (e.g., De Oliveira and Cortimiglia 2017; Payne et al. 2008), and the mechanisms behind VCC (e.g., Saarijärvi 2012; Storbacka et al. 2016). However, the understanding of how the VCC process actually unfolds remained limited, meaning that more research was required (Vargo and Lusch 2008a).

Although some previous studies have considered the broader dynamics of VCC in multi-actor networks and service platforms (Ekman et al. 2016; Lusch and Nambisan 2015; Wieland et al. 2012), the literature has tended to approach the concept of VCC as a matter of co-production (e.g., Etgar 2007), co-development (e.g., Payne et al. 2008), or co-design (e.g., Sanders and Stappers 2008) within services. Further, such studies have focused on the in situ issues that impact the realization of value from service rather than on the actual process of VCC during the use of a service. This dissertation addressed the identified research gap by bringing to the fore the mechanisms that explain the VCC process. Article I explored the VCC process by deriving those mechanisms and their interdependencies as well as by revealing how digital service customers experience VCC in service use. Elaborating on the findings of Article I, Article II explored users' hedonic and utilitarian drivers of system use in the investigated service contexts.

Article I offered explanations for how empirical VCC events are generated, which involves mechanisms that manifest (Mingers 2004) at three levels of abstraction. Using the depicted interdependencies between those mechanisms, we showcased the "generative causality" (Mingers and Standing 2017, p. 180). In other words, we explained how VCC occurs from the digital service user perspective. Article I demonstrated that users' hedonic and utilitarian values and goals are connected to all the other process constructs as outcome constructs, that is, independent variables (Guo et al. 2012). Moreover, the social nature of use was depicted as another focal outcome construct alongside users' hedonic values and goals, particularly in the C2C context. While some variation occurred across both different and similar service types, we found that consistent across all the cases, access to information is a foundational mechanism for the co-creation of utilitarian and hedonic values and goals. Thus, as a unique contribution, this

dissertation adopted an individual customer perspective on VCC with a digital service at a detailed level. Furthermore, by depicting the most recurring interdependencies between the emerging mechanisms across all the cases, we showcased avenues for further research at a detailed level.

Additionally, the investigated cases showed that the emerging mechanisms differ according to the digital service. Of particular interest was the fact that in the metal-detecting case (a C2C system), the mechanism behind the construction of identities was equally high in the hierarchy as users' hedonic values and goals, resulting in them both being outcome constructs according to the classification of Guo et al. (2012). However, a similar pattern did not emerge with respect to the B2B digital services, as utilitarian values and goals tended to dominate as outcome constructs in this context. Interestingly, both hedonic and utilitarian values and goals emerged as distinct outcome constructs in all the investigated B2B services, regardless of the utilitarian orientation of such systems. Thus, we concluded that in the case of B2B digital services, hedonic values and goals have an impact on users' VCC experience alongside utilitarian values and goals. This finding diverges from traditional views of technology adoption, which have tended to underscore the utilitarian aspects of the use of such systems (Van der Heijden 2004; Venkatesh et al. 2003). By offering context-specific findings, we address the call for context-specific approaches to theory development within IS research (Grover and Lyytinen 2015).

Third, contributing to the prevalent understandings of digital service customer behavior, Article II showcased how the hedonic, utilitarian, and hybrid orientations of users' value drivers fluctuated between the investigated digital service cases and service types. While previous studies have recognized that users' goals may be hedonic or utilitarian (e.g., Tuunanen et al. 2010; Van der Heijden 2004), further detail concerning how these orientations may impact VCC has been lacking. Furthermore, although Article I depicted the hedonic and utilitarian values as outcome constructs within the VCC process, the prior literature has not inspected the fluctuations between the co-created hedonic and utilitarian orientations within the use of digital services. Through revealing different value structures for all the investigated service cases, clear differences were found in the value types between the B2B and C2C service types, as had been anticipated. Interestingly, unexpected differences were also found between similar types of services, namely the leisure-oriented services of geocaching and metal detecting. The case of metal detecting illustrated a service system in which hedonic and utilitarian values were nearly equally balanced. By scrutinizing the value distributions, Article II found that, on the one hand, users perceived both hedonic and utilitarian values with regard to many of the system value propositions and customer value drivers. On the other hand, although the geocaching case showcased hedonic-driven service use, the recognized hybrid values indicated the utilitarian undercurrent of VCC. Consequently, our findings provide a novel perspective on VCC at the service system level as well as between systems, which concurs with the earlier arguments of Valkonen et al. (2015) that a system's use inherently involves both utilitarian and hedonic values. Similar findings concerning intertwined hedonic and utilitarian values have been

reported by Penttinen et al. (2018), who investigated users' preferences when using a dual-purpose system.

Further, rather than adopting a service platform or ecosystem perspective, as has been the common approach in prior studies concerning VCC in digital services, Articles I and II investigated the use of particular services. Thus, our studies contributed to the literature by investigating VCC at the level of groups or types of digital services as well as at the level of a single digital service. While previous studies have tended to investigate inter-organizational VCC, the mechanisms depicted in Article I adopt an individual user perspective when describing how customers derive value from digital service interactions. Further, we answered the call for more investigations into the mechanisms and implementations of VCC (Vargo et al. 2008, 2020).

Fourth, our findings extend Tuunanen et al.'s (2010) framework for VCC in the field of IS by proposing four new constructs, namely customer orientation, decision making and support, reliability and credibility, and access to information. Moreover, we detached utilitarian and hedonic values and goals as two separate constructs, which appeared to be interrelated in our findings. The findings illustrated how the user participation construct was linked to the new constructs of customer orientation and decision making and support, which were in turn linked to utilitarian values and goals. By investigating VCC in C2C-oriented digital services, we revealed somewhat diverging mechanisms when compared with those of B2B-oriented digital services. Thus, we suggest that there may be specific characteristics associated with VCC in digital services in the C2C setting. However, we conclude that users' value structures with respect to their hedonic and utilitarian value drivers may vary in seemingly similar types of systems. Thus, in line with calls for more contextualized research (e.g., Grover and Lyytinen 2015), more contextual investigations into VCC within digital services are required.

5.2.2 Explaining the VCD process

Previous studies involving SDL have adopted a rather optimistic perspective when explaining services as processes of VCC whereby actors integrate resources in an effort to improve their own and each other's well-being (Echeverri and Skålén 2011; Plé and Chumpitaz Cáceres 2010). To date, the evolution of SDL (e.g., Vargo and Lusch 2004, 2008a, 2016) has provided researchers and practitioners with tools for understanding VCC. Yet, while SDL has become an essential lens in relation to designing services and understanding how value is co-created, service processes with negative value outcomes have been subject to relatively little attention. As a result, tools and theoretical frameworks for understanding negative value outcomes, and particularly the collaborative processes leading to such outcomes, remain scarce (Echeverri and Skålén 2011; Worthington and Durkin 2012). The present dissertation addresses this imbalance by scrutinizing the concept and process of VCD. In Articles III – V, we developed in-depth insights with respect to synthesizing current understandings of the concept and process of VCD, understanding the reasons behind the emergence of the phenomenon, and further, scrutinizing the mechanisms through which VCD unfolds.

In Article III, we conducted a structured literature review that highlighted how studies concerning the emerging notion of VCD are ambiguous and scarce, in addition to being plagued by the misuse of the concept (e.g., Prior and Marcos-Cuevas 2016). To address this issue, we compiled and analyzed current insights and understandings regarding the phenomenon in a synthesized framework for the VCD process (Figure 7). We defined VCD as *a process between two or more actors whereby the VCD interaction components (lack of resources, conflicts in resource integration, loss of resources, and attempts to restore resources) connect with individual actors' VCD drivers (i.e., goals and intentions, expectations, and value perceptions) before, during, and/or after a service encounter, leading to insufficient or negative perceived value or contradictions in the perceived value as determined by the focal actor*. We found that the developed in-depth understanding and definition provided an important contribution to the service research field as well as to affiliated areas of inquiry, thus helping researchers to understand what constitutes VCD as well as the scope and outcomes of the process, which should prevent misunderstandings and the misuse of the concept. Further, we proposed a research agenda intended to help scholars harness the framework for advancing this emergent area of investigation. The key research implications give rise to an agenda comprising four broad topics, namely (1) the temporal aspects of VCD, (2) the dynamics between VCC and VCD, (3) the exploration of the VCD process, and (4) the impacts of contextual factors.

Further, we depicted the concepts of value destruction and VCD as two distinct phenomena and then discussed their differences. The prior literature concerning services and SDL has tended to discuss the potential emergence of negative value outcomes as a result of the unilateral continuum of practices that occur in service provision from the managerial perspective. Examples of this discourse can be found in the service failure and recovery, customer misbehavior, and risk streams of literature (Harris and Daunt 2013; Malhotra and Malhotra 2011; Maxham and Netemeyer 2002). Such investigations, for example, of how particular services fail, foster knowledge of *value destruction*. Explaining value destruction may illuminate the practices on the part of the provider or customer that lead to such failures, which may suggest recommendations and guidelines for how managers could contextually address risks. In turn, VCD is related to the interactions that occur between actors (e.g., provider and customer) as well as to the individually perceived experience, as depicted within the framework for the VCD process (Figure 7). Thus, the concept of VCD serves to provide a more reciprocal view of the process that leads to negative value outcomes when compared with the value destruction perspective. However, in Article III, we showcased how the two concepts tend to be entangled within the literature, which suggests the lack of a clear conceptual distinction. By establishing an in-depth understanding of VCD within the two-dimensional framework and then proposing a definition for the VCD concept, Article III addressed this gap in the literature. In relation to investigating VCD, we believe that both dimensions (actor-to-actor interaction and actor experience) ought to be acknowledged if we are to understand how negative value outcomes emerge within the interactions that occur between actors in service processes.

In Article IV, we classified service users' reasoning in relation to their experiences of VCD. The classification illustrates why users considered that VCD occurred through seven types of reasoning, namely (1) value contradiction, (2) unmet expectations, (3) technical challenges, (4) personal/social norm conflict, (5) effect of constant mobile use, (6) absence or loss of resources, and (7) insufficient perceived value in use. Identifying the negative value structures underlying service use, and consequently, classifying service users' reasoning with regard to VCD represents a novel approach to investigating the VCD phenomenon. Furthermore, to the best of our knowledge, this dissertation is the first study to investigate VCD in the AR mobile games context, which allows it to provide novel insights because previous studies have tended to focus on the positive effects of gaming (e.g., Ayers et al. 2016; Raj et al. 2016; Serino et al. 2016) as well as the societal influences (e.g., Faccio and McConnell 2018). By adopting a detail-oriented approach to unraveling perceptions of why VCD occurs, we depicted particular constructs that may trigger VCD in the use of a service.

Therefore, we contribute to the literature by presenting findings ranging from the social to the technical aspects of reasoning, which should provide IS researchers and practitioners with insights into the interplay between service actors and technology. While prior studies concerning VCD have addressed the impacts of conflicts and violations of social and/or cultural norms on negative outcomes (e.g., Chowdhury et al. 2016; Daunt and Harris 2017; Prior and Marcos-Cuevas 2016), no distinction has previously been drawn between personal and social norms. Interestingly, our analysis revealed that AR mobile game users' social and personal norms conflicted in terms of service use, thereby triggering VCD. Further, while studies have investigated various relationship types, such as dyadic relationships (e.g., Echeverri and Skálén 2011; Robertson et al. 2014), interfirm relationships (Prior and Marcos-Cuevas 2016), and user communities with a provider perspective (e.g., Camilleri and Neuhofer 2017), the non-users of a service have not previously been discussed with respect to their influence on VCD as perceived by users. Our findings showed that VCD can be triggered in relation to such non-users, thereby affecting the service experience of users, for example, via non-users' mere physical presence. Similarly, it has been suggested that "onlookers" may influence users' ways of engaging with technology (Sergeeva et al. 2017).

Finally, in Article V, we modeled how the VCD process unfolds by deriving the generative mechanisms that drive negative value outcomes throughout the duration of a service encounter. We identified seven VCD mechanisms and the related interdependencies, and we proposed a hierarchical model for the VCD process, suggesting that the process manifests through mechanisms at four hierarchical levels. These VCD mechanisms represent a novel approach to understanding how the overall VCD process unfolds, as previous studies have mainly discussed VCD in the form of frameworks, reasoning, or conditioning from the dyadic, organizational, and community perspectives (e.g., Echeverri and Skálén 2011; Järvi et al. 2018; Plé and Chumpitaz Cáceres 2010; Robertson et al. 2014; Smith 2013; Worthington and Durkin 2012).

Our findings at the lowest hierarchical level (i.e., a situational assessment by an actor) illustrate how the VCD process may be initiated at the individual

actor level as value propositions are introduced to the actor, rather than at the interaction between actors level. Thus, our findings extend previous understandings of VCD as a phenomenon that occurs within the resource integration between the involved actors (Echeverri and Skålén 2011; Plé and Chumpitaz Cáceres 2010). Accordingly, we found that the initiation of VCD may occur at the individual actor level. This finding implies that VCD may occur regardless of the focal actor acknowledging the challenges that lie ahead. Therefore, we proposed that other actors (e.g., the service provider) may not be able to steer or prevent the *initiation* of VCD, thereby extending previous understandings of the distribution of information and transparency as a means of fostering VCC or inhibiting VCD (e.g., Baumann et al. 2017; Im and Qu 2017).

In line with previous research, our findings indicated that conflicts at the actor-to-actor interaction hierarchical level constitute a mechanism that leads to negative value being experienced by the focal actor. Our analysis suggested that the VCD mechanisms at the actor-to-actor interaction level are multifold. We found that conflicts in relation to resource integration may induce the loss of resources in actors' interactions. This finding is in line with the work of Smith (2013), who found that the *unexpected* loss of materials, conditions, as well as self, social, or energy resources is negatively related to the actor's well-being. In a similar vein, we found that expectations represent an underlying issue: when actors' expectations regarding the interaction are not aligned, the process may lead to a loss of resources (Neuhofer 2016; Smith 2013). Further, we found that the mechanisms behind conflicts in the resource integration and the actor experience hierarchical levels are linked, which can result in insufficient or negative value being experienced by the focal actor (i.e., VCD). In accordance with Stieler et al.'s (2014) arguments, our findings showed that value can be co-destroyed and co-created in a process, while the resultant value is uniquely experienced at the individual level by each involved actor (Prahalad and Ramaswamy 2004a; Vargo and Lusch 2008a). Thus, our findings supported the shift in focus from the dyadic experience between the user and the provider and toward the shared experience between all those present during the service encounter (Carù and Cova 2015).

Consistent with the findings of Vargo et al. (2017) and Vartiainen and Tuunanen (2016), our findings also suggested that actors may perceive both positive and negative emerging value at the highest hierarchical level (i.e., actor experience). Further, we proposed that actors experience value contradictions, which may be triggered by the mechanisms behind the actor experience and actor-to-actor interaction (i.e., conflicts of resources, loss of resources, and negative impact on availability of resources) hierarchical levels. Moreover, we found that insufficient perceived value may result from similar mechanisms. This finding is in line with previous studies that emphasized the importance of the expectations of individual resource-integrating actors (e.g., Echeverri and Skålén 2011; Plé and Chumpitaz Cáceres 2010; Smith 2013; Stieler et al. 2014).

5.2.3 Linkages between VCC and VCD

By compiling previous understandings of the VCD phenomenon into a synthesized framework (Figure 7), this dissertation linked an in-depth understanding of VCD with the SDL perspective on VCC. Moreover, by extending the SDL perspective, we depicted an alternative phenomenon that may occur in parallel to VCC within a service encounter. While VCC manifests in the resource integration of multiple involved actors (Vargo and Lusch 2016), Figure 7 shows that VCD may occur through the interplay of the VCD interaction components (i.e., lack of resources, conflicts in resource integration, loss of resources, and attempts to restore resources) and VCD drivers (i.e., goals and intentions, expectations, insufficient or negative perceived value, and contradictions of perceived value) during a service encounter. More specifically, we found that VCC and VCD can fluctuate, and further, that positive and negative outcomes can emerge simultaneously (e.g., Chowdhury et al. 2016; Vartiainen and Tuunanen 2016). This finding extends previous understandings of VCD, which have tended to assume that either VCC or VCD may occur at once, thereby framing the phenomena as two opposing ends of a continuum (Robertson et al. 2014), opposing dimensions (Echeverri and Skålén 2011; Laamanen and Skålén 2015), or flipsides (Neuhofer 2016). Furthermore, Makkonen and Olkkonen (2017) propose that the continuum upon which VCC and VCD rest may be complemented by a “neutral zone” of value *no-creation*. In contrast with these views, we found that actors may engage in resource integration activities guided and initiated by value propositions (Ballantyne et al. 2011) yet still fail to derive sufficient value from their interactions. Thus, VCD processes can result from attempted VCC, as the failure of co-created value to match the expected positive value outcomes may drive VCD (e.g., Stieler et al. 2014). As a novel contribution, this dissertation synthesized the scattered VCD literature, thereby developing comprehensive insights into the phenomenon.

Further, our findings showcased the unique features of VCD, drawing a distinction between the VCD process and the VCC process. Vargo et al. (2020) suggest that co-created value may be positively or negatively valenced. Similarly, a number of previous studies have positioned VCD as the negative flipside of VCC (Kaufmann et al. 2016). Our findings contrasted with such an approach by showing that the outcomes of VCD may be more complex than straightforward negatively valenced states. In fact, VCD may also constitute insufficient perceived value and contradictory value outcomes. Here, value may be co-created, albeit not to the desired extent with respect to the focal actor. Further, in Articles I and V, we presented graphs of the processes of VCC and VCD, respectively. The VCC process is structured with mechanisms related to the affordances of a service, leading to positive value outcomes. However, the VCD process is structured with mechanisms relating to activities leading to negative, insufficient, or contradictory value. Thus, our empirically derived illustrations of the processes of VCC and VCD are not reciprocally valenced (i.e., polarized as positive and negative ends of a continuum). Rather, our findings showcased how two different yet interrelated phenomena may dynamically occur throughout the duration of a service encounter. Thus, the conceptualization of

VCD proposed in the present dissertation contributes to the service research by demonstrating that VCD is not merely the opposite (or negative side) of VCC, as it is instead a unique phenomenon in itself.

Additionally, the framework proposed in Article III illustrates the VCD interaction components dimension, highlighting how just as all actors can be co-creators of value, all actors can also be co-destroyers, thereby extending the SDL perspective. We argued that negative value outcomes are determined by actors both individually and context-specifically (Chandler and Vargo 2011). Thus, while a service encounter may lead to positive value outcomes for one actor, negative value outcomes may be derived by another. As discussed above, our findings showed that positive and negative value outcomes may alternate or occur simultaneously, which is contrary to certain previous findings (e.g., Echeverri and Skålén 2011). Drawing on the work of Vargo and Lusch (2016), we considered that institutional logics may both enable and constrain value creation. For instance, our findings in Article IV imply that actors who believe in divergent social norms may perceive negative service outcomes differently, which may in turn explain VCD in particular service encounters from the customer perspective. Therefore, we believe that whereas prevalent institutional logics may drive VCC, entrenched institutional logics may drive VCD.

5.2.4 Methodological implications

We applied a critical realist approach in Articles I and V, investigating the phenomena of VCC and VCD at the level of individual system users. Prior critical realist studies in the IS field have tended to focus on the organization-level perspective in their attempts to extract generative mechanisms (Wynn and Williams 2012). Thus, our study is among the first to adopt a critical realistic perspective when investigating the causal mechanisms that steer VCC and VCD in relation to individual IS users' service use.

Further, we also contributed to the literature by analyzing a relatively large set of laddering interview data using the ISM approach (in Articles I and V). Prior laddering interview studies have tended to be constrained by their methods of analysis, which favored data sets containing only 20–30 interviews (Guo et al. 2012; Tuunanen and Peffers 2018). As we had a substantially larger data set, we found the ISM approach to be particularly suitable due to its scalability. Notably, we found that the suitability and applicability of the theoretical foundation are essential in terms of utilizing the ISM methodology. The framework for VCC developed by Tuunanen et al. (2010) as well as the framework for the VCD process developed by Lintula et al. (2017) were found to be helpful with regard to determining the variables for the ISM process. We believe that our critical realist approach, as applied in synergy with the laddering data analyzed using the ISM method, represents a suitable and promising pathway that could be followed by scholars seeking to investigate VCC and VCD in divergent research contexts as well as in various other research endeavors across disciplines.

5.3 Contributions to practice

This section discusses the practical contributions made by the present dissertation, with a particular focus on the design, development, and provision of digital services. First, we set out the implications of our findings for the design of digital services for enhancing VCC. Next, we discuss how the developed understanding of VCD may provide the means to prevent service interactions prone to VCD or to steer such interactions toward VCC.

5.3.1 Design and development of services for enhancing VCC

Given the significant growth of the service economy in recent decades, the shift from traditional product- and provider-centric views toward a service exchange view impacts both business practices and the skills associated with them. Information systems analysis and design has traditionally focused on gathering or discovering user requirements in an effort to understand user preferences and then prioritize them in system development according to the client organization's goals (Tuunanen and Peffers 2018). The various forms and methods of participation, such as participatory design and user-centered design, as well as the requirements of participating user groups have previously been discussed (e.g., Dearden and Rizvi 2008; Kujala 2003). Further, discourse and guidelines have established to the extent to which certain situations are suitable for user involvement (Gasson 2003). While the prior research has made the case for participatory approaches to system design, suitable means of involving users in system design and development projects have been only loosely debated (Massanari 2010; Tuunanen and Peffers 2018).

However, the breadth of user involvement within systems development projects extends beyond user participation in the core design, development, and evaluation activities, requiring the development of an overall infrastructure that promotes collaboration with individual users (Engvall 2019). Further, users who participate in development projects may perceive their inputs to go unacknowledged and so believe that despite their best efforts, they were unable to influence the project outcome (e.g., Martikainen et al. 2020). Bano et al. (2017) note the perceived effectiveness of a focus on user involvement in terms of increasing user satisfaction. Another focal challenge when it comes to involving users concerns communication between users and the design or development team (Lawson 2005, p. 85). During the maintenance phase of a system development project, mere updates and sometimes even major releases are typically provided without user involvement (Tuunanen and Peffers 2018). Such shortcomings in relation to user involvement may influence the overall success of development projects, meaning that user involvement efforts require careful planning and management (Bano et al. 2017). Thus, the user experience of participation, as well as the perceived influence of the collaboration on the development project, are salient with regard to the co-creation of value with users.

Our findings indicated how the design and development of IS could benefit from adopting both views and practices from the field of service design. Service

design (i.e., a new service development process) concerns the attainment of an understanding of customers and service providers, as well as of their contexts and social practices, and the subsequent translation of that understanding into service development (Holmlid and Evenson 2008; Yu and Sangiorgi 2018). Service designers use the term “customer” rather than the IS term “user” when referring to the individuals who use the service. The IS development ought to shift focus toward customers’ service experiences (Flint and Woodruff 2014; Prahalad and Ramaswamy 2004b) and how the service provider can influence those experiences through service interactions with the customer (Morelli 2002). Active customer participation ought to be regarded as a prerequisite for success (Grönroos and Voima 2013), as IS design and development practitioners aim to create value in relation to use of the service. Employing digital technologies within services opens up new avenues for service providers to interact and co-create value with their customers (Grenha Teixeira et al. 2017; Lusch and Nambisan 2015). As digital technologies enable and also constrain service interaction, involving and interacting with customers is particularly important with respect to digital services (Williams et al. 2008). Customer involvement is also salient when it comes to understanding VCC, which allows for the realization of individual customers’ needs and wants from service use.

Thus, we proposed that DSD is *an activity that seeks to enable and enhance VCC between a digital service provider and its customers/users*, which underscores the value of understanding the VCC behavior of customers. In Articles I and II, we investigated how VCC unfolds from the service user perspective as well as how users’ value drivers differ between different service systems. In Article II, we highlighted how both utilitarian and hedonic value drivers are present in both utility- and hedonic-driven systems, indicating that the design, development, and provision of services ought not to neglect one or the other form of driver. Instead, systems ought to be designed and developed on the basis of particular customer or target group requirements, needs, and wants. To understand customers’ needs, it is focal to interact with customers throughout the design process, and placing the customer in the locus of the project instead of the company or the available digital technologies. Further, it may not be sufficient to invite customers take part in certain parts of the design process, but rather, give the customers tools to initiate, facilitate, contribute to, and take over such processes. This could be done, for instance, through transparent and agile DSD and development methods, where customers gain access to the development artefact and team, or where customers may even form independent design and development teams.

The model proposed in Article I revealed the mechanisms behind VCC-generating events through which customers derive hedonic and/or utilitarian value from the use of a given digital service. We argued that enforcing and improving these VCC mechanisms through service design and development efforts may help service providers to continuously enhance and enable VCC with customers. On the one hand, we found that customer participation, customer orientation, and decision making and support give rise to positive hedonic and utilitarian value outcomes. On the other hand, we found that the social nature of service use heralds the construction of identities as well as reliability and

credibility, which also lead to positive hedonic and utilitarian value outcomes. These two chains of VCC mechanisms should be of interest to DSD and development practitioners, as the identified mechanisms could be facilitated through service design and development efforts. The interdependencies between the VCC mechanisms and their potential implications for service design, development, and provision are tabulated in Table 13.

TABLE 13 Mechanisms behind VCC (across all the cases in Article I, threshold ≥ 2) and the potential implications for service design, development, and provision

Interdependency between mechanisms	Description of the generated event	Potential implications for service design, development, and provision
<ul style="list-style-type: none"> Context of use – Utilitarian values and goals 	The context of service use leads to the accomplishment of personal utilitarian values and goals.	<ul style="list-style-type: none"> Considering changing user requirements with respect to divergent contexts Enabling and facilitating use in divergent virtual and physical contexts Continuous and timely design process to prolong service life span
<ul style="list-style-type: none"> Access to information – Utilitarian values and goals Access to information – Reliability and credibility 	<p>Having access to information leads to the accomplishment of personal utilitarian values and goals.</p> <p>Having access to information leads to improved perceived reliability and credibility.</p>	<ul style="list-style-type: none"> Communication of timely information to users during service provision Providing users with access to information and other resources during service design, development, and provision Transparency of processes within service design, development, and provision
<ul style="list-style-type: none"> Service experience – Hedonic values and goals Service experience – Utilitarian values and goals Service experience – Social nature of use 	<p>Perceived positive service experience leads to the accomplishment of personal hedonic values and goals.</p> <p>Perceived positive service experience leads to the accomplishment of personal utilitarian values and goals.</p> <p>Perceived positive service experience leads to perceived social nature of service use.</p>	<ul style="list-style-type: none"> Providing the experience of flow through service development and design: the use of the service itself as a goal Providing experience efficacy through service development and design: getting tasks done effectively Providing the option of collaborative use experience through service development and design: access to other users, creation of personalized profiles, sharing content, and shared use experience with others (e.g., managing tasks collaboratively)
<ul style="list-style-type: none"> Customer orientation – Utilitarian values and goals 	Perceived customer orientation of the service leads to the accomplishment of	<ul style="list-style-type: none"> Designing and developing services with the end user in mind

<ul style="list-style-type: none"> • Customer participation – Utilitarian values and goals 	<p>personal utilitarian values and goals.</p> <p>Involving customers in service leads to the accomplishment of personal utilitarian values and goals.</p>	<ul style="list-style-type: none"> • Responsive service flow and new feature development according to user needs • Involving users in design and development of services • Active and continuous user involvement, from new service innovation and feature/version development to service rundown
<ul style="list-style-type: none"> • Decision making and support – Utilitarian values and goals 	<p>Perceived improved decision making and increased support leads to the accomplishment of personal utilitarian values and goals.</p>	<ul style="list-style-type: none"> • Transforming data into meaningful information to support users' task performance through service development
<ul style="list-style-type: none"> • Social nature of use – Hedonic values and goals 	<p>Perceived social nature of service use leads to the accomplishment of personal hedonic values and goals.</p>	<ul style="list-style-type: none"> • Providing users with access to other users (identification, location, communication, etc.) through service development and design • Allowing for the creation of personalized profiles through service development and design • Allowing for the sharing of content and activities through service development and design
<ul style="list-style-type: none"> • Utilitarian values and goals – Hedonic values and goals 	<p>Accomplishing personal utilitarian values and goals leads to the accomplishment of personal hedonic values and goals</p>	<ul style="list-style-type: none"> • Sufficient and continuous requirements acquisition from target users during service design and development as well as tailoring solutions to users' needs for optimal results
<ul style="list-style-type: none"> • Utilitarian values and goals – Social nature of use 	<p>Accomplishing personal utilitarian values and goals leads to the perceived social nature of service use.</p>	<ul style="list-style-type: none"> • Proactively communicating and allowing for communication with and amongst end users during service provision. Continuously designing and developing new features/solutions to meet the elicited user requirements

First, as an individual mechanism, the context of service use may dictate whether a service can help its customers to derive positive service outcomes. Evidently, a service may be of value in one context but not in another, unless the set of provided resources is updated accordingly. Thus, our findings indicated that users' requirements and changes in those requirements should be considered by the service provider with respect to changing service use contexts. This requires continuous communication and interaction with customers. Moreover, as new technologies provide new ways and contexts in terms of service use, service development should focus on enabling and facilitating service use in divergent virtual and physical contexts. This could be achieved, for example, by establishing close relationships with lead users (i.e., users who are more likely to

adopt new technologies and new use contexts). Customers' changing needs as well as changes in the context of use could be carefully detected, for instance, by encouraging customers to share content concerning their service use in social networks.

Second, our findings suggested that access to information represents a focal mechanism for increasing both the reliability and credibility of the service, particularly in relation to utilitarian service outcomes. Facilitating such a mechanism involves increasing the timely communication of relevant information throughout the provision of the service. To underscore the importance of customer involvement throughout the service life span, customers should be provided with access to information resources during the service design, development, and implementation phases. Moreover, the transparency of such processes may be of importance with regard to this aim. Furthermore, practitioners could not merely summon customers to take part in their design processes, but also equip customers with tools for forming their own design, development, and testing teams. This could be achieved by establishing communication and interaction channels, platforms for networking and collaborating with and amongst customers, and by default, by allowing customers access to data stored within the structures of the design of the service as well as collected throughout the span of service use.

Third, a pleasing service experience may increase the perceived social nature of service use. As digital technologies may, by their very nature, distance users from traditional social interactions, the importance of perceptions of social system use was highlighted in our findings. The perceived social nature of service use leads to the accomplishment of personal hedonic values and goals. We argue that designers should pay close attention to providing users access to other users, allowing for creating personalized profiles, and sharing content and use experiences with others. These and other socially-emphasized affordances may steer the perceived social nature of use toward VCC. This could include, for example, developing features that allow for the sharing of task management with other users. Such service development and design efforts support social experiences by providing service users with access to other users. This could be facilitated in various ways, some of which involve the use of identification, location, and communication technologies. Further, allowing for the creation of (or connection with) personalized profiles and the sharing of content and activities should also be considered.

Fourth, a focus on improving the service experience as perceived by customers is critical in relation to VCC. Service design and development efforts should aim to craft and polish the service components in order to provide an optimal experience of both flow and efficacy for customers. This involves customers perceiving that they accomplished their tasks effectively as well as the overall level of pleasure associated with using the system itself. Further, new feature development and the flow of service use should be responsively and continuously developed on the basis of (changing) customer needs. Our findings emphasized the salience of involving customers in service design, development, and provision, as these activities can help customers to achieve their utilitarian values and goals. Moreover, the perceived customer orientation of the service

may help customers to accomplish their utilitarian goals for service use. Thus, it is essential to design and develop services with the end user positioned as the focus of the process. For instance, customer-focused testing of the designed service processes, through simulations or actual use of the service, may offer opportunities to tackle any obstacles in the flow of the service experience in an agile manner. Overall, identifying new ways of connecting and interacting with customers is vital throughout the service life cycle, not merely during the phases of new service design or prototyping.

Finally, our findings underscored the importance of collecting data and then proactively transforming such data to meet the prevailing and future needs of customers. Providing meaningful information to customers may improve their decision-making processes and increase the support they perceive themselves to receive from the service, thereby leading to the accomplishment of customers' utilitarian values and goals for system use. Moreover, to ensure access to the provided information, provision and other integration of resources ought to be implemented through channels specifically preferred by the individual customers. Helping customers to accomplish their utilitarian goals (e.g., through facilitating access to information) may further advance the social nature of service use, and consequently, customers' hedonic values and goals for system use. As such, sufficient and continuous requirements acquisition from target users is salient to service design and development, the tailoring of solutions to customers' needs, and the continuous design and development of new features or solutions intended to satisfy the elicited user requirements. Further, we highlighted the importance of proactive communication and allowing for communication both with and amongst customers throughout the service provision.

5.3.2 Acknowledge and redirect – how to prevent VCD

While it is certainly important to understand how users co-create value and then enhance it through design and development practices, it is equally important to understand how value can be co-destroyed during the process. It is evident that VCD may lead to customer losses, negative word of mouth, and dissatisfaction. Accordingly, service providers ought to proactively take action during the design and development stages, as well as during the provision of services, to prevent VCD. Article IV proposed a classification for the reasoning behind VCD as perceived by AR mobile game users. The classification indicated that VCD occurred due to seven distinct yet potentially interlinked clusters of reasons, namely (1) value contradiction, (2) unmet expectations, (3) technical challenges, (4) personal or social norm conflict, (5) effect of constant mobile use, (6) absence or loss of resources, and (7) insufficient perceived value. We argued that understanding and taking preventative action with regard to VCD in services mediated by technologies such as AR is particularly important due to their potential for multi-dimensional negative service outcomes. For instance, AR-enabled services may have service outcomes in terms of both the physical and virtual dimensions of the service, thereby potentially causing more severe consequences when compared with the consequences triggered by using fully

virtual services in closed settings. Through adopting an in-depth approach to classifying users' experiential VCD reasoning, the classification of the perceived reasons for VCD may be harnessed by service providers who utilize these emerging technologies. Each cluster within the classification depicts critical service interaction components that ought to be addressed via, for example, preventive actions during service provision. For instance, unmet expectations could be addressed by way of extended information provision and/or improved service implementation. Likewise, potential value contradictions should be considered from different user perspectives in order to develop the service toward becoming a less contradictory process for users.

Extending the classification proposed in Article IV, Article V proposed mechanisms for VCD, which could serve as a tool for practitioners seeking to identify and understand how potential negative value outcomes unfold from the customer perspective. The analysis divided the VCD process into four hierarchical levels, namely (1) situational assessment by actor, (2) co-creation attempt by actor, (3) actor-to-actor interaction, and (4) actor experience. The levels are arranged hierarchically according to their temporal occurrence over the duration of the service encounter. Further, the analysis depicted seven mechanisms and the associated interdependencies that generate particular negative service activities. Thus, the model captured the dynamic nature of VCD as it evolves through depicted mechanisms that range from initiation at the focal actor level to the level of actor-to-actor interaction, and finally, to the outcome at the service experience level. Table 14 summarizes the interdependencies that exist between the emerging VCD mechanisms and also depicts the implications for service design, development, and provision.

TABLE 14 Mechanisms behind VCD and the potential implications for service design, development, and provision

Interdependency between mechanisms	Description of the generated event	Potential implications for service design, development, and provision
<ul style="list-style-type: none"> • Awareness of possible challenges – Tasks competing for resources 	Service user engages with the service while knowing this may cause friction between other prevailing tasks concerning available resources	<ul style="list-style-type: none"> • Allowing for the postponement of service use through service design • Utilizing sensor data to eliminate value proposals during identified high-risk situations (e.g., when riding a bike, when engaging with friends, etc.).
<ul style="list-style-type: none"> • Tasks competing for resources – Conflicts in resource integration 	User faces pressure from multiple stakeholders when integrating resources with the service	<ul style="list-style-type: none"> • Allowing for discreet service use through service design and development • Introducing service features that allow for or encourage users to take breaks from the service
<ul style="list-style-type: none"> • Conflicts in resource integration – Loss of resources 	User's integration of resources with other actors (e.g., service provider) leads to	<ul style="list-style-type: none"> • Designing and developing means of communication with users and encouraging user feedback to identify issues in service use

<ul style="list-style-type: none"> • Conflicts in resource integration – Negative impact on resource availability • Conflicts in resource integration – Contradictions of value • Conflicts in resource integration – Insufficient perceived value 	<p>resource loss perceived by user</p> <p>User’s integration of resources with other actors (e.g., service provider) leads to excessive resource reservation</p> <p>User’s integration of resources with other actors (e.g., service provider) leads to both negative and positive value outcomes of the service</p> <p>User’s integration of resources with other actors (e.g., service provider) leads to insufficient perceived value with respect to user’s prior expectations (a negative value outcome)</p>	<ul style="list-style-type: none"> • Harnessing system features to identify deviations in user behavior and conducting timely interventions through service design and provision (e.g., automated service failure reports and proactive compensation for potential anticlimaxes in service use) • Proactively communicating the required resources along with the value propositions to the user in service provision
<ul style="list-style-type: none"> • Loss of resources – Contradictions of value • Loss of resources – Insufficient perceived value 	<p>Perceived loss of resources in service interaction leads to both negative and positive value outcomes of the service</p> <p>Perceived loss of resources in service interaction leads to insufficient perceived value with respect to user’s prior expectations (a negative value outcome)</p>	<ul style="list-style-type: none"> • Proactively communicating the required resources along with the value propositions to the user in service provision • Harnessing system features to identify deviations in user behavior and conducting timely interventions through service design and provision (e.g., automated service failure reports and proactive compensation for potential anticlimaxes in service use)
<ul style="list-style-type: none"> • Negative impact on resource availability – Contradictions of value • Negative impact on resource availability – Insufficient perceived value 	<p>Interaction with service excessively reserves resources, leading to both negative and positive value outcomes of the service</p> <p>Interaction with service excessively reserves resources, leading to insufficient perceived value with respect to user’s prior expectations (a negative value outcome)</p>	<ul style="list-style-type: none"> • Proactively communicating the required resources along with the value propositions to the user in service provision • Allowing for the postponement of the service use through service design • Utilizing sensor data to eliminate value proposals during identified high-risk situations (e.g., when riding a bike, when engaging with friends, etc.)

First, our findings indicated that choices made by the customer prior to the actual service interaction may give rise to VCD. More specifically, a customer may develop an awareness of other interests competing for his/her attention but choose to continue engaging with the service interaction regardless of such a risk assessment. This may result in an overload of interests that are all competing for the customer's resources, such as time, money, or attention, thereby initiating VCD. While some previous studies have suggested engaging with customers through the improved distribution of information and enhanced transparency as a means of fostering VCC or inhibiting VCD (e.g., Baumann et al. 2017; Im and Qu 2017), our findings suggested that VCD may occur regardless of the focal actor acknowledging the challenges that lie ahead, which renders the process more difficult to steer from the service provider's side. Yet, we noted that some service design and development efforts could be harnessed to prevent such occurrences. For example, the service may be designed in such a way as to allow the customer to postpone the service use until a more suitable slot opens up. Particular attention should be paid to the "costs" of switching off. If the customer faces costs, such as losing progress made within a game or experiencing difficulty picking again up from where the service use was paused, he/she may choose to engage despite the possibility of potentially initiating VCD. Further, sensor data could be utilized to eliminate value proposals during high-risk situations (e.g., when engaging with friends at a café or when driving a vehicle in traffic).

Second, we found that a customer's co-creation attempt may be hindered by the mechanism of tasks competing for resources, leading to conflicts in the service interaction itself. We suggested that such conflicts may be steered through service design and development by allowing for discreet service use by introducing service features that permit or encourage users to take breaks from the service. For instance, games and social media applications tend to be designed to "suck in" users so that they become increasingly engaged with the service. Our results, however, showed that the counter effects of such design may promote VCD, which may lead to decreased user satisfaction.

Third, we found that conflicts during the actual interaction between a customer and other service stakeholders may result in VCD. While VCD may be easily noticeable in face-to-face service interactions, for example, those that occur between frontline customer service workers and customers, conflicts may be less easy to identify in digital services, as the relevant interactions are mediated and constrained by technology. According to our findings, conflicts in service interactions may give rise to VCD due to causing the perceived loss of resources (e.g., excess spending of money) or having a negative impact on resource availability (e.g., sufficient attention cannot be simultaneously paid to traffic and a mobile application). To avoid such instances of VCD, service design and development efforts could attempt to provide means of communication with users as well as to encourage user feedback for the instant identification of issues with regard to service provision. Moreover, companies ought to proactively communicate the required resources to their customers (e.g., the requisite time to perform a service encounter) along with the value propositions. Further, deviations in user behavior could be monitored, thereby allowing for timely interventions (e.g., automated service failure reports) to be performed.

Finally, conflicts in resource integration, the perceived loss of resources, and a negative impact on resource availability may lead to negative value outcomes as well as to a negatively perceived service experience. The potential negative value outcomes could manifest as contradictions of value (e.g., a positive value such as fun may be derived, while negative value outcomes such as unintentional pollution may emerge) and insufficient perceived value (e.g., the derived positive value is not in line with the customer's expectations). Such occurrences could be derived by proactively communicating with customers, not merely regarding the value propositions but also concerning the requirements that must be met by the customer in order to enjoy positive value outcomes. Diminishing the requirements facing customers may help to initiate new service interactions with customers while simultaneously undermining the VCC process, thereby leading to VCD. Furthermore, utilizing sensor data to identify the optimal temporal slots for service interactions may give rise to more positive service outcomes. Data concerning deviations in user behavior may also be harnessed to conduct timely interventions through service design and provision, including proactive compensation for potential anticlimaxes in relation to service use.

5.3.3 Limitations

It must be acknowledged that this dissertation had a number of limitations, which are discussed in this section. The main limitations are depicted with respect to contextualization, literature collection, and theorization.

First, we consider the limitations related to generalization. The data employed in our studies are not generalizable to all contexts. The data set utilized in Articles I and II was based on five divergent digital services, meaning that our findings might not be generalizable to other digital services. In particular, the findings might not be generalizable to business-to-consumer (B2C)-type digital services, as such services were not investigated within the scope our studies. The investigated digital services, however, represent a varied range of C2C and B2B services, which enriched our findings with interesting details and context-specific nuances. Therefore, our findings could be harnessed in the design, development, and provision of digital services targeted toward businesses, business networks (e.g., corporate cyber-physical systems, management and organizing systems, as well as networking services), and consumer network services (e.g., networking applications and games involving user-generated content). We recommend that B2C digital services be included in future studies.

Furthermore, the data set employed in Articles IV and V included data from the users of only one AR mobile game, namely Pokémon GO. Thus, our findings may not be generalizable across all AR mobile games. Indeed, although Pokémon GO represents a widely adopted AR mobile game, our findings may not be generalizable to all AR mobile games and users. Further, the participating Pokémon GO gamers were predominantly active in one country, namely Finland. Due to the nature of the game—it utilizes location data and provides gaming opportunities with respect to population density—our findings may not directly apply to divergent cultural and geographical contexts. We hope that future studies with a similar design are conducted in other contexts and across

divergent services. In particular, we invite scholars to reflect and elaborate on the similarities and differences between VCD mechanisms.

Second, we consider the limitations concerning the literature review process. In Article III, the keyword search was designed on the basis of the goal of the structured literature review, namely to obtain a deep understanding of the current body of knowledge about VCD. However, the relative infancy of the concept of VCD constrained the results that could be obtained using the search terms. In other words, we believe that there may exist more studies into how collaborative interactions influence negative value outcomes of services, which discuss such processes using divergent terminology. Further, it is relatively likely that the implications of VCD are also discussed in other areas of research that employ a more unilateral approach to the processes and/or differing terminology to that of SDL. We discussed multiple keyword options and included the keyword “negative” in our search terms in an effort to partially address this limitation. We also wish to acknowledge that domains such as strategic and managerial research include closely related research streams, such as service failure and recovery, customer satisfaction, misbehavior and engagement, and value imbalance. Potentially, these streams include unilateral evidence resulting from potential occurrences of VCD. Similarly, interesting viewpoints are available in the marketing literature, showcasing critical perspectives regarding instances of VCC, such as ethics and consumer exploitation (e.g., Bonsu and Darmody 2008; Cova and Dalli 2009; Zwick and Bonsu 2008). However, these streams of knowledge were not included in our review because they tended to focus on the perspective of the organization as well as on the one-way delivery of services to customers, rather than on VCC between generic actors. This delineation supported the attainment of our goal, which was to adopt a more generic approach to the VCD phenomenon, investigating it across contextual and disciplinary boundaries.

Third, as VCC and VCD are two closely related phenomena, they ought to be investigated in a way that reflects their close connection. Our approach involved developing an in-depth understanding of both these phenomena, which allowed us to establish the potential inter-linkages within the natures of the phenomena and their mechanisms. Thus, rather than investigating both phenomena simultaneously, the scope of this dissertation was limited to modeling the mechanisms behind the VCC and VCD processes. In particular, we investigated the concept and process of VCD, which we showed to be scattered and imbalanced. Due to the imbalance in the level of knowledge available regarding VCC and VCD, it was important to construct a synthesized understanding of the VCD concept in order to allow for the investigation of the manifestations of the phenomenon in parallel to those of VCC in future studies. Therefore, we attempted to balance the scales, and we invite future studies to investigate the dynamics and inter-occurrence of VCC and VCD. In this way, the parallel processes of VCC and VCD could be observed, while temporally connected models could be made of the focal process constructs and their mechanisms. We also hope that future research contributions will propose concrete tools as well as more detailed guidelines for managing the mechanisms of VCC and VCD within digital services.

5.3.4 Future research topics

In this section, we set out an agenda for future research. The potential topics are discussed with respect to investigating the processes behind VCC and VCD separately, and further, with regard to examining the dynamics between the two phenomena. Potential research questions for future studies are included in Table 15.

TABLE 15 Future research topics

Topic	Research questions
The process of VCC	<ul style="list-style-type: none"> • How do the mechanisms behind the VCC process differ in divergent system use contexts? • Which mechanisms behind the VCC process emerge as universal across various system use contexts? • How can the universal mechanisms behind the VCC process be continuously facilitated through DSD?
The process of VCD	<ul style="list-style-type: none"> • How do the mechanisms behind the VCD process differ in divergent system use contexts? • How can the mechanisms behind the VCD process be foreseen and harnessed in the design, development, and provision of digital services in divergent system use contexts? • Which temporal points during service encounters are the pain points most prone to VCD in divergent system use contexts?
The dynamics between VCC and VCD	<ul style="list-style-type: none"> • How do VCC and VCD occur in parallel in divergent system use contexts? • Why does VCC turn into VCD in divergent system use contexts? • How can VCD be steered toward VCC during particular temporal points in service encounters? • How can VCD be steered toward continuous VCC through DSD? • How can VCC and VCD be modelled as two distinct and interconnected phenomena that occur dynamically and in parallel? • How can VCC and VCD be measured in particular system use contexts? • How can VCC and VCD be measured across multiple system use contexts?

In light of the fact that SDL offers a well-established lens for understanding VCC, we recognize significant research potential in terms of developing an in-depth understanding of the mechanisms behind the VCC process in divergent system use contexts as well as a more generalized understanding across multiple contexts. We believe that our research provides indications of how the proposed mechanisms could be harnessed in DSD through the development of new DSD methods. Additional investigations are required to develop a generalizable model of the VCC mechanisms across service contexts and system types. In a similar vein, there exists a need for contextualized investigations that delve deeply into the mechanisms and examine how they differ across various service

contexts and system types. The work conducted within this dissertation provides a foundation and directions for the development of a new theory concerning the VCC mechanisms. We welcome scholars to join us in this endeavor.

Further, we suggest that future research efforts should investigate the mechanisms behind the VCD process in divergent system use contexts. We hope to see the close investigation of the mechanisms at particular temporal points, as such work should reveal valuable insights into the “pain points” within the scope of the service encounter as well as into the chains of multiple service encounters during the service life cycle. Moreover, the VCD mechanisms ought to be investigated in divergent service contexts and across multiple system types. We believe that one objective ought to be the formulation of more contextualized understandings of the VCD mechanisms, while another point of interest would involve the development of theoretical knowledge concerning universal VCD mechanisms across system types and service contexts. Such novel knowledge could be linked to the development of methods and guidelines for detecting and preventing the pain points applicable across multiple service contexts. Practitioners could harness such methods and guidelines when mapping service components prone to VCD and critical bottlenecks within service provision, thereby rectifying the identified issues.

Our findings highlighted crucial differences in the emergence of VCD in divergent temporal dimensions of a service encounter (before, during, and after) as well as with respect to individual actors and contextual factors, such as the context of use and the system type. We also identified the strong interconnection between VCC and VCD. With regard to the volatility of the service encounter, as discussed above, VCC and VCD may take turns and coexist dynamically – similar to the principle of Yin and Yang – either weakening or strengthening as the service process develops. In fact, the VCC and VCD phenomena may co-exist without interdependency on a continuum. Thus, further investigations are required in terms of the fluctuations between VCC and VCD as well as the potential for *no-creation* (Makkonen and Olkkonen 2017). Moreover, when value is not co-created to the extent expected by the focal actor, the service encounter may result in VCD (Smith 2013; Stieler et al. 2014). Therefore, more investigations are needed in relation to our suggestion that value “non-creation” (Makkonen and Olkkonen 2017) may fall within the conceptual umbrella of VCD.

Research efforts concerning the dynamics between VCC and VCD ought to employ the SDL lexicon and delve deeper in the mechanisms and dimensions of the identified fluctuations, showcasing how the VCD process, alongside the VCC process, constitutes a dynamic aspect of service encounters. Thus, we call for research designed to deepen the understanding of how VCC and VCD interact and occur during both spatially and temporally multidimensional service encounters, sequences of service encounters, and service processes, as such work should enable the development of typologies and models of actors’ value co-destructive interactions and experiences during the service process.

Further, future research efforts should strive to create a dynamic joint model for measuring actors’ VCC- and VCD-related behaviors and processes. Such a model would assist service designers and managers to plot the potential emergence of VCD as well as to identify, analyze, rectify, and avoid any

unwanted outcomes of service processes. For researchers, this would entail better comprehending the service process itself as well as more clearly describing how the different factors relevant to VCC and VCD impact the service process from the user perspective. In the case of companies, understanding such dynamic processes from the user perspective should prove beneficial with regard to avoiding negative value outcomes of services.

In conclusion, we welcome researchers to contribute to our effort to unravel the linkages between VCC and VCD. We believe that doing so will have a positive impact on the understanding of user behavior as well as on how digital services could be designed to better enable VCC in future technology-enabled services.

YHTEENVETO (SUMMARY IN FINNISH)

Digitaalisten palvelujen yleistyessä palveluiden osuus vastaa jo noin 70 prosenttia maailmantaloudesta ja kasvaa edelleen. Väitöskirjan viidessä artikkelissa (I–V) tarkastellaan arvon yhteisluomisen sekä arvon yhteistuhomisen ilmenemistä digitaalisten palvelujen yhteydessä. Arvon yhteisluominen ja palvelukeskeinen logiikka ovat tarjonneet uusia näkökulmia digitaalisten palvelujen suunnitteluun ja palvelujen arvolupausten muotoiluun. Vaikka kirjallisuus on tarkastellut tietojärjestelmiä palveluina sekä palvelullistamisen näkökulmasta, tarkastelun keskiössä ovat tavallisimmin olleet organisaatiokäyttäjät sekä yritykset. Lisäksi tietojärjestelmien tuottamaa arvoa on tavallisimmin käsitelty välineellisten arvojen näkökulmasta, keskittyen hyötyvaikutuksiin esimerkiksi yrityksen ydintoimintojen tukemisessa. Vasta viime aikoina myös nautintoperäinen arvon luominen on nostanut päätään tietojärjestelmätieteen kirjallisuudessa, esimerkiksi pelitutkimuksen saralla. Näin ollen tietojärjestelmätieteen tutkimuksessa piilee tarve syvennetylle ymmärrykselle erityisesti yksilötason arvonluomisen sekä nautintoperäisten arvojen merkityksestä tietojärjestelmien suunnittelussa ja käytössä.

Väitöskirjan artikkeleissa I–II tarkastellaan arvon yhteisluomista viiden erilaisen digitaalisen palvelun käyttäjien näkökulmasta. Artikkeleiden hyödyntämässä kenttätutkimuksessa on haastateltu tikashaastattelutekniikalla (engl. 'laddering interview technique') 113 käyttäjää niin yritysten kuin kuluttajien välisistä digitaalisista palveluista. Kenttätutkimusaineisto kerättiin osana viittä erillistä tutkimusprojektia, joiden yhteen koottua aineistoa tarkastellaan meta-analyysin ja selittävän rakennemallinnusmenetelmän (engl. 'Interpretive Structural Modeling, ISM') keinoin. Tuloksena artikkelissa I esitetään produktiivisia mekanismeja, jotka selittävät toimintoja, joissa haastatellut käyttäjät kokivat arvon yhteisluomista palvelun käytössä. Selittävän rakennemallin kaaviot havainnollistavat arvon yhteisluomisen prosessia erityyppisten digitaalisten palvelujen tasolla sekä kootusti. Tuloksissa tarkastellaan erityisesti erityyppisistä palveluista koottua kaaviota, josta eristettäviä mekanismeja valjastetaan niin palvelumuotoilun tarpeisiin kuin jatkotutkimuskohteina. Artikkelissa II puolestaan paneudutaan käyttäjien hyöty- ja nautintoperäisiin arvoajureihin kenttätutkimusaineiston meta-analyysin kautta. Tulokset syventävät ja tukevat Artikkelin I tuloksia havainnollistaen, kuinka niin hyöty- kuin nautintopainotteisten digitaalisten palvelujen käytön keskiöön nousee sekä hyöty- että nautintoperäisiä arvoajureita, ja näiden yhdistelmiä. Mielenkiintoista on erityisesti se, että näennäisesti samankaltaisten järjestelmien, kuten pelillisten ajanviesovellusten, taustalta voi paljastua varsin erilaisia arvoajureita. Uutta tietoa voidaan hyödyntää erityisesti palvelujen suunnittelussa, jolloin tutkimustuloksien perusteella tietojärjestelmiä tulisi suunnitella erityisesti käyttäjien arvoajureiden – ei ainoastaan järjestelmätyypin – perusteella. Tämä edellyttää järjestelmäkehitykseltä sekä palvelumuotoilulta hyvää asiakasryhmän tuntemusta ja jatkuvaa kanssakäymistä uusien tai muuttuvien tarpeiden kartoittamiseksi.

Arvon yhteisluomisen sekä palvelukeskeisen logiikan kirjallisuus korostavat positiivisten arvojen muodostumista tuotteiden ja palvelujen käytössä. Kirjallisuus ei kuitenkaan huomioi negatiivisten lopputulemien ja arvojen muodostumista, mikä on ongelmallista niin teorian kuin käytännön sovellutusten kannalta, sillä todellisuudessa tuotteiden ja palvelujen käyttö ei ole aina käyttäjälleen suotuisaa. Tämän lisäksi on tilanteita, joissa käytöllä on sekä positiivisia että negatiivisia vaikutuksia, jotka ilmenevät keskinäisessä ristiriidassa. Tähänastinen kirjallisuus on kohdellut arvon yhteistuoamista osittain arvon yhteisluomisen käänttöpuolena, sekä arvonluomisen jatkumon toisena ääripäänä. Toisaalta kirjallisuudessa on myös näyttöä ilmiölle, jossa arvon yhteisluominen ja -tuoaminen voivat ilmetä rinnakkain. Väitöskirjan artikkelin III tavoitteena on tarkastella olemassa olevaa kirjallisuutta arvon yhteistuoamisen ympärillä ja muodostaa syntetisoitu näkemys sen käsitteestä ja prosessista. Tämän lisäksi väitöskirjan artikkeleissa IV–V toteutettiin kenttätutkimus, jossa haastateltiin 43 digitaalisen palvelun käyttäjää. Kenttätutkimuksen tavoitteena oli ymmärtää käyttäjien arvon yhteistuoamisen kokemuksia laajennetun todellisuuden mobiilipelin käytössä.

Tuloksina esitetään kirjallisuuskatsauksen ja käsitekeskeisen analyysin perusteella muodostettu viitekehys arvon yhteistuhoutumisen prosessista (artikkelissa III). Viitekehys koostuu kahdesta dimensiosta, joiden toisiinsa yhteydessä olevat komponentit voivat ilmetä kolmessa eri vaiheessa: ennen palveluprosessia, palveluprosessin aikana, sekä palveluprosessin jälkeen. Kenttätutkimusaineistolle toteutetun hierarkkisen klusterianalyysin tuloksena esitetään seitsemän käyttäjälähtöistä perustelurykelmää, jotka selittävät käyttäjien kokemia arvon yhteistuhoutumisen taustatekijöitä (artikkelissa IV). Perustelurykelmät ovat urauurtava tapa tarkastella negatiivisen arvon muodostumista ja arvon yhteistuoamista laajennetun todellisuuden mobiilipelisovelluksen käytössä. Väitöskirjan artikkelissa V tarkastellaan arvon yhteistuoamista prosessinäkökulmasta, mikä on niin ikään urauurtava lähestymistapa ilmiön tarkasteluun. Tikashaastattelutekniikalla kerätyn aineiston meta-analyysin ja selittävän rakennemallinnusmenetelmän avulla väitöskirjassa esitetään produktiivisia mekanismeja, jotka selittävät toimintoja, joita haastatellut käyttäjät kokivat negatiivisina palvelun käytössä. Selittävän rakennemallin graafinen muoto havainnollistaa arvon yhteistuoamisen prosessia, ja mallista eristettävät mekanismit sekä näiden väliset suhteet tarjoavat mielenkiintoisia jatkotutkimuskohteita.

Väitöskirja kokoa löydökset artikkeleista I–V syventäen ymmärrystä kahdesta erillisestä, joskin vuorovaikutteisesta, ilmiöstä: arvon yhteisluomisesta ja -tuoamisesta. Tärkeimpänä kontribuutiona väitöskirja tuo kaksi käsitettä lähemmäksi toisiaan tarkastellen molempia palvelukeskeisen logiikan linssin kautta. Näin ollen väitöskirja laajentaa palvelukeskeisen logiikan ymmärrystä niin arvon yhteisluomisesta kuin -tuoamisesta, mutta myös ilmiöiden välisestä yhteydestä. Väitöskirjassa mallinnetaan molempien ilmiöiden prosessia selittävällä rakennemallinnusmenetelmällä ja löydetään keskinäisiä poikkeavuuksia ilmiöiden rakenteissa. Johtopäätöksenä ja tutkimuskontribuutiona todetaan, ettei ilmiöitä tulisi tarkastella toistensa ääripäinä vaan keskenään erillisinä.

Väitöskirjan löydökset tarjoavat myös käytännön implikaatioita palvelumuotoiluun, järjestelmäkehitykseen ja palvelujen tarjoamiseen asiakkaille. Erityisiä implikaatioita avataan eritellen arvon yhteisluomisen mekanismeja, joiden korostaminen palveluntuotannossa voi mahdollistaa jatkuvaa arvon yhteisluontia asiakkaiden kanssa. Toisaalta avataan myös yksittäisiä arvon yhteistuloamisen mekanismeja, joihin reagoiminen palveluntuotannon eri vaiheissa voi torjua asiakkaiden kokemia negatiivia palvelunkäytön lopputulemia sekä ohjata palvelukohtamista kohti arvon yhteisluontia.

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ORIGINAL PAPERS

I

VALUE CO-CREATION MECHANISMS FOR DIGITAL SERVICE DESIGN

by

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II

UNBOXING CO-CREATION OF VALUE: USERS' HEDONIC AND UTILITARIAN DRIVERS

by

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Unboxing Co-creation of Value: Users' Hedonic and Utilitarian Drivers

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Abstract

Value co-creation through involving users in service processes via resource integration is a focal service research interest. However, studies often take a firm-centric or generic approach and overlook value co-creation from the point view of an individual user. We address this gap by adopting a qualitative research approach and laddering interviews (n = 113) to examine users' hedonic and utilitarian drivers for value co-creation behavior in five service system contexts. We argue that underlying differences exist among all service systems and contribute with a novel approach by depicting the differences in value-based motivations for users to co-create value. As practical implications, our findings suggest services should be designed according to users' value drivers rather than system types. Furthermore, we demonstrate how the consumer information systems (CIS) framework can be used to benchmark users' value co-creation behavior with specific service systems or to compare such behavior between different service systems.

1. Introduction

Co-creation of value is one of the key tenets of service-dominant logic (SDL) in the service literature [1]. From Vargo and Lusch [2] to more recent studies by Grönroos and Voima [3] and Lusch and Nambisan [4], papers discuss the importance of resource integration and how to incorporate different actors in the value creation process to facilitate the generation of value-in-use [2]. However, they rarely look at value co-creation from the user's point view. Our study addresses this need.

In the literature, value co-creation is thought to occur through interaction between the service provider and the service user. This process is also linked to the user's service experience and the intangibility of the services; that is, the service happens at a certain time, in a designated place, and cannot be stored in situ. Grönroos and Voima [3] philosophized this process further by referring to the customer as the value creator

who chooses or, more specifically, invites, the service provider into direct interaction with her or him in order to co-create value together. Thus, the service provider may also become an active co-creator of value. Alternatively, there is discussion of different actors joining in to the value co-creation process. Lusch and Nambisan [4] explore this with their view of service innovation in which actor-to-actor networks offer service platforms for resource integration, that is, for co-creation of value. In a similar tone, Breidbach and Maglio [5] further investigate this compound as a service ecosystem, including how industry actors contribute to value co-creation by taking different roles, using different resources, and carrying out practices. While some researchers, such as Payne et al. [1], look more specifically at how customers co-create value, the research still tends to focus on enterprises as actors interacting with other similar entities.

Missing from the literature is an inspection of co-creation of value focused on the user level. Tuunanen et al. [6] have argued that value co-creation for users is an interplay of at least two issues. First, a service system offers value propositions to the users, and, second, the users possess values or goals that drive their behavior. Service systems are defined as "value-co-creation configurations of people, technology, value propositions connecting internal and external service systems, and shared information" [7].

Tuunanen et al. [6] highlight the utilitarian and hedonic value and goals of system use. However, the literature on system use tends to be tilted toward a focus on utilitarian aspects, while the hedonic aspects have only been highlighted in recent years. Van der Heijden [9] was one of the first to make such a distinction between hedonic and utilitarian value in system use. In the same vein, Kahneman et al. [8] have suggested that users derive not only utility from system use but also hedonic benefits and goals. Van der Heijden [9] further argues that two types of motivation for system use can be determined: extrinsic and intrinsic. If a user is motivated extrinsically, he or she is driven by the expectation of a reward or benefit that is external to the system-user interaction [9], that is, utilitarian values. Intrinsic motivation, in turn, is based on the process of a certain activity rather than

the enjoyment of using the system [10]. Instead, the intrinsically motivated user wants to perform the activity “for no apparent reinforcement other than the process of performing the activity per se” [11:1112] and is, thus, driven by hedonic values. Therefore, the interaction with the system can be seen as a sufficient reason to use the system [12].

Our paper seeks to fill the above-recognized gap in the literature. Our objective is to unbox the co-creation of value for service system use by investigating hedonic and utilitarian drivers of the service system users. Consequently, our research question is as follows: *How do service systems differ in terms of users’ hedonic and utilitarian value drivers?* More specifically, our study looks at five different service systems and applies a qualitative research approach to investigate how these systems enable co-creation of value from the viewpoint of individual system users. We have collected data by conducting 113 laddering interviews [13-16]. The data was analyzed and coded according to hedonic and utilitarian value definitions.

Our study contributes by depicting how value structures of users differentiate between systems. It is interesting to note that while some of the systems are perceived as highly utilitarian, the value drivers for system use vary between the systems. Similarly, while some systems are perceived to be hedonic by nature, they nonetheless have a strong utilitarian undercurrent as drivers for system use.

The remainder of the paper is structured as follows. First, we review the literature of the SDL foundations with a focus on value co-creation. Next, we look into both the conceptual levels and the user perspective of value co-creation. Subsequently, we present our research methodology and the findings from the study. Finally, we discuss the implications of the findings and conclude with a summary of the study.

2. Literature review

2.1. Foundations of SDL

Traditionally, the literature has viewed value creation as an action where firms sacrifice resources in order to pursue benefits [17] by exchanging value with customers [18]. Such a firm-centric view of service orchestration regards customers as mere consumers of value and objects of marketing, while companies ultimately determine what is of value to customers [19].

Prahalad and Ramaswamy [19, 20] presented a new view of value creation by stating that unique and cooperatively created value is produced by involving customers in firms’ processes. Consequently, firms

should regard the interactions between consumers and providers as key to value co-creation [19]. In the same vein, Vargo and Lusch [2] suggested a shift from the firm-centered goods-dominant logic toward service as the fundamental unit of exchange. They introduced the SDL depicting that value is derived from service use and always co-created and determined by the customer contextually and phenomenologically [2].

Business research has tended to measure value as value-in-exchange, but divergent measures have recently emerged that define value, for instance, through an extrinsic-intrinsic or hedonic-utilitarian division [e.g., 9, 22] and through service experience [e.g., 23]. The SDL [2] provides a customer-centric view of value creation, which focuses on the *use* of an offering. Vargo and Lusch [2] positioned service as the foundation for exchange between firms and customers, where the customer as the beneficiary determines all value in use of the service. Hence, the value of a service or a good does not exist by itself but is rather derived from the customers’ perceived contextual experiences that it enables [see, e.g., 23, 24].

According to SDL, value co-creation is a service-for-service exchange, where companies offer value propositions to customers who may accept the proposition by integrating their own resources and co-creating value-in-use. Here, *service* is explained as the application of possessed resources for the benefit of another entity. Consequently, value co-creation is a collaborative process [19] of resource integration between benefit-pursuing entities [2]. Such entities can be considered as generic actors [25] or service systems that are connected to each other by value propositions [26]. This resource integration process is a key function of SDL.

2.2. Conceptual levels of value co-creation

In accordance with SDL, value is created through combined actions and processes rather than customers’ and firms’ separate actions. In such processes, actors conduct deeds, processes, and performances by applying operand resources, such as knowledge and skills, on tangible and substantial operand resources [26]. The co-created value is regarded as an improvement in a system’s well-being, which is measured by the system’s capability to fit into its environment [26:49].

As SDL takes an all-encompassing and holistic view of value co-creation—that value is always co-created by the customer’s and firm’s simultaneous actions [2]—Grönroos and Voima [3] take an interaction view and argue that value can only be co-created in a joint co-creation sphere between the service parties (customer and provider). Contrasting

with the SDL view, they state that value can be created by the customer with no interaction with the firm, but it can only be co-created if the firm manages to penetrate the customer's value creation sphere and engage the customer in direct interaction. This service logic lens provides an analytical understanding of the action and interaction spheres before, during, and after the course of service provision.

Furthermore, the literature recognizes service systems as multi-actor networks and multiple service ecosystems [27, 28]. This systemic view integrates multiple actors into the value co-creation process. Lusch and Nambisan [4] explore the concept of service innovation with the SDL lens and depict that mutual value creation occurs in 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" [4:162]. The resource integration processes and activities fuse service systems' efforts in value co-creation.

Furthermore, the concept of value co-creation may be regarded as customer involvement in the production of the core offering of the service, for instance, the design or development phase [29]. Such a level of investigation may be considered as co-production, a sub-notion of value co-creation [30]. Co-production [e.g., 31], co-development [e.g., 1], and co-design [e.g., 32] of service components may provide opportunities for value co-creation, yet the conceptual understanding of value co-creation should not be limited solely to the co-production of value [30]. Because the implications of involving users in service design, development, and provision phases are relevant for service science research, the focus often remains on users' labor and its value implications [31] and conditions that lead to such benefits [33] from the company perspective.

2.3. The user perspective on value co-creation

Technology-assisted/enabled value co-creation is still poorly understood [5]. As the all-encompassing lens of SDL considers value co-creation processes as similar between all types of service systems, the literature lacks discussion regarding value co-creation on the particular level of the user perspective. Tuunanen et al. [6] take the user perspective when investigating value co-creation in consumer information systems (CIS) development. They presented a conceptual framework for CIS development that dissects system value propositions ((1) construction of identities, (2) social nature of use, and (3) context of use) and complements users' value drivers ((1) participation in service production, (2)

service process experience, and (3) goals and outcomes). Tuunanen et al. [6] argue that value co-creation can be established in a supplementing interplay between the users' value drivers and the system value propositions.

The CIS development framework takes a user experience perspective by understanding that value is co-created and determined by customers in accordance to user participation (e.g., co-production activities), experienced flow of the service process, and individual goals of use. Consistent with customer-centric service measures as extrinsic and intrinsic value [9], Tuunanen et al. state that users' goals may be hedonic or utilitarian [6].

Utilitarian (i.e., productivity-oriented) values represent pursued benefit-driven use as a means to an end. Hedonic values comprehend pleasure-oriented use, where the use itself is aspired to and could be characterized with fun, novelty, aesthetics, and unexpectedness [9]. In the same vein, Van der Heijden [9] divides users' goals of systems use into utility-oriented and hedonic-oriented goals, and Valkonen et al. [12] find that systems may inherently comprehend both utilitarian and hedonic values. Valkonen et al. [12] argue that as the user perceives the required level of utilitarian value being achieved, hedonic values become dominant and, thus, the ultimate driver of use. Accordingly, the interaction with the respective system may as such stir the use of the system.

3. Research methodology

We have applied the laddering interview technique for collecting data, which is based on the Personal Construct Theory (PCT) [34]. PCT enables us to understand how and why people see the world in different ways. Kelly [34] argued that by understanding the relationships between the states of the universe, the consequences of the states, and the impact of the consequences to the personal values of individuals, we can infer how individuals observe and interpret things and events in life. Additionally, the personal construct systems describe not only the properties and operation of the connected things and events but also the consequences of those and their effect on the individual's values. The laddering interviewing technique operationalizes PCT by providing a means to investigate system attributes, consequences (reasoning) for system use, and values and/or goals that drive the use [13-16].

Our study is based on the analysis of data, which was collected in five studies [35-39] that used the CIS framework for different kinds of service systems and used an identical research methodology to conduct the studies. We applied theoretical sampling to have both

business-to-business and customer-to-customer service systems in the study and worked with the local industry and organizations to gain access to their service system users. Hänninen [35] used the CIS framework for a study of an intelligent cyber physical system for mining, and Korpinen [36] used the framework for the development of an online customer relationship management (CRM) system. Kaaronen [37], in turn, studied an online event organizing and planning system. Huttu [38] and Vartiainen and Tuunanen [39] studied value co-creation for the consumer-related service systems of metal detecting and geocaching hobbies, respectively. One of the authors was involved in all of the studies and also supervised the students' thesis work.

The numbers of the laddering interview chains (data units) and interviewees per each study are depicted in Table 1. Examples of laddering interviews are described, for example, in [13-15].

Table 1. Data set

Study	Chains	n
Geocaching	336	26
Metal detecting	478	24
Intelligent cyber physical system for mining	266	20
Event organizing and planning system	321	22
Online CRM	287	21
Sum	1688	113

3.1. Data analysis

In each of the studies, the researcher developed codes for attribute, consequence, and values/goal items of the laddering interview chains. The aggregated data set totaled 3005 data units, which were derived from the original chains. These codes were later used for the clustering analysis as depicted in [13-15], for example. For the meta-analysis for this study, we did not use the previous clustering data analysis results, but instead we re-coded the laddering chains according to either hedonic or utilitarian value creation activities and behavior.

For this purpose, we checked all laddering chain codes of the data set and the coherence of the attribute, consequence, and value codes of the chains. First, two of the authors performed the re-coding individually, which was followed by a collective review of the proposed changes. The changes in the codes of each study are presented in Table 2. Most of the changes were suggested by both coders mutually (64%–79%). The conflicts were resolved via consensus by the two coders, and finally they were evaluated by the third author of the paper (no changes made). In total, 196 changes were made in the original data set, but only 48

of the changes were proposed by a single coder. Thus, the overall agreement level was exceptionally high, which reflects the overall quality of the data set and the coding process and protocol used.

Table 2. Changes in original data codes

Study	Changes	Both	Single
Geocaching	9	78%	22%
Metal detecting	14	79%	21%
Intelligent cyber physical system for mining	58	78%	22%
Event organizing and planning system	73	79%	21%
Online CRM	42	64%	36%

Because all of the data were reviewed, we aggregated and standardized the data so that all the headings and stimuli themes were in the same format. To enable the comparison of the values, we classified them into three value types: hedonic, utilitarian, and hybrid. While classifying each value, we used information from the whole chain; hence, a single value code could be placed in different classes in different chains. The hybrid value type was formed because some of the values could not be classified directly to the hedonic or the utilitarian class, but the data unit contained both views. In Table 3 we depict some exemplars of coding for different value types, including the source of the chain in question.

Table 3. Exemplar coding for value types

Value Type	Attribute	Consequence	Values or Goals
Hedonic [39]	Caching as non-serious phenomenon	Finding the cache	Feeling of success
Utilitarian [35]	Environmental monitoring	Can make decisions based on data	Cost-effectiveness
Hybrid [38]	Find information	More information out of the find and context	Social relationships and identification

4. Findings

In the following, we present the findings from the data analysis. In Tables 4–9, we present the findings according to the specific case studies and CIS themes to which the values and goals of the participants were linked in the data analysis. These CIS themes are as follows:

1. construction of identities;
2. social nature of use;
3. context of use;
4. participation in service production;
5. service process experience;
6. goals and outcomes.

Table 4 summarizes all mapped values for the five studies [35,-39] based on the themes. All 1,960 individual values or goals of the participants were mapped against the abovementioned six themes. From the distribution of the values, we can observe that construction of identities (#1) has the smallest (5%) portion of observations. However, it is interesting to see that one of the B2B-oriented studies (event planning and organizing system) has more than twice (11%) the number of observations than the other studies. This may reflect the nature of the given system in question because, with the event planning system, the identities of event speakers, hosts, and participants are highly visible to the system users.

Another interesting finding is that the users of an intelligent cyber physical system for mining thought that the service process experience (#5) merited the most (47%) contribution toward value co-creation, but social nature of use (#2) (25%) was also important. In the metal detecting and geocaching hobbies, we see more interest in the three last themes (#4–6) in general, with the exception of geocaching for the participation in service production (#4) theme.

Also, the distribution of the values between the themes and the studies is noteworthy. With the exception of the construction of identities (#1) theme, there is no clearly observable pattern; instead, the value distributions within the study vary. We further investigate this by dissecting the value distributions for hedonic, utilitarian, and hybrid values, which are reported, respectively, in Tables 5–7.

Table 5 reports the hedonic distribution of values for the studies. Here, we started to see more evident differences between the studies. Not surprisingly, the systems with mainly a B2B orientation are less represented in the findings than the more leisure-oriented systems of metal detecting and geocaching hobbies. However, it is intriguing to see that for the event planning system, an evident undercurrent of hedonic values is driving co-creation of value for its users. Similarly, there are some indications that the online CRM system users benefit from hedonic-value-driven co-creation. With the metal detection and geocaching systems, we observe that hedonic values neither dominate nor have a strong influence. In geocaching, nearly all values are hedonic, whereas in metal detection, 47% of values are hedonic. Here

again, we observe different patterns among the two studies. The only similarity is that both have a small (4%) portion of the hedonic values attached to construction of identities (#1). Otherwise, the emphasis between the themes varies so that while, for instance, social nature of use (#2) is important to metal detecting and the co-creation of value (19%), it is less important to geocachers (9%). Similarly, the context of use (#3) is less important to metal detecting (6%), whereas it is of relatively higher importance to geocachers (18%). Finally, we can also see that service process experience (#5) is the most important hedonic value for geocachers (40% of all values).

Table 5 provides an overview of the hedonic value distribution between the themes. From the results, we can see that themes for service process experience (#5) (30%) and goals and outcomes (#6) (23%) collect more than half of the values in the studies with an emphasis on the two hobby activities. Thereafter, participation in service production (#4) (16%) and social nature of use (#2) (16%) are similarly important. The context of use (#3) (11%) and construction of identities (#1) (4%) remain the two least important themes.

In Table 6, we see the distribution of utilitarian values. Here the value distribution is more focused on the B2B systems, namely, the online CRM system, the intelligent cyber physical system for mining, and the event planning and organizing system. However, we can see that more than half (53%) of the values of the metal detection system were linked to utilitarian observations for value co-creation. This was unexpected. In geocaching, only some values were linked to utilitarian purposes, which is in line with the activity itself; geocaching is a hobby that people do for leisure and relaxation.

While all of the B2B systems vary in their distribution of value between the themes, some observations can be made. First, the social nature of use (#2) seems to be important to all three B2B systems. We expected such a pattern to be present in the hobby activities, but less so in the utilitarian purpose-oriented systems. For the intelligent cyber physical system for mining, we also see that while social nature of use (#2) (25%) and context of use (#3) (21%) are important, the value co-creation with the service system is dominated by the service process experience (#5) (47%).

Table 7 summarizes hybrid values that had characteristics of both hedonic and utilitarian values. The distributions here are focused on the three last listed systems, that is, event planning and organizing, metal detecting, and geocaching, which were also emphasized for hedonic value distributions for the themes. From this, we can infer that the hybrid values

have similar implications to value co-creation as the values characterized as hedonic.

Next, we look into the findings on two specific studies: the metal detecting and geocaching hobbies (cf., Tables 8 and 9). These two cases were selected for closer examination because they showcase systems that are impacted by both hedonic and utilitarian values for co-creation. The similarities between the two cases merely entail the construction of identities, which both studies seem to include but which have only marginal impact on the value co-creation. Our expectation was that these two studies would have similar patterns because both of them are characterized as hobby activities and have some competitive aspects. Furthermore, both activities are done in small groups of people.

The findings show something different. The geocaching hobby is mostly dominated by co-creation of hedonic values (77%), and only some utilitarian values (2%) emerged from the data. Hybrid values balance the situation at some level (21%). With the metal detecting hobby, the value distributions are balanced among 43.5% hedonic values, 46.5% utilitarian values, and 10% hybrid values. Distribution of values for the six themes also varies between the two studies.

When looking more carefully at the results of the metal detecting study (Table 8), we can detect some similarities in the value patterns; for example, the participation in service production (#4) is important (22%). The same can be noted for the goals and outcomes (6#) theme (29%), which emerges as the most important theme for the metal detecting hobby. In both of these themes, nearly an equal number of hedonic and utilitarian values are present. In addition, both themes have a relatively large number of hybrid values (28% and 27%, respectively). Together, these themes represent 51% of the values. If we look at the distribution of values within themes, we note that for participation in service production (#4), 46% (73 out of 158) was considered hedonic only and 41% utilitarian only (65 out of 158). The rest were a hybrid of both. For the goals and outcomes (#6) theme, the percentage was 38% (80 out of 209) for hedonic, 53% (110 out of 209) for utilitarian, and 6% (19 out of 209) for hybrid values. Some other themes are more clearly biased towards either hedonic or utilitarian values. An example of a utilitarian bias is the context of use (#3) with only 22% (19 out of 83) of the values considered as hedonic only.

The case of the geocaching hobby remarkably differed in comparison to the metal detecting hobby, as summarized in Table 9. While geocaching is clearly dominated by hedonic values (77%), the difference is even greater when hybrid values are also accounted for

(98% of all values). Utilitarian values are clearly less important to geocachers versus metal detecting hobbyists, for example. Noteworthy insights can also be observed from the emphasis of themes between the cases. To our surprise, the social nature of use (#2) was relatively unimportant for geocachers (11% of all values), although geocaching itself is a social activity. In addition, participation in service production (#4) was considered not important (9%).

Another unexpected finding was that the context of use (#3) is important to geocachers (19% of all values). This may, however, reflect the importance of the location where geocaching is pursued and that geocachers feel they can extract more value from the activity in a location of their choice versus geocaching in randomly indifferent locations. Naturally, the geocaches themselves are located in specific places, so this finding can also infer that geocachers naturally connect geocaches to specific locations. Finally, the clear drivers for geocaching were service process experience (#5) (36%) and goals and outcomes (#6) linked to the geocaching itself (21%).

5. Discussion

The earlier literature on value co-creation has highlighted several important aspects that enable such activity between the users and the service system. Prahalad and Ramaswamy [19, 20], for example, have argued the importance of involving customers in firms' processes. Vargo and Lusch [2], in turn, argued that value is gained from service system use and that it is contextually and phenomenologically determined by the customer [2, 21]. Consequently, the SDL literature has argued that value co-creation is a service-for-service exchange, where companies offer value propositions to customers who may accept the propositions by integrating their own resources and co-creating value-in-use. This has led to a more finely grained debate in the literature about resource integration between benefit-pursuing entities [2].

Our study takes a user-focused perspective on value co-creation. While there is literature that touches on this perspective, such as Grönroos and Voima [3] who argue that value can only be co-created in a joint co-creation sphere between the customer and service provider, this typically does not further elaborate on how value co-creation is experienced by the service system user.

To investigate this, we build on the framework for CIS development created by Tuunanen et al. [6], which makes the argument that value co-creation can be enabled by the interplay between the users' value

Table 4. All values across the cases

Case/Theme	1	2	3	4	5	6	Sum
Online CRM	3% (9)	33% (98)	5% (15)	24% (70)	14% (42)	21% (61)	295
Intelligent cyber physical system for mining	4% (11)	25% (70)	21% (58)	0% (0)	47% (131)	3% (8)	278
Event planning and organizing system	11% (35)	29% (92)	10% (26)	15% (47)	19% (60)	17% (54)	314
Metal detecting hobby	3% (24)	16% (112)	11% (83)	22% (158)	19% (136)	29% (209)	722
Geocaching hobby	4% (13)	11% (40)	19% (65)	9% (30)	36% (128)	21% (75)	351
Sum	5% (92)	21% (412)	13% (247)	16% (305)	25% (497)	21% (407)	1,960

Table 5. Hedonic value distribution across the cases

Case/Theme	1	2	3	4	5	6	Sum
Online CRM		31% (4)		8% (1)	46% (6)	15% (2)	13
Intelligent cyber physical system for mining							0
Event planning and organizing system	4% (1)	38% (10)	12% (3)	12% (3)	23% (6)	12% (3)	26
Metal detecting hobby	4% (12)	19% (61)	6% (19)	23% (73)	22% (70)	25% (80)	315
Geocaching hobby	4% (11)	9% (25)	18% (48)	8% (21)	40% (108)	21% (57)	270
Sum	4% (24)	16% (100)	11% (70)	16% (98)	30% (190)	23% (142)	624

Table 6. Utilitarian value distribution across the cases

Case/Theme	1	2	3	4	5	6	Sum
Online CRM	3% (9)	33% (94)	5% (15)	24% (69)	13% (36)	21% (59)	282
Intelligent cyber physical system for mining	4% (11)	25% (70)	21% (58)	0% (0)	47% (130)	3% (8)	277
Event planning and organizing system	11% (28)	29% (75)	8% (21)	16% (41)	19% (51)	18% (47)	263
Metal detecting hobby	3% (12)	13% (42)	16% (54)	19% (65)	15% (53)	33% (110)	336
Geocaching hobby			17% (1)		50% (3)	33% (2)	6
Sum	5% (60)	24% (281)	13% (149)	15% (175)	23% (273)	19% (226)	1,164

Table 7. Hybrid value distribution across the cases

Case/Theme	1	2	3	4	5	6	Sum
Online CRM							0
Intelligent cyber physical system for mining					100% (1)		1
Event planning and organizing system	24% (6)	28% (7)	8% (2)	12% (3)	12% (3)	16% (4)	25
Metal detecting hobby		13% (9)	14% (10)	28% (20)	18% (13)	27% (19)	71
Geocaching hobby	3% (2)	20% (15)	22% (16)	12% (9)	22% (17)	22% (16)	75
Sum	5% (8)	18% (31)	16% (28)	19% (32)	20% (34)	23% (39)	172

Table 8. Value distribution by types for metal detecting

Type	1	2	3	4	5	6	Sum
Hedonic	4% (12)	19% (61)	6% (19)	23% (73)	22% (70)	25% (80)	43.5% (315)
Utilitarian	3% (12)	13% (42)	16% (54)	19% (65)	15% (53)	33% (110)	46.5% (336)
Hybrid		13% (9)	14% (10)	28% (20)	18% (13)	27% (19)	10% (71)
Sum	3% (24)	16% (112)	11% (83)	22% (158)	19% (136)	29% (209)	722

Table 9. Value distribution by types for geocaching

Type	1	2	3	4	5	6	Sum
Hedonic	4% (11)	9% (25)	18% (48)	8% (21)	40% (108)	21% (57)	77% (270)
Utilitarian			17% (1)		50% (3)	33% (2)	2% (6)
Hybrid	3% (2)	20% (15)	21% (16)	12% (9)	23% (17)	21% (16)	21% (75)
Sum	4% (13)	11% (40)	19% (65)	9% (30)	36% (128)	21% (75)	351

drivers and system value propositions. While Tuunanen et al. recognize that users' goals may be hedonic or utilitarian, they do not further detail how these might impact the depicted users' value drivers and system value propositions in the CIS framework.

This perspective differs from the extant view of value co-creation in the literature where service systems are typically looked at as multi-actor networks and service platforms [4, 25, 28]. Although some examples of literature partly address the argument, they look more into co-production [e.g., 31], co-development [e.g., 1], and co-design [e.g., 32] of services. Each of the foregoing arguably offers opportunities for value co-creation. However, they focus on *in situ* issues that impact users' and the service system's service realization, users' participation in the service production, or service design matters relating to the provider's service development activities rather than value co-creation during the use of a service system. Furthermore, so far, the extant literature has not inspected different types of values (hedonic, utilitarian, hybrid) co-created during the service system use within a single study nor has there been a study available comparing different types of service systems in this regard.

Consequently, we argue that our findings provide a novel and new perspective of value co-creation at the service system level and also between systems. Our findings reveal that all five service systems are differently structured in terms of how users perceive how value is co-created. We foresaw that there should be clear differences in value types between B2B service systems and more consumer-oriented service systems, which was supported by our findings. Furthermore, unexpected differences in value type emphases were found between similar types of service systems.

Table 4 summarizes differences in distributions of recognized values by the participants among the six CIS themes. We depict different emphases of the CIS themes in each service system. This concurs with Tuunanen and Kuo's [14] argument that system features should be prioritized according to the value structures of the users. Moreover, our findings suggest services should be designed according to such value structures rather than system types. The implication of this finding is that the CIS framework and the applied research methodology enable researchers and practitioners to recognize which aspects of value co-creation are more important to the users than others, allowing development and design efforts to be directed accordingly. The use of the CIS framework also facilitates assessment of users' perceptions of a service, for instance, comparisons between major versions of a deployed service system. This

assessment allows the firm to investigate whether the added or changed (or removed) features of the system (for system value propositions) have an impact recognized by the users. Similarly, changes to the users' drivers with regard to the service system use can be recognized. Therefore, the CIS framework provides a benchmarking tool for estimating how the service system enables co-creation of value.

We also investigated how values were distributed among the studies, the CIS themes, and the three types of values (hedonic, utilitarian, and hybrid), as summarized in Tables 5–7. The findings show that B2B service systems are driven more by utilitarian-based value co-creation between the users and the service systems. Similarly, the leisure-oriented metal detecting and geocaching are driven by more hedonic-based value co-creation activities between the users and the service systems. The analysis of the impact of the hybrid values supports each of these arguments as well. This result confirms the earlier argument [12] that a system's use inherently comprehends both utilitarian and hedonic values, at least for co-creation of value as argued here. Valkonen et al. [12] also argued that there is a continuum of utilitarian and hedonic values as drivers for system use. The application of the CIS framework provides researchers and practitioners a tool to estimate where the service system is located in the value continuum at any given moment.

Finally, the closer analysis of two of the studies reported in Tables 8 and 9 provide further insights into how values are distributed with regard to the three value types. The metal detecting study is particularly interesting as it depicts a service system where hedonic and utilitarian values are nearly in equal balance. By scrutinizing the value distributions, we find that the study participants in many of the CIS themes perceive both hedonic and utilitarian values. On the other hand, the geocaching study showcases rather purely hedonic-driven service system use, although the recognized hybrid values indicate that there are also underlying utilitarian reasons for geocaching that impact co-creation of value.

6. Conclusions

Our study captures ways to unbox the concept of value co-creation from the service system user's point of view. To do this, we dissect users' hedonic and utilitarian drivers for value co-creation activities and behavior in five different service system contexts by using laddering interview data [13, 14, 15, 16]. More specifically, we attempt to assess how service systems

differ in terms of hedonic and utilitarian value drivers of their users.

Based on our findings, we can argue that there are clear differences in the value drivers between the service systems. Some of the systems are evidently perceived as more utilitarian- or hedonic-oriented while each of the service systems retain varying value drivers. An interesting undercurrent of hybrid values also exists that either characterizes the hedonic side of utilitarian service systems or vice versa for the more hedonic systems. Our study contributes by being one of the first to depict and highlight the differences in value-based motivations for users to co-create value. Our findings also show that the CIS framework can be used to benchmark users' actual or perceived value co-creation behavior with specific service systems or to compare such behavior between different service systems. Finally, the findings also confirm an earlier argument [12] that system use inherently comprehends both utilitarian and hedonic values and that these value types impact the system use.

Our study has some limitations that should be recognized. Due to space requirements, we were not able to fully depict the coding process used in the study. Instead, some exemplars are provided of how we have conducted the coding (cf., Table 3). Similarly, we were not able to provide full details with the paper for the original laddering chain coding that was done in the individual studies. However, we do provide references to the individual studies, and the reader can access the original works. Therefore, we feel that sufficient transparency of the coding is achieved. One of the authors has taken part in all five studies, which has guaranteed a similar grounding in the field studies and consistency in data coding procedures.

In conclusion, we welcome researchers to join our effort to unbox value co-creation. We believe this will have an impact on the understanding of user behavior as well as how service systems should be designed so that they better enable value co-creation.

7. References

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III

UNDERSTANDING SERVICE ACTORS' VALUE CO-DESTRUCTION PROCESS: A STRUCTURED LITERATURE REVIEW

by

Lintula, J, Tuunanen, T. & Salo, M.

Unpublished working paper.

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IV

WHEN VALUE CO-CREATION TURNS TO CO-DESTRUCTION: USERS' EXPERIENCES OF AUGMENTED REALITY MOBILE GAMES

by

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When Value Co-Creation Turns to Co-Destruction: Users' Experiences of Augmented Reality Mobile Games

Completed Research Paper

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Abstract

Service-dominant logic (SDL) provides a well-established lens for understanding services as value co-creation processes. However, also value co-destruction can occur in service processes, but the literature on value co-destruction remains scattered and more research is called for. Our study addresses this research gap with a classification of users' subjective reasoning for value co-destructive experiences while playing the augmented reality (AR) mobile game Pokémon GO. We conduct laddering interviews with Pokémon GO players to uncover their value co-destruction experiences. Employing clustering analysis, we investigate users' reasoning for value co-destruction experiences, and argue that value co-destruction may occur due to seven types of reasoning: value contradiction, unmet expectations, technical challenges, personal or social norm conflict, effect of constant mobile use, absence or loss of resources, and insufficient perceived value. The study contributes to research and practice with new insights to the unfavorable side of value co-creation and users' co-destructive service experiences.

Keywords: Service-dominant logic, Value co-creation, Value co-destruction, Augmented reality, Pokémon GO.

Introduction

When designing and providing services, it is important to understand how value is created for users. Service-dominant logic (SDL) has come to the fore as a well-established framework for understanding service interactions between providers and customers as value co-creation processes. SDL has been adopted in various domains, such as Marketing and Management and Information Systems (IS). In SDL, value is regarded to be co-created in service use by two or more actors integrating resources, such as time and skills, aiming to increase well-being for themselves and one another.

However, the SDL literature has tended to overlook one aspect of services. Not all service occurrences are co-creative (Echeverri and Skålén 2011; Plé and Chumpitaz Cáceres 2010). In fact, Plé and Chumpitaz Cáceres (2010) suggest that value co-destruction can occur. In this study, we apply their definition of value

co-destruction as accidental or intentional resource misuse leading to the decreased well-being of at least one of the actors involved. Recently, some studies have applied this concept in domains such as Marketing, Tourism, Banking, and Information Systems (e.g., Echeverri and Skålén 2011; Neuhofer 2016; Worthington and Durkin 2012; Vartiainen and Tuunanen 2016), supporting the idea that both value co-destruction and value co-creation can occur. However, research on value co-destruction and its underlying processes is still scarce (Lintula et al. 2017).

In order to understand co-creation of value for different service actors, we also need to understand how value can be co-destroyed in their resource integration processes. Therefore, we investigate the negative side of actors' interactions and aim to extend the current knowledge by revealing underlying reasons to value co-destruction from the service user perspective. Hence, our study responds to the call for more investigations into the emerging concept of value co-destruction (Kuppelwieser and Finsterwalder 2016; Lintula et al. 2017; Plé 2017).

In this paper, we focus on why value co-destruction occurs in augmented reality (AR) mobile games. AR mobile games offer novel opportunities for value co-creation (and co-destruction) because they fuse the virtual world of the game with the surrounding physical environment in one interface, thus providing players with new ways of exploring their physical surroundings (Serino et al. 2016). For instance, Pokémon GO, a particularly well-known AR mobile game, integrates geographical space data into a virtual environment complemented with social playing (Clark and Clark 2016; Tateno et al. 2016). Players utilize a mobile platform to catch AR characters that appear to be reflected in their physical surroundings. Recent studies have indicated that Pokémon GO players increase their physical and psychological well-being by playing the game (e.g., Althoff et al. 2016; Baranowski 2016; Joseph and Armstrong 2016; Kari et al. 2017; Yang and Liu 2017). Drawing on SDL, such beneficial interactions between service users and providers may be regarded as value co-creation processes. For instance, users of Pokémon GO engage with the app to integrate their time and other resources to co-create value, e.g., social unity, fun and excitement for themselves and the community. Therefore, we draw on SDL and conceptualize Pokémon GO as a service provider aiming to offer customers a variety of value propositions across the AR game platform, where players globally integrate resources to co-create value. However, not all gaming interactions are co-creative. Pokémon GO players have been reported to engage in negative interactions, which have sometimes led to traffic accidents and assaults (Ayers et al. 2016; Raj et al. 2016). As most of the previous research has focused on the positive impacts of Pokémon GO, we want to study the perceived negative effects and experiences associated with playing the game.

We aim to address this gap in the literature by answering the research question (RQ) *Why does value co-destruction occur in AR mobile games?* Our goal is to gain an in-depth understanding of the value co-destruction phenomenon by investigating and explaining users' value co-destruction experiences in the AR mobile game Pokémon GO. Extant literature shows Pokémon GO provides potential for value co-creation at many different levels. However, value co-destruction may occur simultaneously with value co-creation (Vartiainen and Tuunanen 2016). According to SDL, resource integration is an integral activity in value co-creation, thus, Plé and Chumpitaz-Caceres (2010) argue accidental or intentional misuse of the drawn resources may lead to value co-destruction. To our knowledge, value co-destruction as a process has not been previously studied in the context of AR mobile games. In order to investigate value co-destruction in this context, we focus on users' experiences regarding occurrences where attempted beneficial resource integration and value co-creation turns to value co-destruction.

We adopt a qualitative approach and collect interview data from Pokémon GO players using the laddering interview technique (Reynolds and Gutman 1988; Peffers et al. 2003). This technique emulates informants' mental models, providing tools to analyze and understand the reasoning behind co-destroyed values. In total, 43 laddering interviews were conducted with Pokémon GO players in Finland. We assess the interview data to depict emerging constructs to explain reasoning for value co-destructive occurrences. For this purpose, we utilize Ward's method (Aldenderfer and Blashfield 1984) for classifying the coded laddering chains into hierarchical clusters. This analysis method provides us with emerging clusters of constructs, each representing different reasons for perceived value co-destruction. As a result, we aim at establishing an analytical framework for users' reasoning for value co-destruction in AR mobile games.

Our findings contribute to the literature by explaining reasons for experienced value co-destruction processes in AR mobile games from user perspective. As such, our findings go beyond the rather optimistic SDL literature that has focused mainly on the positive side of service interactions. More specifically, our

research constitutes a pioneering value co-destruction study in the AR mobile games context. Our study aims to inform scholars and service providers who utilize emerging technologies, such as AR and virtual reality, that are beginning to take over traditional service domains. Gaining insights about value co-destruction in services mediated by new technologies is particularly important because blending the physical and virtual worlds may bring about more complex value co-destruction consequences compared to those triggered by fully virtual services in closed settings.

The remainder of the paper is structured as follows. We start with an introduction to the research by presenting the theoretical foundations of value co-creation and SDL. This is followed by an introduction to the value co-destruction concept and the scattered literature on the topic. We then discuss the background of AR mobile games and user-provider value interactions in Pokémon GO, applying the lens of SDL. The research phases and methodology are described next, followed by the findings of our analysis. These findings are discussed in light of the existing literature. We conclude with a summary of the study, its contributions and limitations, and suggestions for future research.

Value Co-creation and the SDL framework

Understanding how the value of a product or service is formed is a focal challenge for service design and provision as companies strive to accommodate changing customer needs and capitalize on continuous technological developments. Value has traditionally been described as an outcome of a trade-off, where benefits are pursued by sacrificing resources (Zeithaml 1988). In contrast, Prahalad and Ramaswamy (2002, 2004a) suggest that interactive customer-producer involvement leads to cooperatively created value unique to the individual customer. They further argue that customers should be regarded as co-creators of experience or value and that customer-provider interaction should be regarded as the key to value co-creation (Prahalad and Ramaswamy 2002, 2004a). Soon thereafter, Vargo and Lusch (2004) introduced the SDL framework, suggesting that companies should start focusing on services rather than products.

The emergence of SDL (Vargo and Lusch 2004, 2008) and customers co-creating value together with the service provider (Grönroos and Voima 2013) has since shaped the way services are designed and value is proposed to customers. In SDL, the concept of service refers to the action, where an entity aims to benefit itself or another entity by co-creating value (Vargo and Lusch, 2004). Vargo, Maglio and Akaka (2008) state that value is “an improvement in system well-being” which can be measured as a system’s ability to fit in its environment. We apply this definition in the current study. Furthermore, we regard value as tangible or intangible and as stated by Vargo and Lusch (2008), “always uniquely and phenomenologically determined by the beneficiary.” Moreover, SDL regards that companies are merely offering and delivering value propositions, which customers may use as they see fit to co-create actual perceived value-in-use (Lusch and Vargo 2006a). As the provider offers value propositions to the customer, the establishing of connections and relationships between the involved service systems is enabled (Vargo et al. 2008).

Value co-creation is a key function in SDL and is regarded as an interactive process of parties co-creating value by integrating their own and utilizing each other’s resources (Grönroos and Voima 2013; Plé 2016; Tuunanen et al. 2010). It is seen as a service-for-service exchange occurring between involved parties, referred to as service systems, connected to each other by value propositions (Vargo et al. 2008). The underlying goal in a service process is for the involved entities to benefit themselves and/or the other entities involved by applying resources through particular interactive functions (Vargo et al. 2008). In service provision, the resources used are divided into a) *operant resources*, which are tangible and substantial resources being acted upon by b) *operand resources*, such as knowledge and skills (Lusch and Vargo 2006b). The role of goods is regarded as optional, as services may be delivered either with or without the assistance of physical goods. For example, when physical goods are used as tools to deliver a service, they can be considered operant resources.

SDL regards value co-creation as the underlying function for all services, steering activities from design and production through service use and experience. Vargo and Lusch (2004) state that all economies are service economies; therefore, SDL can be applied in all functions between actors. Accordingly, the concept of value co-creation is adopted and applied in various disciplines. For instance, in IS research, it has been employed in explaining and designing IS and technology-enabled services and innovations (e.g., in Kohler et al. 2011; Lusch and Nambisan 2015; Tuunanen et al. 2010). The SDL and value co-creation offer a novel perspective

over user value derived through the user's resource integration actions and the service experience. Tuunanen et al. (2010) state that value co-creation in the use of consumer IS can be enhanced by facilitating the interplay of system value propositions and user value drivers. They showcase in a conceptual framework that in successful co-creation of value, system offerings are complemented by value drivers of the user and that value co-creation in the context of IS use occurs as an interplay between these two entities (Tuunanen et al. 2010).

The Emerging Concept of Value Co-destruction

However, service encounters may lead to negative value (Grönroos 2008). SDL takes a rather optimistic approach to customers interacting with providers over service encounters, but not all interactions have desired or positive outcomes (Pralhad and Ramaswamy 2004b). Accordingly, literature about services with negative or conflicting outcomes and the concept of value co-destruction are emerging in interdisciplinary domains (e.g., Echeverri and Skålén 2011; Plé and Chumpitaz Cáceres 2010; Vartiainen and Tuunanen 2016). Plé and Chumpitaz Cáceres (2010) coined the concept, stating that because value can be co-created it is logical that the interaction process between parties may also result in value co-destruction. Echeverri and Skålén (2011) argue that value co-creation in SDL is an unrealistic conception and that interactive value formation not only occurs as value co-creation but also as value co-destruction. Also a few earlier studies implied there could be a negative side of value co-creation. For example, Prahalad and Ramaswamy (2004b) suggest that not all interactions between firms and customers end up being perceived positively by the customer. Other studies have found that value imbalances between customers and providers can occur, as well as devaluation processes potentially resulting in value diminishment (Woodruff and Flint 2006).

Some scholars now recognize that value co-destruction can occur (e.g., Neuhofer 2016; Robertson et al. 2014; Smith 2013; Vartiainen and Tuunanen 2016; Worthington and Durkin 2012) and have negative outcomes, such as increased costs, customer loss, negative word-of-mouth, and customer dissatisfaction (Smith 2013). However, we currently lack sufficient understanding of value co-destruction at different levels, that is, individuals, community, and society (Kuppelwieser and Finsterwalder 2016). In the IS literature, signs of value co-destruction can be found, for instance, in organizational studies relating to theft, sabotage, and deception in IS projects (Rost and Glass 2009, 2011) and technology misuse (D'Arcy et al. 2014). However, literature on opportunistic or deviant behavior or technology misuse does not address the need to understand risks related to involving users in services as resource integrators and co-creators of value.

The SDL (Vargo and Lusch 2004) provides a lens to investigate possible value co-destruction from the point of view of generic actors in an interactive resource integration process, where the decrease in well-being is experienced subjectively and contextually. Vartiainen and Tuunanen (2016) state there is a lack of previous research discussing the negative consequences of IS design in relation to possible negative occurrences arising during the value co-creation process. They apply the contradiction theory and find that users of the technology-enabled outdoor treasure hunting game Geocaching pursuing value co-creation may simultaneously co-destroy value. Hence, value may be co-destroyed simultaneously as it is co-created for the beneficiary. Vartiainen and Tuunanen (2016) state that both poles of the found contradictions should be understood separately, which suggests that value co-creation and co-destruction are not merely the flip sides of one phenomenon but indeed distinct yet dynamically connected. Lintula, Tuunanen, and Salo (2017) synthesize previous literature and argue that value co-destruction comprises three interrelated dimensions, orientation, resources, and perceptions, that include nine value co-destruction triggering components in three temporal positions.

Value Co-creation and Co-destruction in AR Mobile Games

After its launch on July 6 2016, it took only 13 hours for Pokémon GO to rank first as the top grossing mobile app in the US (Nelson 2017). The free downloadable Pokémon GO broke Apple's App Store record for the most downloads in a launch week. Only a few months later, the app had 550 million downloads and more than 15 million weekly players (Sonders 2016).

The app offers value propositions for users by employing AR mechanics in supplementing the real world with animated Pokémon GO characters, which players aim to catch and evolve in their value co-creation

attempts. The game requires players to navigate substantial distances in real world settings to catch Pokémon characters, hatch Pokémon eggs, and take part in collaborative events, such as raids, whilst being physically active in order to play the game (Baranowski 2016). Therefore, the physical health benefits of Pokémon GO and other AR mobile games have attracted the attention of many scholars. However, studies show that physical activity is not the only positive effect of the game on players' physical well-being. Players' well-being has been reported as having increased in various dimensions, for example, psychological wellness, such as preventing withdrawal in youth (Tateno et al. 2016; Kato et al. 2016), cultural and historical awareness, a sense of social unity (Kari et al. 2017; Serino et al. 2016), bonding and social capital (Yang and Liu 2017), experiences of escapism (Serino et al. 2016), and overall wellness (Kari et al. 2017; Yang and Liu 2017). Such outcomes can be regarded as manifestations of co-created value. Moreover, Ruiz-Ariza et al. (2018) report that youth playing Pokémon GO score higher in selective attention, concentration, and sociability compared to non-playing youth.

However, the Pokémon GO boom soon started to decline; one study shows that more than 78% of a sample of users had given up or significantly cut down playing just two months after the launch (Liu and Ligmann-Zielinska 2017). Other studies report a decrease in players' engagement and significant dropout rates (Kawa and Katz 2016; Rodríguez-Serrano et al. 2017). Furthermore, negative implications of Pokémon GO have been reported, such as trespassing, abduction, and violence (Serino et al. 2016), as well as injuries related to accidents and assaults (Ayers et al. 2016; Raj et al. 2016). Playing experiences with negative outcomes, such as sadness, hurt, or disappointment, can be regarded as instances of value co-destruction. As co-creation of value is considered a prerequisite for the existence of many games (Pralhad and Ramaswamy 2004a), attaining an understanding of perceived value co-destruction in game service encounters may be helpful in comprehending such negative experiences and the decline in game popularity.

AR-enabled services, such as Pokémon GO, are different from other digital enabled services due to their ability to facilitate co-creation across the virtual and physical dimensions. Therefore, we draw on SDL (Vargo and Lusch 2004; Vargo et al. 2008) and conceptualize Pokémon GO as a service provider aiming to establish connections and relationships with potential players for value co-creation by offering players value propositions over the AR game platform. Using this platform, players may globally accept the offered value propositions and actively co-create value by integrating time, knowledge, money or other resources with the provider's resources. From the players' perspective, values such as fun, physical well-being or social unity may be co-created as an outcome of this resource integration process. However, value co-destruction may occur and have severe consequences. Our study therefore aims to provide an in-depth understanding of users' value co-destruction behavior with the intention that this might inform the design of AR-enabled services in promoting value co-creation and preventing value co-destruction.

Methodology

We adopted a qualitative approach in this study and collected data by conducting interviews with Pokémon GO users. The acquired data was coded and classified in clusters addressing the research question. This approach was considered beneficial because it enabled an examination of users' perceptions of co-destructive occurrences and helped to uncover the underlying reasons for them. In this section, we describe the methodological steps of the study, from field study preparations and data collection to coding and analysis.

Field Study Preparations and Data Collection

The field study preparations for collecting interview data about value co-destruction occurrences experienced by AR mobile game users began in September 2016. The study objective was to investigate and interpret reasons for value co-destructive service outcomes from the users' perspective. To do this, we applied the laddering interview technique, which enables researchers to tap into informants' underlying thoughts about a phenomenon (Reynolds and Gutman 1988). The laddering interview technique is based on the personal construct theory (Kelly 1955), and is useful for uncovering linkages between perceived (service) attributes and outcomes (Gutman 1991) and has been found suitable for studying customer value (Modesto Veludo-de-Oliveira et al. 2006). Basing on personal constructs, the technique emulates respondents' mental models and provides tools to analyze and understand pathways of value co-destruction and the connections between co-destructive service components and co-destroyed values.

Previous literature argues that there is potential for value co-creation in Pokémon GO at different levels. Furthermore, literature on value co-creation and co-destruction by users of an IT artefact (Vartiainen and Tuunanen, 2016) shows that value co-destruction may occur simultaneously with value co-creation. However, to our knowledge, value co-destruction as a process and/or possible outcome are not previously studied in the context of AR mobile games and particularly, Pokémon GO. In order to investigate potential co-destruction of value in this context, our approach was to recognize deviations from users' expected value co-creation behavior. Thus, we chose to collect interview data from respondents who had both value co-creation and co-destruction experiences of using the service. We recognized such respondents by conducting a pre-survey.

We recruited study participants by posting announcements in Finnish regional Pokémon GO Facebook groups. The announcements were purposefully distributed in particular Facebook groups that had a great number of active Pokémon GO players. By doing this, we aimed to ensure the recruitment of players with extensive value co-creation experience and avoid recruiting users who were no longer using the service. Volunteering participants signed in to the study by answering the pre-survey regarding their positive and negative Pokémon GO use experiences. The goal of the pre-survey was for the participants to list examples of such occurrences. Furthermore, participants were asked to give a subjective estimate of their level of playing activity and to report their age and occupation. In total, we collected 88 entries, all having implications for potential value co-creation and/or value co-destruction in Pokémon GO. The pre-survey findings supported the findings of previous studies showing that most respondents truly enjoyed the app and evidently co-created value. Nevertheless, also negative use experiences were listed by most of the participants.

Purposeful sampling (Patton 2002, p. 230) was used to select information-rich cases for the interviews. In order to interview users who most likely had both co-creative and co-destructive value experiences, the criterion for selecting informants was that there needed to be at least two examples of both positive and negative use experiences entered by the respondent in the pre-survey. In this way, we attempted to ensure that selected informants had both value co-creative and co-destructive experiences to discuss in the laddering interviews.

Most of the selected informants stated, they were enthusiastic of the game and enjoyed using it. Hence, it was evident that they were using the service (at least in part) for value co-creation purposes. This being the case, we aimed to detect value co-destruction as a phenomenon deviating from value co-creation. For example, if a respondent reported that s/he uses the app for going out and getting exercise, but experienced being mocked by his/her friends when doing so, such occurrence could manifest a co-creation attempt resulting in at least partial value co-destruction.

Exactly 50% of the 88 volunteer participants were actively playing the game in a regional city in central Finland with a population of 140,000, and the other 50% were actively playing the game in a regional city in southwestern Finland with a population of 190,000. Most selected informants could be regarded as "Pokémon GO enthusiasts" and active users of the service. In the pre-survey, informants tended to report more positive than negative game experiences, and some appeared to have an agenda to "promote" the game. Of the 88 Pokémon GO players, 48 were invited for interviews. Due to five cancellations, however, 43 of the invited participants were actually interviewed (21 from the smaller city and 22 from the larger city). The interviewed respondents were between 19 and 62 of age. Most respondents were employees or students, and more than two thirds of them were female (cf. Table 1).

Gender	Age Group	Occupation	Level of Game Activity
Female 30	19–28 21	Employee 15	Daily 35
Male 13	29–38 14	Student 15	Weekly 4
	39–48 6	Entrepreneur 6	Occasional 2
	49–62 2	Unemployed 4	Not Active 2
		Retired 2	
		Stay-at-home parent 1	

Table 1. Informants' demographic data and level of game activity

The main focus in the interviews was on the perceived negative playing experiences, with the laddering technique proving to be an effective means determining the subjective reasons for the connection between particular game features and any negative values experienced by players. The interview technique requires that at the beginning of each interview, the researcher presents the informant with a stimuli collection comprising a list of brief written scenarios (Peppers et al. 2003). The informant then reads the stimuli collection carefully, reflecting on his/her own experiences. Subsequently, the informant is asked to rank the top two most important scenarios. In this study, the pre-survey and the Conceptual Framework for Value Co-destruction Process for Service Systems (Lintula et al. 2017) were utilized in designing the stimuli collection for the laddering interviews. As we wanted to discover underlying reasoning for experienced value co-destruction, the designed stimuli collection comprised scenarios with potential value co-destruction occurrences. Using the lens suggested by Lintula et al. (2017), nine types of potential value co-destruction experiences were depicted. These experiences were tabulated into a stimuli collection along with storylines extracted from the replies containing descriptions of each type of potential value co-destruction.

The interviews took place between May and September 2017. Each one of the 43 informants was individually interviewed by one of the authors (41 face-to-face interviews and 2 video interviews). The interviews were conducted in peaceful settings on two different university campuses in Finland. The duration of the interviews ranged between 40 and 180 minutes, the average being about 60 minutes. The interviews were voice recorded, and laddering notation was carried out in spreadsheet format throughout the interviews. In each interview, the first 5 to 10 minutes were spent on introducing the research project, warmup conversation, and discussing the purpose of the interview. The stimuli collection was then introduced to the respondents.

The respondents were asked to select two scenarios from the stimuli collection according to the highest perceived “negative significance”. In other words, the informants selected two scenarios they had experienced as particularly negative in their own service use history. They were also told that it was possible to make up new scenarios on the spot in the case if the presented ones were not suitable. Each informant was, however, able to select at least two scenarios from the pre-designed stimuli collection for further discussion. Subsequently, the researcher started with the first selected scenario, asking “What in this scenario was particularly negative for you?” The respondent then started to describe a particular experience that was similar to the one presented in the selected scenario. In line with established procedures for laddering interviews (Reynolds and Gutman 1988), the researcher continued, asking “And why was this negative for you?”, and the informant would continue reasoning. The “why” questions would continue as long as the informant continued providing further reasoning. In the end, when no further reasoning could be provided the ultimate personal goal of the informant was typically found. At this point, this part of the interview ended, and the researcher moved on to asking questions relating to another stimulus.

The interviews were recorded in spreadsheet format as chains of attributes, consequences, and values (Peppers et al. 2003). Here, the attributes represent the trigger or initial circumstance for a negative experience, such as a system feature. Informants' reasoning statements were recorded as consequence ladders. There could be several ladders of consequences in some chains. Finally, the underlying negative reasons, which could not be reasoned with further explanations, were recorded as value ladders. Thus, laddering chains were formed, as in the following example: *The app said there's a wild Pokémon nearby* [Attribute ladder] → *I went for a walk outside to catch it* [Consequence ladder] → *It got dark and I could not see my surroundings* [Consequence ladder] → *I was frightened of strange people and wild animals*

[Consequence ladder] → *I did not feel safe* [Value ladder]. Each interview branch that originated from one scenario led to several chains, and often chains were divided into sub-chains as new issues emerged. Interviewing the 43 informants resulted in gathering a total of 382 chains, with an average of 8.9 chains from each informant.

Coding and Analysis

After the data collection, the chains were mapped into a matrix where 382 rows represented the chains and 73 columns represented the individual attribute, consequence, and value ladders. Next, the 382 chains were coded one by one into attribute, consequence, and value codes (Peffer et al. 2003). To ensure that individual statements were coded consistently and with an appropriate level of specificity and a suitable level of abstraction without excess information loss, the laddering research advocates the use of two independent coders striving to reach a high degree of agreement (e.g., Klenosky, Gengler, and Mulvey 1994; Peffer et al. 2003; Reynolds and Gutman 1988). Therefore, the coding in this study was carried out in three phases by two coders, one of whom conducted all the interviews. First, both coders individually coded the attribute codes in spreadsheet format. Subsequently, the coders compared these initial attribute codes in a face-to-face meeting. Here, both coders' initial attribute codes were tabulated in one spreadsheet, and inconsistencies between these codes were discussed with the objective of reaching a consensus. Differences in the independently created codes were noted in the spreadsheet, and all differences were reconciled by consensus. Accordingly, conclusive attribute codes were transcribed in the column next to the two initial codes. Thereafter, coding rounds were conducted in a similar manner for the consequence ladders and the value ladders.

Once the coders had coded and reached a consensus on all codes for all chains, 156 codes remained. All chains were coded to the extent that was allowed by the data. Some chains could not be coded with all three codes, as there was no attribute and/or consequence and/or value code emerging from the chain in question. However, the majority of chains (92%) were coded with all three codes. The initial agreement level between the two coders was 83% for attribute codes, 89% for consequence codes, and 87% for value codes. Finally, a third researcher with vast experience in the laddering interview technique analyzed the final codes. The conclusion was that the coding differences were insubstantial, and the final codes were consistent and representative. Altogether, the coding process took six weeks, resulting in 156 codes. 53 attribute codes represented the triggering system features or circumstances, 63 consequence codes represented the reasons for negative perceptions, and 40 value codes represented failed personal goals or negative values.

The coded chains allowed us to investigate the respondents' personal constructs, i.e., beliefs and mental models resulting from their individual observations and interpretations of events (Kelly 1955). In the analysis, we utilized constructs, which comprehended the attribute, consequence and value codes derived in the previous phase (Tuunanen and Peffer 2018). Consequently, we constructed a binary matrix database and employed a hierarchical clustering analysis to analyze the data. To aggregate the value co-destructive chains into clusters of minimum variance, we employed Ward's method (Aldenderfer and Blashfield 1984, pp. 43–44). In order to answer our research question, we based our analysis on the 63 constructs derived from the consequence codes, which provided us with an understanding of users' underlying reasons for value co-destruction in Pokémon GO. After testing different clustering solutions, a seven-cluster solution was selected, as it depicted thematically coherent clusters. We then selected the most emphatic constructs from each cluster based on the frequency of their occurrence in the data as exemplars for reporting. In clusters 1 and 4, five exemplar constructs were included, as these constructs had an identical number of occurrences.

Findings

In the hierarchical clustering analysis, the 63 constructs were classified into seven emerging clusters: 1. Value Contradiction (25 constructs); 2. Unmet Expectations (5 constructs); 3. Technical Challenges (3 constructs); 4. Personal or Social Norm Conflict (12 constructs); 5. Effect of Constant Mobile Use (3 constructs); 6. Absence or Loss of Resources (11 constructs); and 7. Insufficient Perceived Value (4 constructs). Each cluster explicates a different approach to understanding users' experienced value co-destruction in the AR mobile game Pokémon GO. Altogether, 25 most emphatic constructs were depicted by the greatest relative number of occurrences within clusters. Table 2 presents the emerging clusters and

their descriptions, the most emphatic constructs, and examples of study participants' reasons for potential value co-destruction. Next, we discuss the clusters individually and give examples of each cluster.

Cluster Name	Cluster Description	Most Emphatic Constructs (Occurrences in Data)	Example Reasoning of Value Destruction/Co-destruction by User
Value contradiction	Value is co-created for the actor while a different value is co-destroyed during or after the service	Wanting to take care of responsibilities (3) Luck defines success too much (3) Play takes time from other things in life (3) Playing excludes others (3) Setting a bad example for kids (3)	Having fun through playing and being mentally engaged in pursuing in game goals contradicts with focal values, such as being an attainable friend: co-created value "fun" contradicts with co-destroyed value "friendship"
Unmet expectations	The actor's preconceptions remain unfulfilled during or after service regardless of attempted co-creation	Increased meaning of teams and sociality in game (3) Social conflicts with peers (4) The game evolves slowly (4)	Expecting to meet new people and forming new friendships while playing, when in reality users play alone and ignore each other
Technical challenges	The actor cannot co-create value during the service as resource integration is restrained due to a technical failure, damage or shortcoming, e.g., in the employed hardware, software or the environment	Mobile device fails to function/ collapses (3) Achieving of goals in game: no goals left to achieve (3) Bad weather for playing outside (5)	A player's personal device fails to function; intra-game issues, such as lack of challenges in the game; or exterior issues, such as stormy weather
Personal or Social Norm Conflict	A self- or socially positioned norm conflicts with the actor's service activity causing e.g., self- and/or social disapproval during or after the service	Having to take the car to travel far for the game (7) Personal values conflict with playing (7) Players behaving badly/disrespectfully (7) Being assessed by others and put in a box (7) Need to control a child's playing (8)	A playing parent struggles to take parental control of a child's game usage: the self-positioned norm "a mature adult" conflicts with the parent playing the game; or a dentist would not want to be assessed by his/her subordinates as "someone who plays mobile games": the social norm "a formal, businesslike professional" conflicts with the dentist playing the game

Effect of Constant Mobile Use	Co-creation requires the actor's constant attendance to the technology and the service, which reflects unwanted harmful effects on the actor and/or on the actor's relationships/ environment during or after the service	Dependence on technology and peers (9) Being left as an outsider (7) Negative effects on health (9)	A player develops an unwanted dependence on other players or an addiction to the service use, which can lead to the health issues or the player being left outside of a group of friends
Absence or Loss of Resources	Actor experiences lack or loss of resources (e.g., time, effort, information or reputation) before, during or after the service	Outsiders' negative preconceptions of the game (14) Psychological presence suffers (13) Playing becomes more difficult over time (17)	Player experiences loss of acceptance and recognition by non-players; or player perceives loss of effort/time going to waste; or player experiences misplacement of psychological presence when playing in social circumstances
Insufficient Perceived Value	Co-created value is perceived as insufficient by the actor as compared to the (required) invested resources during the service	Sole concentration in game (20) Requires too much resource investment (37) Playing is useless/senseless/childish (16)	Perceived value may decrease in service use as the challenge level increases; or the amount of invested resources may exceed gained value as perceived by the user

Table 2. Findings of Hierarchical Clustering Analysis

Value Contradiction

The first cluster, namely Value Contradiction, includes the largest set of constructs for potential value co-destruction, all with the common nominator of contradictive values emerging from service use. By value contradiction, we regard that value is co-created for a user while a different value is co-destroyed during or after the use of the service. Five out of 25 constructs emerged as the most focal based on the number of total occurrences in the data (3 occurrences each). First, being and appearing to others as a responsible person, parent, spouse, student, or supervisor was perceived to be contradicted when the user engaged in playing the game, as represented by the construct [Wanting to take care of responsibilities]. For example, a respondent experienced that playing the game was fun, but it took her away from her young child, which made her feel like a bad parent; therefore, continuing the game led to feelings of guilt. Furthermore, the excitement of playing contradicted values of safety and security when playing in traffic or late at night in the dark. Playing the game was also perceived to conflict with taking care of oneself or others and with being considerate of others' feelings, as in [Play takes time from other things in life] and [Playing excludes others]. For example, some respondents recognized their friends felt neglected if they had been playing the game in their company. Continuing to play led to a perceived contradiction with the value of friendship. Additionally, continuing to play the game was perceived as contradictory; a player may have wanted to quit the game but considered the ensuing loss of in-game achievements as a worse alternative. Therefore, the player experienced the feeling that quitting the game was not an option despite actually wanting to stop. Some respondents also felt that aiming to develop as a player and abiding by the rules of the game was frustrating, as skills did not play a key role in succeeding in the game. This was represented by the construct [Luck defines success too much]. Furthermore, some informants experienced the contradiction of being a

parent and restricting their children from constant playing and being a Pokémon GO player themselves, which was represented by the construct [Setting a bad example for kids].

Unmet Expectations

Three out of the five constructs emerged as the strongest (minimum of three hits in the data) in the second cluster, Unmet Expectations. We describe unmet expectations as an occurrence where a user's preconceptions remain unfulfilled during or after service use regardless of attempted co-creation. If the expected level of value gained from service was not reached, the user may have experienced value co-destruction. Some users' expectations appear to have formed according to value propositions made by the game provider. For instance, some respondents explained that the expectation of a fun team game was crushed because conflicts emerged among team members, as represented by the construct [Social conflicts with peers]. Players' unmet expectations had also been formed based on previous game experiences. For instance, one of the informants felt that too much social interaction was required after the *raid* feature was added to Pokémon GO, as represented by the construct [Increased meaning of teams and sociality in game]. For him, the new feature meant he could no longer play whenever he wanted, as he had become more dependent on other players. As he continued playing, he perceived a loss of independence. As the nature of the game had changed, this user could no longer experience fulfilment of expectations. However, some informants explained they had expected the game to evolve dynamically, as represented by the construct [The game evolves slowly]. They had experienced disappointment, as updates and new features had been implied by the game provider but were never put into practice.

Technical Challenges

In the third cluster, namely Technical Challenges, is described as occurrences where a user cannot co-create value during the service use due to resource integration being restrained by technical failure, damage or shortcomings, e.g., in the employed hardware, software or the environment. A total of three constructs emerged in this cluster, all of which were regarded as most emphatic within the cluster, each having three to five hits. The constructs reveal users of Pokémon GO experienced potential value co-destruction due to technical challenges related to in-game issues, dysfunctional devices, and the conditions of the physical environment: [Achievement of goals in game: no goals left to achieve], [Mobile device fails to function/collapses], and [Bad weather for playing outside]. Here, in-game technical issues, such as problems with the flow of the game, led to negative experiences. For instance, a player who had completed all levels or achieved all launched milestones described a perceived feeling of emptiness, as there was nothing left to achieve. In addition, technological challenges within the game led to the game collapsing at a critical moment. Such in-game issues were reported as causes of frustration. Furthermore, the cluster of technical challenges includes occurrences where a player's smartphone had collapsed or was physically damaged in the playing activity. This happening at a critical moment in the game may have led to perceived frustrations, which were aimed at the game provider or the player themselves.

Personal or Social Norm Conflict

The fourth cluster regards occurrences where self- or socially positioned norms conflict with the user's service usage, leading to self- and/or social disapproval during or after the service use. More specifically, the activity related to playing conflicts with prevailing social norms, "rules and standards that are understood by members of a group and that guide and/or constrain social behavior without the force of laws" (Cialdini and Trost 1998, p. 152), or personal norms, "the expectations people hold for themselves while underscoring that these expectations derive from socially shared norms" (Schwartz 1973). The cluster includes 12 constructs, five of which were included as emphatic, with seven to eight hits each. In each construct, a conflict between playing activities and predominant personal and/or social norms underlies potential value co-destruction. First, some informants reported of a worry that their personal image would suffer due to playing the game or being a part of the Pokémon GO community [Being assessed by others and put in a box]. Here, playing may have had a bad reputation and been negatively perceived by non-players, which the player perceived as damaging to his/her image. Some respondents explained that they did not want to be regarded as "one of the Pokémon GO players" and felt that being a Pokémon GO player did not fit the image of themselves they want to present, such as a being professional or a parent. One respondent expressed worry about not being taken seriously in the eyes of her subordinates if seen playing Pokémon GO. Some informants also described the activity of playing Pokémon GO as a conflicting activity

with the expectations they personally have of themselves [Personal values conflict with playing]. For instance, one informant noted that playing was actually not in line with her identity as a mother because she wanted to regard herself as not being the kind of person who would leave her children home and go out playing a mobile game. Whereas in rural areas, driving long distances had become a necessity for playing, which was conflicting for respondents because more physical exercise and less cost would have been preferred, as represented by the construct [Having to take the car to travel far for the game]. An emerging need to better control one's own playing was also mentioned, as perceived by several informants. Furthermore, as the construct [Need to control a child's playing] represents, the duty of monitoring and controlling a child's playing was perceived as challenging if the parent was an active player themselves. With respect to playing with children, challenges were also faced when other players were behaving inappropriately or in a disruptive manner, such as swearing or bullying others [Players behaving badly/disrespectfully]. Here, the self-formulated parental duties were challenged, as the parent was responsible for exposing his/her children to such misbehavior.

Effect of Constant Mobile Use

Fifth, the Effect of Mobile Use cluster holds negative service occurrences where value co-creation requires a user's constant attendance to the technology and/or the service, which reflects negatively on the actor and/or on the actor's relationships or environment during or after the service use. The cluster includes four constructs related to mobile device usage, three of which were selected as emphatic within the cluster, with seven to eight hits each. While playing the game, one may perceive an unwanted dependence on other players and technology, as represented by the construct [Dependence on technology and peers]. This was manifested as, for example, anxiety when meeting and communicating with strangers about the game. Some informants perceived they were excessively dependent on and/or addicted to their smartphone. Moreover, several respondents reported incidents where their non-playing family members were left as outsiders while the rest of the family went out playing. This was due to, for example, the non-playing family member's intentional non-playing and overall reluctance regarding the game. Similarly, a player could be left as an outsider in a non-playing group of friends or family members, which was represented by the construct [Being left as an outsider]. Such occurrences tended to hinder relationships. For instance, one informant explained that a rude atmosphere would take over the house if she talked about Pokémon GO with her child while her husband was listening. Another respondent explained that her partner did not tolerate her playing Pokémon GO. The respondent therefore ended up hiding her playing from him, which made her feel guilt and shame. Additionally, health disadvantages emerged from excessive playing, as some respondents experienced neck and back pain and increasing stress levels [Negative effects on health].

Absence or Loss of Resources

The Absence or Loss of Resources comprehends lack or loss of resources (e.g., time, effort, information or reputation) as experienced by the user before, during or after the service use. Five out of 11 constructs were selected as most significant in this sixth cluster, all with a minimum of nine hits in the data. The constructs represented players experiencing an absence or loss of resources due to the playing activity itself, for example, when playing took away resources needed to engage in social relationships and quality time was lost, as represented by the construct [Psychological presence with loved ones suffers]. As playing evidently requires the integration of a player's resources to co-create value, we found that players typically expected to invest a particular amount of time or money. If the expected amount of resource investment was exceeded or if value was not co-created as expected, the player may have experienced loss of resources. For example, if a player had walked for a long time to hatch an egg only to notice s/he had forgotten to switch on the Pokémon GO app, s/he experienced loss of invested resources. Several informants explained that in cases where walked kilometers went unnoticed by the game, they felt that all the effort (time and work) had gone to waste. This was also the case for the informants who suggested they initially played the game to motivate more physical exercise. Moreover, as the game's degree of difficulty increased over time, more time was required [Playing becomes more difficult over time], which in some cases was also perceived as a loss of resources.

As the distribution of information in Pokémon GO is vital for more success in the game, lack of information resources was experienced as a trigger of potential value co-destruction. Furthermore, lack of acceptance by non-players, which was manifested as negative comments, for example, was noted by several

respondents [Outsiders' negative preconceptions of the game]. However, players' lack of knowledge and experience appeared to attract bullying and misbehavior on the part of higher-ranking or more knowledgeable players. It was also evident that some players were disregarding and intentionally excluding children and elderly players from group playing. This led to some informants perceiving a lack of acceptance by other players. Furthermore, as some players always played in groups, competing groups started to recognize competitors' physical appearances and vehicles. Such loss of anonymity was experienced as a potential security threat. For example, one of the respondents shared an experience she had where competitors had recognized her group's car and started to follow it. Finally, lack of social unity was reported as potentially leading to experienced value co-destruction. For example, a respondent explained that playing the game made her feel lonely, as she perceived a lack of community.

Insufficient Perceived Value

In the Insufficient Perceived Value cluster, the user experience is that the co-created value is insufficient with respect to invested resources during the service use. Three out of four constructs emerged as most empathic in the seventh cluster: [Requires too much resource investment] with 37 hits in the data, [Sole concentration in game] with 20 hits, and [Playing is useless/senseless/ childish] with 16 hits. This cluster captures the idea of suboptimal co-creation outcomes, leading to potential value co-destruction for players. Inequality issues emerged because the game did not offer equal opportunities for all players. For instance, as playing became more demanding over time, the pursued value became insufficient making the user consider discontinuing the service use.

Some informants reported a lack of *PokéStops* in rural areas, which meant that in those areas players could not obtain the *Pokéballs* required for the core activity of the game (catching Pokémon characters). Informants explained that they may therefore have had to travel long distances to continue playing, as playing was practically disabled in their area. They had experienced that their value co-creation attempts did not lead to sufficient perceived value that would balance the excessive amount of invested resources. Moreover, as Pokémon characters had become increasingly difficult to catch over time, some players felt frustrated and that value (i.e., fun) could not be co-created as attempted. Furthermore, some informants reported that playing was inherently senseless, and therefore the need to invest resources was perceived as an unnecessary everyday strain with insufficient perceived value.

Discussion

We conducted laddering interviews with 43 Pokémon GO users. Based on our analysis of the data, we proposed a classification of reasons for users' value co-destruction in AR mobile games (Table 2). The classification indicates that value co-destruction for users occurs due to seven distinct yet potentially interlinked clusters of reasons: 1. Value contradiction, 2. Unmet expectations, 3. Technical challenges, 4. Personal or Social Norm Conflict, 5. Effect of Constant Mobile Use, 6. Absence or Loss of Resources, and 7. Insufficient Perceived Value. Each of these clusters is comprised of three to five focal constructs. Our classification sheds light on the value co-destruction phenomenon from a customer-centric viewpoint.

Our findings suggest that users may experience value contradictions while playing the game. Our findings thus support the idea that value can be simultaneously co-created and co-destroyed by the user in service use (Vartiainen and Tuunanen 2016). Moreover, our findings support the arguments of Vargo et al. (2017) that to promote co-creation, service providers ought to consider users' potential value dimensions and both the positive and negative sides of emerging value. Our findings suggest that in using AR mobile games, a contradiction between a user's personal identity-related values may become critical for value co-destruction. This extends the findings of Tuunanen et al. (2010), who state that construction of identities is a focal system value proposition promoting value co-creation for users. According to our findings, it appears that identities may also be co-destroyed through the use of Pokémon GO. For instance, a respondent lied to their spouse about going to a Pokémon GO event because the spouse had previously expressed non-appreciation of playing. Thereupon, the respondent experienced a contradiction between his/her identities as a Pokémon GO player and a spouse and the values related to those identities, for example, excitement vs. honesty. Therefore, we suggest that aiming to understand users' values and potential value contradictions is potentially an important issue in service design and provision. Furthermore, Tuunanen et al. (2010) emphasize the importance of users' service experience as a driver of value co-creation. Our findings indicate that value co-destruction may also occur due to technical challenges and constant mobile

use with regard to physical and virtual complications related to the technical service process. We therefore propose that users' service experience also plays a critical role in value co-destructive outcomes in AR mobile games.

Edvardsson et al. (2011) state that value co-creation is affected by the social context in which actors operate, along with a set of values and norms. We found that AR mobile games may trigger conflicts with social norms as well as with personal norms, which may lead to perceived value co-destruction. More particularly, we found that such norms were sometimes in conflict with the playing activity, for instance when a user played the game while driving a car despite this setting a bad example for their children, which made them feel disappointed in themselves as a parent. Although the value co-destruction literature has addressed the effect of conflicts or violations of social or cultural norms on value co-destructive outcomes (e.g., Chowdhury et al. 2016; Daunt and Harris 2017; Prior and Marcos-Cuevas 2016), no distinction has been made between personal and social norms. Our findings reveal the potential for value co-destruction rooted in both personal and social norm conflicts. Therefore, we encourage further research in this area to obtain a deeper understanding of users' value co-destruction experiences. We predict such efforts may provide researchers and practitioners with an improved understanding of the service user perspective in social contexts.

Furthermore, a shift in focus from the dyadic experience between customer and provider toward the shared experience between those present in the service encounter has emerged in the service experience literature (Carù and Cova 2015). Carù and Cova (2015) state such collaborative service experiences are shaped either positively or negatively by the actors present in the encounter. Our findings support this idea, and we further suggest that non-users may affect the service experience (e.g., by their physical presence) of a user engaging with an AR mobile game. We found that in such occurrences, a conflict with social norms may potentially lead to perceived value co-destruction for the user. The current value co-destruction literature has investigated services in dyadic relationships (e.g., Echeverri and Skålén 2011; Robertson et al. 2014), interfirm relationships (Prior and Marcos-Cuevas 2016), or from a user community and provider perspective (e.g., Camilleri and Neuhofer 2017). However, the literature is silent on non-user-driven value co-destruction for service users. As non-users and onlookers do indeed influence users' ways of engaging with technology (Sergeeva et al. 2017), we suggest researchers investigate the role of non-users in the context of value co-destruction in future studies.

Our findings indicate that value co-destruction may also occur due to critical issues with service provision and value realization. Here, value propositions constructed by either the user and/or the provider were inconsistent with the outcome of the process, potentially leading to insufficient perceived value. We found that users may experience absence or loss of resources potentially due to inadequate service design/implementation or users' intrinsic issues, such as lack of time or skills. Earlier studies have pointed out that users' lack of resources (Robertson et al. 2014), such as knowledge, or perceived loss of resources (Neuhofer 2016) may lead to value co-destruction. We found that such issues may occur, for example, due to the lack or insufficiency of distributed information on the part of the provider. In the same vein, Baumann et al. (2017) found that a communicative incongruence in value proposition and sought value— i.e., the provider failing to communicate the intended value proposition to the customer—could negatively affect the customer's value co-creation experience. Our findings reveal lack of information as a perceived reason for potential value co-destruction. This extends the findings of previous studies implying that by improving communication (Baumann et al. 2017) and fostering transparency (Im and Qu 2017) between users and providers, potentially negative value co-creation outcomes may be rectified. For instance, a provider's prompt announcements about recent and upcoming developments and reacting to users' feedback and suggestions may prevent distorted user expectations and insufficient perceived value.

Altogether, our study contributes to the extant literature of value co-destruction in different levels. In addition to building an in-depth understanding of users' experienced value co-destruction in AR mobile games, the proposed classification reveals seven different experiential ways in which users may reason value co-destruction. The classification of users' reasoning to value co-destruction is a novel approach, as previous literature has mainly considered the value co-destruction from a dyadic, organizational or community perspective. Moreover, the classification depicts value co-destruction triggering constructs within a service use experience, underlining the complexity of users' resource integration and service experience as a driver of value co-destruction. Thus, our study takes a more detailed, in-depth approach in comparison to that taken by previous literature. We have also presented considerations that are new to the

extant literature and relevant for the understanding of value co-destruction, e.g., the effect of conflicting personal norms, the non-users (onlookers) and lack of information. Furthermore, we have shown that the laddering interview technique offers a purposeful set of tools for data inquiry regarding not only value co-creation but also co-destruction and co-destroyed values.

Conclusions

The existing SDL literature focuses mainly on explaining the positive co-creative side of interactions between service systems and therefore tends to overlook processes with negative outcomes. The emerging discussion around the notion of value co-destruction aims to address this shortcoming, but this literature is still in its infancy (Lintula et al. 2017). A few studies have used a conceptual approach to examine value co-destruction (e.g., Plé and Chumpitaz Cáceres 2010) or have used an empirical approach (e.g., Echeverri and Skálén 2011; Robertson et al. 2014; Smith 2013; Worthington and Durkin 2012), but the concept remains unclear. More research and theoretical development has been called for (Kuppelwieser and Finsterwalder 2016; Plé 2017).

We have attempted to answer this call by investigating the value co-destruction phenomenon in the context of AR mobile games. We conducted a qualitative study and looked at users' value co-destruction experiences in a particular AR mobile game, Pokémon GO. Our data collection was based on laddering interviews (Reynolds and Gutman 1988; Peffers et al. 2003) (n=43) with Pokémon GO players regarding their actual value co-destruction experiences. Employing a hierarchical clustering analysis, we shed light on users' subjective reasons for value co-destruction experiences and found that value co-destruction occurs as a result of at least seven types of reasoning: 1. Value Contradiction; 2. Unmet Expectations; 3. Technical Challenges; 4. Personal/Social Norm Conflict; 5. Effect of Constant Mobile Use; 6. Absence or Loss of Resources; and 7. Insufficient Perceived Value-in-use. In this paper, we have given examples of each reasoning cluster along with their most focal constructs emerging in our data.

Our findings support the idea that in the SDL literature, scholars need to look at co-destruction of value as well as the co-creation of value. Previous studies on the critical aspects of AR mobile games have mainly focused on the impacts on individuals' physiological and psychological well-being (e.g., Ayers et al. 2016; Raj et al. 2016; Serino et al. 2016) and influence on society (e.g., Faccio and McConnell 2018) but have not considered why these negative occurrences happen from the user perspective. To our knowledge, our study is the first to apply the SDL lens in the context of AR mobile games and to examine playing activities as value co-creation and/or value co-destruction occurrences from the user perspective.

We conducted laddering interviews with 43 Pokémon GO users and showed that the laddering interview technique offers a purposeful set of tools for data inquiry on value co-destruction. Based on our analysis of the data, we proposed a classification of reasons for users' value co-destruction in AR mobile games (Table 2). The classification indicates that value co-destruction for users occurs due to seven distinct yet potentially interlinked clusters of reasons: 1. Value contradiction, 2. Unmet expectations, 3. Technical challenges, 4. Personal or Social Norm Conflict, 5. Effect of Constant Mobile Use, 6. Absence or Loss of Resources, and 7. Insufficient Perceived Value. Each of these clusters comprised three to five focal constructs. The classification sheds light on the value co-destruction phenomenon from a customer-centric view point and contributes with new considerations to the previous knowledge of value co-destruction. As previous literature has taken a dyadic, organizational or community perspective on the phenomenon, we take a novel, more in-depth approach classifying users' experiential value co-destruction reasoning. Furthermore, we present considerations that are new to the extant literature and relevant for the understanding of value co-destruction, e.g., the effect of conflicting personal norms, the non-users (onlookers) and lack of information.

The findings of our study can inform service providers who utilize emerging technologies, such as AR and virtual reality. Gaining insights about value co-destruction in services mediated by such technologies is particularly important because value co-destruction may have more severe consequences in both the physical world and the virtual world compared to the consequences triggered by using fully virtual services in closed settings. Our classification of users' reasons for experienced value co-destruction showcases that attempted value co-creation may lead to value co-destruction due to seven distinct types of reasoning. The classification depicts critical service interaction components that ought to be addressed by, for example, preventive actions in service provision. For instance, unmet expectations ought to be addressed by extended information provision and/or improved service implementation. Likewise, potential value contradictions

ought to be considered from different user perspectives to develop the service toward becoming a less contradictory process for users. Service providers may derive new insights from our findings and classification for improved service design, implementation, and provision. Furthermore, an improved understanding of users as active co-creators (and co-destroyers) of value may be attained.

We recognize that our study has some limitations. First, all our informants were predominantly playing Pokémon GO in a demarcated geographical area. The game utilizes location data and is richer in material in areas of higher population density and poorer in rural areas. Therefore, our findings may not be generalizable to all geographical and cultural contexts. Second, we investigated service interactions in a particular AR mobile game; therefore, our findings may not be generalizable to all AR mobile games. However, we believe that Pokémon GO represents typical AR mobile games and provides an interesting case for this study, as its users are well distributed in various age and socio-economic groups. It is also likely the best known and most widespread AR mobile game. Based on our research design, we were able to study users who were actively co-creating and co-destroying value. Therefore, our data was not biased by negative experiences of users who generally disliked or stopped using the service. Third, the laddering interview technique as a data collection method is subjective by nature. However, as our study explores an emerging phenomenon, the technique enabled us to collect rich data and to follow up on emerging value co-destruction triggers in the interviews.

We propose three future research directions—conceptual development, process understanding, and the dimensions of effect. First, to gain a holistic understanding of services and value co-creation, more research is needed to conceptualize value co-destruction within the emerging SDL paradigm. It remains unclear whether value co-creation and co-destruction are flip sides of the same phenomenon or if they are rather distinct. The conceptual understanding of value co-creation ought to be harnessed further in the design of new systems and services. We propose that understanding the actual components of the value co-destruction process will be key for finding ways to inhibit its occurrence in AR and other smart services. A process model for value co-destruction could be utilized in the investigation of, for example, the dynamic nature of co-destruction and the most critical components of the process by researchers and service providers. Second, research is needed to investigate which parts of the service process are particularly prone to value co-destruction and whether the process components or their relationships differ in different types of services. In turn, practitioners could use the process model in mapping value co-destructive service components and critical bottlenecks within service provision and subsequently rectify identified issues. Finally, this study and other recent studies have started to shed light on value co-destruction and have found negative effects on individual, relationship/community, and societal levels. All levels could be further investigated, as they complement the evolving understanding of the phenomenon. Furthermore, future research might combine these levels and aim at establishing a multi-level understanding of value co-destruction. Here, an ecosystem perspective may be useful in accounting for effects on multiple stakeholders and complex service systems.

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V

**VALUE CO-DESTRUCTION MECHANISMS IN
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by

Lintula, J., Tuunanen, T., Salo, M., Zhang, Y. & Myers, M. D.

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