SANNA KETONEN-OKSI

The Role of Social Media in Value Cocreation and Innovation in Service Ecosystems

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ACADEMIC DISSERTATION
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To my daughters Peppi and Mettenoora, with all my love ♥

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When I was starting this dissertation work, my only goal was to challenge myself with new knowledge and new ways of thinking. I did not have any academic ambitions and did not give much of a thought for structuring a clear and effective research design. I was simply interested in exploring new ways to approach innovation development. With M.A. in French language and culture (Turku University), including a strong minor in tourism studies (University of Eastern Finland, FUNTS), it seemed to me that my biggest challenge would be in finding such a doctoral programme where my previous degree would be accepted. Little did I know! For that reason, I want to express my gratitude to a number of people who helped me during my PhD studies and in finalising this dissertation:

Early in my career, I had the honour to work at the forefront of Finnish tourism research and further education, at the University of Eastern Finland. I am forever grateful to Professor emeritus Timo Toivonen and Mrs. Ulla Nikulainen, you both always believed in me and encouraged me to continuously challenge myself. I still felt your support while working on this dissertation.

Eventually, in 2013, encouraged by my former colleague and present co-author Docent Harri Jalonen (Tampere University), I found myself talking to Dean Antti Lönnqvist (Tampere University), at that time working as a Professor in Knowledge Management in Hervanta. With the support from you two, a few months later, I was accepted as a PhD student in the Doctoral Programme in Business and Technology Management, and I also received my first (out of three) full-year grant from Jenny and Antti Wihuri Foundation. For this, I am sincerely grateful to you both – and to the unknown reviewers of my grant application.

With my first supervisor, Professor Hannu Kärkkäinen, I was introduced to crowdsourcing and to social network analysis. It was a great learning experience, thank you. I am also grateful to M. Sci Jani Multasuo and PhD Jari Jussila for your precious help during my first research analysis and publication process. A special thanks go to Jari for all the peer support I had from you during my first two years as a doctoral student. It was both insightful and a great pleasure.

No later than when working on my third publication, I started to have some serious doubts about my research approach. For me, studying the use of social media

in the development of complex industrial products was too narrow and I wanted to have a more holistic approach to innovation. By chance, while attending the 25th Summer School in Technology Management (Twente University, the Netherlands) in summer 2015, I met PhD Johan Netz (Karlstad University) and got introduced to service-dominant logic. With one thing leading to another, I ended up doing two mind-blowing study visits to the Service Research Center (CTF) at Karlstad University in Sweden. Both the summer school and the first study visit were funded by the Foundation for Economic Education. Thank you.

A special thank you to Dean Henrietta Huzell, PhD Nina Löfberg and PhD Kaisa Koskela-Huotari for providing me an office and for all the welcoming social events and great learning experiences during my visits to Karlstad. During my first visit, I learned about the differences between service-dominant logic and servitisation. During my second visit, I attended CTF's annual conference on service innovation and I also had the opportunity to join Kaisa and Professor Stephen Vargo (University of Hawaii) in their private debates regarding the evolution of markets. I was really excited about all the encounters, thank you so much for all of you brilliant researchers I had the chance to talk to during my visits. Above all – Kaisa, you really rock! I did not understand half of the insight you exposed me with during my visits, but I am forever grateful for all the effort and time you put on me. Thank you.

Soon after my first visit to Karlstad, I started to apply service-dominant logic as the theoretical framework of my research. I was also appointed with a new supervisor, Professor Nina Helander, with whom I started working with at VALIT, a research project developing tools for value creation measurement and management within the context of business relationships. Later on, we also worked together at DEEVA, a research project developing novel practices of value creation with social media data. Both our collaborations and my second study visit to Karlstad were funded by Business Finland. Nina, I am sincerely grateful for all your patience and support in finalising this dissertation. I learned a lot working with you. Thank you.

Lastly, I would like to express my gratitude to Adjunct Professor Marja Toivonen (University of Helsinki) and Professor Bo Edvardsson (Karlstad University). You were essentially helping me out in my pursuit to find the focus of my research, and I was overwhelmed by your constructive feedback and advice. I really appreciate it. I could not have had better pre-examiners! I also want to thank Professor Miia Martinsuo for the last-minute feedback that helped me to put an end to my work.

Changing the theoretical approach was not easy, and it was only in my last publication that I managed to apply it successfully. Even so, I learned a lot about service-dominant logic only when working on with this summary, all articles being

published. This certainly had an impact on the outcomes of this dissertation. At the end, however, this doctoral dissertation served me well in providing me with new knowledge and understanding to build on in the future. Hence, a special thank you to Jari, Jukka, Vilma, Heli, Katri and all the other research fellows and other great people whom I met and 'coupled' with (see Figue 3, page 47) during my studies. I am grateful to all of you. After all, as stated by the Professor Osmo A. Wiio (1928-2013), '*It is possible to predict technology development, but not, what it will mean in people´s lives*'. Indeed, by first understanding how social media impacts our perceptions and practices of value creation and innovation, I have learned a lot about the role of social technologies in shaping our societies in overall. With my decision to accomplish 20 extra credits of futures studies (Turku University, FFA) as an extension of my PhD studies, I also found myself a new professional goal: to continue my research on innovation ecosystems as an integral part of developing organisational futures orientation.

Lastly, I could not have succeeded in this journey without the support of my friends and family. For many of you, near and far, I have not been much of a friend lately and I hope to spend more time with you in the near future. Most importantly, Docent Mari Krappala, a great friend who helped me most when I was getting started, and Minna Saariketo, my fellow PhD student with whom I have shared many ups and downs as peers – thank you so much! Above all, a huge thank you to Mervi Huhtelin who's been the best possible peer support a doctoral student can imagine: always there, boosting faith and looking for solutions when I was desperate, and reminding me of the great work I have already done. Now it's my turn to help you to finalise your dissertation. Ladies, I am blessed to have friends like you.

Most importantly, I want to thank my parents Marketta and Martti, my husband Jarmo and my daughters Peppi and Mettenoora. Marketta and Martti, thank you for all your love and faith in me. Always. Jarmo, thank you for letting me put all this time and effort in my PhD studies. Whatever work load you had yourself, you always helped in taking care of our children when I was too busy with my deadlines. This was an important journey for me, not only professionally, but in many other ways. Thank you for believing in me all the way through. Peppi and Mettenoora, my awesome daughters, what I hope you learned during this process is to always believe in yourselves and to make an effort to find your own passion. I love you all.

Tampere 1.4. 2019

Sanna Ketonen-Oksi

ABSTRACT

Given the scope, size and speed at which technological innovations and development occur in today's world, unprecedented impacts on human behaviour and society have emerged. In light of the resultant increasing dynamism and complexity of modern business environments, many solutions are becoming increasingly dependent on their broader institutional alignments and on specific actors. Seeing organisations as dynamic and nested systems with a multiplicity of interrelated components that make the systems self-organised and continuously self-renewing, elaborating and conceptualising the role of digital technologies has become an endogenous part of knowledge and value creation.

From a business perspective, more holistic knowledge and understanding are needed regarding the impacts of modern social media-based communication and its implications on the explicit, symbolic and social structures of value creation. In fact, considering that the social media platforms are strongly reclaiming their position as active participants in the network formation, it is largely suggested that technology should no longer be limited in its conceptualisation as a content provider or as a context only, but rather as a combination of them both.

In this dissertation, the focus is set to understand the impacts of online social networks on supporting the multi-actor collaboration in innovation – that is, to understand the relationships between the concepts of value cocreation, innovation and ecosystems. Hence, based on the theoretical foundations of service-dominant logic, and by thus referring to ecosystems as the structures for engagement and interaction through joint knowledge creation and exchange, the following two individual, yet interconnected research questions are initiated: 1) 'How does social media enhance the organisational practices of value cocreation in innovation?' and 2) 'How does social media enhance value cocreation and innovation in ecosystems?'.

On the one hand, there is an emerging need to understand the ways how to use social media to enhance value cocreation in real-life settings. Hence, the first research question studies innovation as a firm-centric activity and considers social media as a set of technologies that are used to enhance the development of novel value cocreation practices. On the other hand, by highlighting the importance to understand why social media is so important for innovation, the second research

question shifts the focus to social media as a resource capable of acting on other resources and thus as a critical 'push' for value cocreation and innovation in ecosystems. By representing a case example of qualitative research with an interpretivist research approach, this dissertation brings forth a multiplicity of perspectives and meanings related to the studied phenomena.

Finally, five main propositions are produced to summarise the various results of the individual publications. According to these results, social media proves to play a key role in increasing a) the liquification and density of resources available for service exchange and b) the institutional complexity in resource integration. However, the level of understanding value cocreation as a process that extends the context of innovation beyond firm-specific activities is very low, and the development of innovation activities largely depends on the ecosystem actors' abilities to engage themselves in co-experiencing and co-defining their system-specific values, rules, and value cocreation practices. Major improvements are needed to support the more advanced utilisation of social media in resource exchange and integration. Therefore, a three-level approach to social media is presented as a framework to challenge the deeply rooted, preconceived attitudes and mindsets regarding the role of social media in value cocreation and innovation.

TIIVISTELMÄ

Runsaan vuosikymmenen aikana tapahtuneen merkittävän teknologiakehityksen myötä modernit liiketoimintaympäristöt ovat muuttuneet yhä dynaamisemmiksi ja kompleksisemmiksi. Tämä on johtanut siihen, että lukuisat organisaatiokohtaisetkin ratkaisut ovat yhä useammin sidoksissa niitä itseään huomattavasti laajempiin, erilaisia toimijoita yhteen tuoviin systeemisiin kokonaisuuksiin sekä niitä ohjaaviin erilaisiin institutionaalisiin linjauksiin. Samaan aikaan digitaalisten teknologioiden hyödyntämisellä on todettu olevan ennennäkemättömiä vaikutuksia niin ihmisen käyttäytymiseen kuin yhteiskuntaan yleisesti ottaen.

Tämän eräänlaisen keskinäisriippuvaisuuteen sekä itseohjautuvuuteen nojaavan systeemisen muutoksen kasvaessa kiinnostusta ovat herättäneet erityisesti sosiaalisen median liiketoiminnalliset vaikutukset sekä erilaiset sosiaalisen median innovaatiotoimintaa tukevat symboliset ja sosiaaliset rakenteet. Toisaalta, lukuisat uudet teknologiainnovaatiot ovat nostaneet esille myös ajatuksen siitä, ettei sosiaalisia teknologioita tulisikaan enää nähdä vain uudenlaisina toiminta-ympäristöinä tai sisällöntuotannon välineinä, vaan jopa ihmisen toiminta ohjaavina aktiivisina toimijoina. Niinpä tämän väitöskirjatutkimuksen tavoitteena on ymmärtää, millaisia vaikutuksia sosiaalisella medialla on ollut arvoluonnin yhteiskehittämisen, innovaatiotoiminnan ja ekosysteemin käsitteiden välisten suhteiden kehittymiselle - niin teoriassa kuin käytännössä. Väitöskirjatutkimus nojaa ns. palveluperustaisen logiikan (engl. service-dominant logic) teoreettiseen viitekehykseen.

Yhteensä viidestä yksittäisestä julkaisusta muodostuvaa artikkeliväitöskirjaa ohjasivat seuraavat, toisiinsa kytkeytyneet tutkimuskysymykset: 1) 'Miten sosiaalinen media lisää arvonluonnin yhteiskehittämisen käytänteitä organisaatiotason innovaatioprosesseissa?' ja 2) 'Miten sosiaalinen media tukee arvonluonnin yhteiskehittämistä ja innovaatiotoimintaa monia eri toimijoita yhteen kokoavissa ekosysteemeissä?'. Siinä missä ensimmäinen tutkimuskysymys pyrkii ymmärtämään, miten sosiaalista mediaa voidaan hyödyntää organisaatioiden innovaatiotoiminnan uudenlaisena välineenä, toinen tutkimuskysymys pyrkii rakentamaan ymmärrystä siitä, miten sosiaalisen median käyttö on vaikuttanut arvonluonnin yhteiskehittä-misen ja innovaatiotoiminnan käytänteisiin erilaisissa toimijaverkostoissa.

Tämän laadullisen, tulkintaan perustuvan väitöskirjatutkimuksen nojalla näyttää vahvasti siltä, että sosiaalisen median käyttö on a) kasvattanut merkittävästi niin arvonluonnin yhteiskehittämistä tukevien resurssien saavutettavuutta kuin kokonaismäärää sekä b) tukenut arvonluonnin yhteiskehittämiseen tarjolla olleiden resurssien laaja-alaista hyödyntämistä. Toisaalta ymmärrys yhteisarvonluonnin prosessimaisesta luonteesta on vasta hiljalleen muotoutumassa ja sosiaalisen median hyödyntämisessäkin riittää vielä parantamisen varaa. Esimerkiksi ekosysteemi-tasoisen innovaatiotoiminnan kehittyminen riippuu pitkälti toiminnassa mukana olevien toimijoiden sekä kyvystä että uskalluksesta asettaa jo olemassa olevia arvojaan, kokemuksiaan ja toimintamallejaan uudelleen arvioitavaksi kullekin uudelle systeemille tarpeellisella tavalla. Väitöskirjan keskeisimpänä tuloksena onkin viisi-vaiheinen prosessikuvaus siitä, kuinka yhteisarvonluontia tukevia toimintamalleja on mahdollista kehittää niin organisaatiokohtaisesti kuin ekosysteemitasolla. Lisäksi väitöskirjan lopussa esitellään kolmiportainen viitekehys, jonka avulla organisaa-tioiden on mahdollista haastaa niiden toimintakulttuureissa ja -tavoissa syvälle juurtuneita, ennakkoluulojen pölyttämiä asenteitaan ja ajattelumallejaan. Ne kun saattavat nykyisellään estää sosiaalisen median todellisten mahdollisuuksien realisoitumisen innovaatiotoiminnassa.

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ORIGINAL PUBLICATIONS

I   Ketonen-Oksi, S., Multasuo, J., Jussila, J., & Kärkkäinen, H. (2014). Social Media Based Value Creation in Innovation Community in Mechanical Engineering Industry. Proceedings of European Conference on Social Media (ECSM) 2014. Brighton, UK. Academic Conferences and Publishing International Limited, 2014. pp. 649-655

II   Ketonen-Oksi, S., Kärkkäinen, H. & Jussila, J. (2016). How can crowds be used in developing complex industrial products? An analysis of factors impacting the usefulness of crowdsourcing outcomes. International Journal of Business Innovation and Research. Vol 14, Issue 4, pp. 460-478.

III   Ketonen-Oksi, S., Jussila, J. & Kärkkäinen, H. (2016). Social Media Based Value Creation and Business Models. Industrial Management & Data Systems. Vol. 116, Issue 8, pp. 1820-1838.

IV   Ketonen-Oksi, S. (2016). Reinventing organisational creativity and innovation through adapting a service-based working culture. In 'Integrating Arts and Creativity into Business Practice' (Eds. Schiuma, G. & Lerro, A.), IGI Global Book, 2016, pp. 1-20.

V   Ketonen-Oksi, S. (2018). Creating a shared narrative: The use of causal layered analysis to explore value co-creation in a novel service ecosystem. European Journal of Futures Research. Vol 6, Issue 5, Available online at https://doi.org/10.1186/s40309-018-0135-y.

In Publication I, the research data (i.e. the netnographic data that had been collected from online discussions and the interviews) had already been collected by the co-authors. The author did however have an active role in making and interpreting the data analysis and in writing the conference article, in close collaboration with and guided by the co-authors.

In Publication II, the author was also alone in charge of the writing and review processes, but the research objectives were set, and the theoretical approach was chosen as a result from joint planning and discussions with the co-authors. The analysis was based on the same data as in Publication I, except that the data was reinforced with additional interviews conducted by the author.

In Publication III, originally planned as a self-study whereby the author could form a more holistic view on the studied phenomenon, the author did collect alone the entire data (first in 2014, and with updates in 2015). The first analysis and manuscript were accomplished in collaboration with the co-authors. However, during the required two rounds of major revisions, the author did eventually reconstruct the entire theoretical framework, including its implications on results, discussions and conclusions.

Publications IV and V were initiated and produced by the author alone, with no co-authors. Publication IV, published as a book chapter, was based on a conference paper published in the proceedings of the International Forum on Knowledge Asset Dynamics (IFKAD) 2016. The author was personally invited by the book editors to submit in the book. Publication V was based on the researcher's conference presentation at Futures of a Complex World -conference in 2017, and later selected to be published in the journal.

1 INTRODUCTION

In this first chapter, both the motivation and aims of this study are presented. Firstly, the overall motivation for this research is explained, vis-à-vis the emerging need for a more systemic understanding of value cocreation and innovation. To do this, an evolutionary overview of the sociotechnical transitions shaping societies and businesses is also provided in order to raise the importance and extent of the ongoing system change. In particular, the breadth and depth of the recent development of individual technologies are discussed, thus highlighting the growing importance of understanding the impacts of social media on value cocreation and innovation. Secondly, the research aim and the research questions of this dissertation are introduced. This includes a description of the scope and major limitations of this research. Finally, the research strategy as well as the outline of the study are presented.

1.1 Research motivation

1.1.1 A more dynamic view on innovation

The scope, size and speed at which technological innovations and development occur in today's world are growing exponentially (Schwab, 2017), with unprecedented impacts on human behaviour and society (Park, 2017; Schwab, 2017). For example, with the recent development of digital information and communication technologies (Cormode & Krishnamurthy, 2008), dramatic changes have taken place in the ways people interact and communicate with one another (Kaplan & Haenlein, 2010; Akaka & Vargo, 2014). Moreover, in light of the resultant increasing dynamism and complexity (Capra & Jacobsen, 2017; Akgun, Keskin & Byrne, 2014; Casti, 2012) of modern business environments (Koskela-Huotari, 2018; Whalen & Akaka, 2016), many solutions are becoming increasingly dependent on

their broader institutional alignments and on specific actors (Wieland, Hartmann & Vargo, 2017; Mazzucato, 2018).

By referring to the 'configurations of people, technology, and value propositions' (Akaka & Vargo 2014, p. 368) that are both internally and externally connected through the sharing of information (Akaka & Vargo 2014), growing attention is now being paid to the integration of various kinds of sociotechnical systems (Spohrer & Maglio, 2008; Ostrom, Parasuraman, Bowen & Vossl, 2015; Gustafsson et al., 2015) and approaches (Vargo & Lusch, 2011), encompassing many disciplines and industries (Ostrom et al., 2015; Gustafsson et al., 2015; Singaraju et al., 2016; Hellström & Mäenpää, 2017). In fact, this emerging need for a more dynamic view of businesses, i.e. markets (Koskela-Huotari, 2018; Whalen & Akaka, 2016) and innovation (Adner & Kapoor, 2010; Still, Huhtamäki, Russell & Rubens, 2014; Koskela-Huotari et al., 2016; Aal, Di Pietro, Edvardsson, Renzi & Guglielmetti Mugion, 2016) has been recognised by actors from both the private and public sectors. (Kijima, 2015; Toivonen, 2015). Furthermore, as stated by Adler (2015), 'the most successful businesses of the future will not only have knowledge of the ecosystems in which they operate, but [it] will play an important role in shaping – and […] reshaping those ecosystems' (Adler, 2015 p. 44).

In order to maintain their competitiveness, network-specific innovation capabilities have become a lifeline for many companies (Valkokari et al., 2016). The term innovation has most commonly been used to describe either a) the formation of something original, unexpected and contextually useful (Sternberg, 2006), b) a new idea, device or method or c) the application of new value creating products, processes, services or technologies (Vargo et al., 2015; West & Farr, 1990). With an excessive raft of studies, for example, on product and service innovation (Djellal, Gallouj & Miles, 2013; Witell, Snyder, Gustafsson, Fombelle & Kristensson, 2016), open innovation (Gassman & Enkel, 2004; Chesbrough, 2011; Sang, Lee & Olsson, 2012) and creativity in innovation (Amabile & Kramer, 2011; Anderson, Potocik & Zhou, 2014), the term innovation has been rather limited to its use in explaining the successful implementation of creative (Sternberg, 2006) ideas within an organisation (McLean, 2005). Indeed, ever since the Schumpeterian notion of creative destruction in the 1950s – referring to the process of creating something new to replace something old – (Reinert & Reinert, 2006), a number of definitions have been introduced to describe the concept of innovation (Koskela-Huotari et al., 2016; Anderson, Potocnik & Zhou, 2014; Angle, 1989). Moreover, the research has mainly focused on companies representing the manufacturing or high-tech industries (Djellal et al., 2013; Fagan, 2014).

In order to replace the former conceptualisation of innovation as a firm-centric activity (West & Gallagher, 2006; Chesbrough, 2010; Simula & Vuori, 2012), an increasing emphasis on the cocreation of shared value is emerging (Ramaswamy & Ozcan, 2014; Calvagno & Dalli, 2014). In fact, significant steps have already been taken to reopen the debate about the relationship between innovation and value creation, along with remodelling the former solutions-based innovation policies and practices (Schwab, 2017; Mazzucato, 2018). As a result, elaborating and conceptualising the role of digital technologies has become an endogenous part of knowledge and value creation (Edvardsson et al., 2011; Wagner, Vollmar & Wagner, 2014) and of ecosystem evolution (El-Darwiche, Hertzog, Singh & Malouf, 2018; Serrat, 2017). By thus referring to technology as potentially useful knowledge that provides solutions to both novel and existing problems (Akaka & Vargo, 2014; Vargo et al., 2015), as well as an instrument through which social structures can be reproduced, a growing number of researchers have suggested that technology should be considered both as an outcome and as a medium of value creation (Akaka & Vargo, 2014; Breidbach, Kolb & Sinivasan, 2012; Edvardsson, Tronvoll & Gruber, 2011).

Nevertheless, the current perceptions of the interrelations between the various components representing both society and business are still far too limited (Barile, Lusch, Reynoso, Saviano & Spohrer, 2016; Järvi & Kortelainen, 2017). From a business perspective, more holistic knowledge and understanding are needed regarding the impacts of modern social media-based communication and its implications on the explicit, symbolic and social structures of value creation. As companies have become more and more dependent on their abilities to engage themselves in large, global networks of value creation, an urgent need to redefine actor-specific roles (Hanna, Rohm & Crittenden, 2011; Romero and Molina, 2011) and market practices (Kartemo, Kowalkowski & Edvardsson, 2018; Helkkula, Kowalkowski & Tronvoll, 2018) is now emerging.

1.1.2   Sociotechnical transitions shaping societies and businesses

The human tendency to associate in social groups and to form cooperative societies cannot be overestimated (Malaska 1999; Wilenius & Kurki, 2012). According to evolution theorists, all great social revolutions have their origins in innovations in the system of societal technology (Beniger, 2009). This is equally true in both Kondratjev's long wave theory, referring to the link between social structures, human

agency and technological innovations (Kondratjev & Stolper, 1935), and in Malaska's theory of social evolution, offering a synchronic threefold model of society to explain the emergence and nature of major sociotechnical transitions (Malaska, 1999). In other words, as described in Geels' dynamic multi-level perspective of transition (Geels, 2002; Geels & Schot, 2007) – a middle-range theory that conceptualises the overall dynamic patterns in sociotechnical transitions by bridging evolutionary economics and technical studies - technologies play an important role in fulfilling different societal functions, but they only appear when in association with human agencies, social structures and organisations. That is, human agencies always interact within the constraints and opportunities of the existing structures, yet simultaneously act upon and restructure these social systems. (Geels, 2002; Geels & Schot, 2007).

Accordingly, as explained by Herbert Spencer, the father of social Darwinism and the creator of the concept of evolution (Francis, 2007), the social development of humanity has three basic laws. Firstly, the law of continuity of motion sees everything as subject to continuous change, be it from simple to complex or from homogeneity to heterogeneity. Secondly, the law of persistence of force describes how creatures that best adapt to the continuously changing conditions will survive the longest. Thirdly, the law of the indestructibility of matter refers to the periodical emergence of ultimate causes that transcend human behaviour and knowledge. (Carneiro & Perrin, 2002). When referring to these basic laws in terms of making sense of how social media emhances value cocreation and innovation, the question remains: how is the recent, radical development of individual technologies (Andersen, 1998; Singh, Brady, Arnold & Brown, 2017) challenging and (potentially) transforming the yet dominant, firm-centric practices of value creation?

Given the evolutionary trajectory of technology development, a variety of highly disruptive, technology-mediated solutions and services have emerged along the way, providing completely new forms and contexts for resource exchange and integration (Koskela-Huotari, Edvardsson, Jonas, Sörhammar & Witell, 2016; Singaraju, Singaraju, Nguyen, Niininen & Sullivan, 2016). Considering that these dynamics of transition in sociotechnical systems emerge from societies' ability for cyclic self-renewal and structural coupling (Geels, 2011; Geels, 2005; Geels & Schot, 2007), it is important to recognise that the more complex the self-organising systems have become, the more they have also accumulated in resource exchange.

According to Malaska's theory of social evolution (Malaska, 1999; Wilenius, 2014), there are three major transitional phases to describe how technological innovations have shaped human history. To begin with, during the era of agrarian

dominance, societal activities were based on fulfilling basic human needs. Information was only embedded in physical structures (people, letters, books etc.) and only moved at the speed at which the physical structures could be transported from one place to another. In other words, for thousands of years, the role of technology was purely restricted to devices. It was not until the period of industrial dominance, starting from the revolutionary invention of the telegraph in 1747, that it was possible to have instant communication across long distances (Briggs & Burke, 2009). Or, it was not until the development of technology-enabled services (see Figure 1, phase III) in the 1970s and 1980s that the use of technology was expanded to tools that finally enabled communication without any dependence on physical structures (Woodford, 2018). Characterised by the many intangible needs of society, this on-going phase of service dominance has been strongly impacted by the speed at which the methods of communication and information sharing have developed (Wilenius, 2014; Malaska 1999).
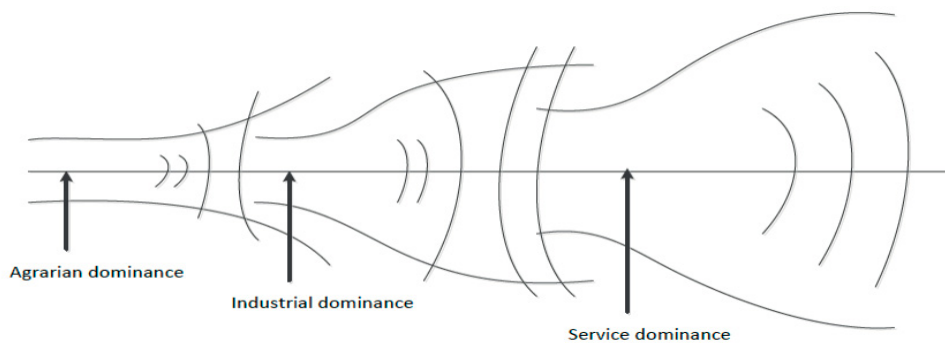
Figure 1. Technological innovations shaping societies (Source: Malaska,1999)

In recent years, it has been suggested that technology should be redefined as something that is 'neither exclusively physical nor social, but as potentially useful knowledge that may provide solutions for new or existing problems' (Wieland et al., 2015, p. 41). By thus highlighting the notion of technology as knowledge (see e.g. Layton, 1974; Akaka, Vargo & Wieland, 2017), i.e. the importance of competences over physical things, the former conceptualisation of technology as either a content provider or as a context is now being increasingly replaced with the understanding of technology as a combination of both of these concepts (Mattila, 2015). For example, although the social media are often perceived as simple platforms enabling various forms of user-generated content sharing, the use of social media extends far

beyond being a simple source of information. Instead, when effectively deployed and processed, social media content is an important tool with which to extract beneficial patterns and intelligence. (Kohli, Suri & Kapoor, 2015; Cawsey & Rowley, 2016; Andersson & Jiang, 2018.)

In order to maximise the benefits of the emerging growth in resource density, more understanding is needed about the impacts of technology on resource exchange and resource integration. This requires a completely new systems view of thinking regarding the mobilisation and integration of resources in value cocreation. Hence, urgent calls to challenge the existing perceptions about innovation are now appearing (Wieland, Vargo & Akaka, 2015), including the need for redefining the concepts of 'networks' (Letaifa, Edvardsson & Tornvall, 2016), 'markets' (Vargo, Koskela-Huotari, Baron, Edvardsson & Reynoso, 2017; Koskela-Huotari, 2018) and 'institutions' (Feldman & Massard, 2012; Vargo & Lusch, 2016). Early attempts to integrate the systems view into the social debate took place as early as the 1940s. However, it took almost half a century before the debate gained a foothold in explaining entire systems in terms of their individual, constituent parts (Taborga, 2011; Mingers, 2014). It was only after the introduction of the concept of ecosystems (Moore, 1993) in the 1990s that more attention was given to the socially constructed meanings of value creation (Moore, 1993; Adler, 2015). One of the essential reasons leading to the expansion of the debate lies in the rapid growth of Web 2.0 and social technologies.

With a diverse set of opportunities to form new kinds of virtually enabled customer collaboration and social networking (O'Reilly, 2007; Briggs, 2009; Castells, 2011; Cawsey & Rowley, 2016), the need for more personalised curation of news and civic information is now mediated through individuals' online social networks (Bakshy, Messing & Adamic, 2015). This change has thus triggered the transformation from a limited number of elements for social interaction (Obar & Wildman, 2015) to the increasingly decentralised structure of the Internet (Bechmann & Lomborg, 2013). On the one hand, more emphasis has been given to the multi-layered and interdependent nature of service systems (Spohrer & Maglio, 2008; Ostrom, Bitner, Brown, Burkhad, Goul, Smith-Daniels & Rabinovich, 2010; Gustafsson, Aksoy, Brady, McColl-Kennedy, Sirianni, Witell & Wunderlich, 2015). In addition, social media platforms have increasingly reclaimed their position as active participants in network formation (Prohaska, 2011; Serrat, 2017). On the other hand, due to the increased nestedness of modern social media-based information resources (Koskela-Huotari et al., 2016; Vargo & Lusch, 2016b), many of the actor-specific roles and the relationships between them have broken down into various

contextually changing ways to connect and integrate resources (Norman, 2001; Serrat, 2017).

In addition to the development of methods for collecting, monitoring, analysing and visualising social media-related conversations and interactions, completely new possibilities for organisational transformation (Mayer-Schönberger & Cukier, 2013; Pettersson, Jussila & Aramo-Immonen, 2014) and new business practices (He, Schen, Tian, Li, Akuta, Yan & Tao, 2015; Jussila, Boedeker, Jalonen & Helander, 2017) are arising. However, research in this area is still far too fragmented in the form of case studies of various micro-level study contexts and thus fails to provide any generalisable, in-depth understanding of the potential and actual use of social media for real-time business and competitive analysis. (Kietzmann, Hermkens, McCarthy & Silvestre, 2011; He et al., 2015; Alinaghian & Razmdoost, 2018). As a result, the understanding of the role and impacts of social media have remained surprisingly ambiguous and disconnected from the overall discussion on value cocreation (West & Bogers, 2014; Barile et al., 2016).

More recently, there has been interest not only in viewing technology as a means to create new tangible products (such as mobile phones) or intangible properties (such as social media which enables global communications at all times), but also in understanding how technology in remodelling the social structures in relation to value creation (Edvardsson et al., 2011; Rajala et al., 2016). As a result, focus is now gradually shifting towards gaining a more profound understanding of the growing impacts of technology in increasing institutional complexity and resource exchange (Akaka et al., 2017; Wagner, Vollmar & Wagner, 2014; Fagan, 2014). In other words, within the last couple of years, an increasing number of researchers have raised the need to study the impacts of social media on institutional logics and the practices of value cocreation. In particular, they have highlighted the need for more real-life examples that challenge the still rather theoretical and unrealistically positive approaches to innovation in ecosystems. (Christopher & Ryals, 2014; Clarysse, Wright & Bruneau, 2014; Kijima, 2015; Gadde, 2016; Koskela-Huotari et al., 2016; Lintula, Tuunanen & Salo, 2017.)

With many uncertainties regarding the return on investment from their social media activities (Tørning, Jaffari & Vatrapu, 2015), many companies tend to struggle in deploying and managing their social media interactions and networks (Frow, Nenonen, Payne & Storbacka, 2015; Singaraju et al., 2016). Despite all the attention paid to viewing social cognition and connectivity as the basis for all shared knowedge creation (van Overwalle, D'aes & Marien, 2015; Knyazev, Savostyanov, Bocharov & Merkulova, 2018), little is known about how to develop and manage the increasingly

multidimensional and complex networks in practice (Koskela-Huotari et al., 2016; Chew, Russell, Basole, Still & Guedria, 2017). Similarly, little is known about how to accelerate the new forms of interconnectedness between digital technologies and human actors, increasingly affected by the social structures directing the use of social media in value creation (Siltaloppi, Koskela-Huotari & Vargo, 2016; Rajala, Gallouj & Toivonen, 2016).

1.2 Research aim and research questions

1.2.1 Research gaps and the resulting research questions

Four major research gaps have been identified concerning the many fundamental changes in the field of innovation explored in the previous section. As shown below in Table 1, the research gaps and the resulting research interests are as follows:

Table 1.   The research gaps and resulting research interests

	Research gap	Research interest
1	The need to explore the role and impacts of new technologies in value creation (Edvardsson et al., 2011; Breidbach et al., 2012; Akaka & Vargo, 2014; Park, 2017; Schwab, 2017). Especially the role of social technologies (Spohrer & Maglio, 2008; Ostrom et al., 2010; Gustafsson et al., 2015) is emphasised	What is the role of new technologies in value creation?
2	The need to understand the rise of online social networks (Bakshy et al., 2015; West & Bogers, 2014; Barile et al., 2016; Alinaghian & Razmdoost, 2018)	What is the specific role of social technologies in value creation?
3	The need to support innovation through multi-actor collaboration (Kijima, 2015; Ostrom et al., 2015; Gustafsson et al., 2015; Wieland et al., 2017)	What is the role of multi-actor collaboration in innovation and how to support it? What is the relationship between value cocreation and innovation?
4	The need to elaborate the understanding of innovation in ecosystems (Aal et al., 2016; Djellah & Gallouj, 2016; Rajala et al., 2016; Koskela-Huotari et al., 2016)	What does it mean to innovate in ecosystems? How to increase innovation in ecosystems?

Firstly, the need to explore the role and impacts of new technologies in value creation (Edvardsson et al., 2011; Breidbach et al., 2012; Akaka & Vargo, 2014; Park, 2017; Schwab, 2017) resulted in a question about the role of new technologies in value creation. Secondly, the need to understand the rise of online social networks (Bakshy

et al., 2015; West & Bogers, 2014; Barile et al., 2016; Alinaghian & Razmdoost, 2018) resulted in a question about the specific role of social technologies in value creation. Thirdly, the need to support innovation through multi-actor collaboration (Kijima, 2015; Ostrom et al., 2015; Gustafsson et al., 2015; Wieland et al., 2017), resulted in questions about the role of multi-actor collaboration in innovation and the ways to support it – as well as about the relationship between value cocreation and innovation. Fourthly, the need to elaborate the understanding of innovation in ecosystems (Aal et al., 2016; Djellah & Gallouj, 2016; Rajala et al., 2016; Koskela-Huotari et al., 2016; Tsujimoto, Kajkawa, Tomita & Matsumoto, 2018) resulted in questions about the meaning of innovation in ecosystems and the ways to increase innovation in ecosystems.

Ultimately, by combining these research interests, the aim of this dissertation was set to explore the ways how social media enhances value cocreation and innovation in service ecosystems. By simply using the term 'ecosystems', but referring to the service-dominant logical view on ecosystems, two individual and yet interconnected research questions are formed:

Research question 1:

How does social media enhance the organisational practices of value cocreation in innovation?

Research question 2:

How does social media enhance value cocreation and innovation in ecosystems?

Since the first research question aims at exploring how social media enhances the practices of value cocreation in the context of innovation, the focus is on understanding whether the use of collaborative technologies allows new ways to advance the practices of value cocreation during firm-specific processes of innovation. Namely, innovation is considered as a process which develops through value cocreation practices and social media refers to technology a) as a resource capable of acting on other resources to create value and b) as a critical resource for value cocreation (Akaka & Vargo 2014; Vargo & Lusch 2016a; Vargo, Wieland & Akaka 2015).

As the second research question aims at exploring how social media enhances value cocreation and innovation in ecosystems, the focus is on understanding

whether the use of social media contributes to value cocreation in the context of ecosystems. Ecosystems refer to structures for engagement and interaction through joint knowledge creation and exchange (Lusch & Nambisan, 2015; Galbrun & Kijima, 2009), and represent places where multiple different actors with different aims and motives come together for innovation. In other words, the aim is to study whether the use of social media impacts the value cocreation and network formation practices that lead to innovation in ecosystems (Christopher & Ryals, 2014; Gadde, 2016; Kijima, 2015). While the first research question studies innovation as a firm-centric activity (West & Gallagher, 2006; Chesbrough, 2010; Simula & Vuori, 2012), the second research question shifts the focus to cocreation as a means to create shared value in a broader context (Ramaswamy & Ozcan, 2014; Calvagno & Dalli, 2014).

This study contributes to two different academic streams of literature: innovation management related literature and the theory of service-dominant logic. From the innovation management perspective, this study provides both theoretical and empirical insight that supports the on-going transformation where theories and models with rationality as their driving force (Dattée, Alexy & Autio, 2018; Meynhardt, Chandler & Strathoff, 2016) are being replaced with a more dialogic approach to innovation (Lee, Olson, and Trimi, 2012; Järvi and Kortelainen, 2017). From the perspective of service-dominant logic, this study resonates well with the early service-dominant logic conceptualisation of technology. As such, it offers interesting empirical knowledge and understanding regarding the still rather theoretical discussions about the role of social media (i.e. of technology) in value cocreation and innovation.

1.2.2 Research focus of individual publications

Based on the two research questions, the individual publications are split into two coherent research themes according to the two research questions. The first three publications are based on the theoretical foundations of innovation management (Schumpeter, 2004; Burns & Stalker, 1961). They focus on exploring the role of social media vis-à-vis company-specific innovation processes.

As explained below in Table 2, in Publications I and II, the focus is on looking for the regularities, patterns and mechanisms that affect value transactions during the formation of value networks. Based on empirical observations made during a crowdsourcing process, multiple different factors and stages were identified that

potentially advance organisational competitiveness through product development (Baregheh, Rowley & Sambrook, 2009; Burns & Stalker, 1961). Subsequently, during the writing process of Publication III, which was a systematic literature review of social media-based business models and value cocreation, a theoretical understanding of innovation as a collaborative process was developed with an increasing emphasis on the conceptual, service-dominant logic view of value creation.

Table 2. The aims and focuses of individual publications for research question 1

How does social media enhance the organisational practices of value cocreation in innovation?		
Publication	**Aim**	**Focus**
I: 'Social media-based value creation in innovation community in the mechanical engineering industry.'	To explore the impacts of social media on innovation	Value networks and resource density
II: 'How can crowds be used in developing complex industrial products? An analysis of factors impacting the usefulness of crowdsourcing outcomes.'	To identify the key indicators for value cocreation through social media enabled resource exchange and integration	Resource exchange and integration
III: 'Social media-based value creation and business models.'	To review the impacts of social media in reconstructing and changing the value cocreation practices	Value cocreation and resource integration

As explained below in Table 3, the last two publications represent the service-dominant logic view of value creation and build on the results acquired for the first research question. The use of service-dominant logic as the theoretical framework of this study is further developed in Publications IV and V. Whereas Publication IV served as a background study to build up and discuss the conceptual understanding of a service system view of innovation, in Publication V the results and conclusions of the earlier publications are placed in the forefront in the context of a real-life ecosystem. In other words, both Publications IV and V are both strongly affected by the service science view of innovation (Lusch & Nambisan, 2015), although only in Publication V are the consistencies between the intentions and actual practices of value cocreation examined.

Table 3.   The aims and focuses of individual publications for research question 2

How does social media enhance value cocreation and innovation in ecosystems?		
Publication	**Aim**	**Focus**
IV: 'Reinventing organisational creativity and innovation through adapting a service-based working culture.'	To manifest the potential role of social media in increasing institutional complexity	Value networks and institutional complexity
V: 'Enabling density in value co-creation – the transformational role of social media in service ecosystems.'	To study the impacts of increased institutional complexity for advancing innovation in ecosystems	Value cocreation and resource integration

Regardless of the theoretical approach originally used in the publications, in this chapter, the service-dominant logic view of value cocreation and innovation is applied as the theoretical framework of analysis. More specifically, attention is paid to social media in enabling new socially constructed meanings as both the basis and the outcomes of the value cocreation process (Vargo & Akaka, 2012). Hence, by assimilating two completely different streams of literature, this research may be considered richer than usual in viewpoints and analysis.

1.3   Research methodology and design

In this chapter, the methodological choices of this dissertation are presented and justified. Given the many contradicting and partly overlapping classifications and views regarding the different research paradigms (Mkansi & Acheampong, 2012), in this research, the research onion presented by Saunders, Lewis and Thornhill (2009) is applied to describe the chosen research methodology and design. The research onion refers to the outermost layers as the researcher's view of the world, and to the innermost layers as the unobtrusive, but important elements that describe ways to gather and analyse data (Saunders et al., 2009). The research onion consists of the following layers: 1) research philosophy, 2) research approach, 3) research strategy, 4) research methods, 5) time horizon and data collection and 6) analysis techniques.

1.3.1   Research philosophy

In academic research, there are a few important stages through which the researcher should pass in order to formulate an effective methodology. The work always begins

with choosing a research philosophy – a system of beliefs and assumptions that guide the ways of collecting, analysing and using data that best serve the chosen phenomenon (Burrell & Morgan, 1979; Guba & Lincoln, 1982). Since these beliefs and assumptions may be either conscious or unconscious, they may have significant impacts on the researcher's methodological choices and the resulting development of knowledge creation. The methodological choices (underlined) of this research are shown below in Figure 2.
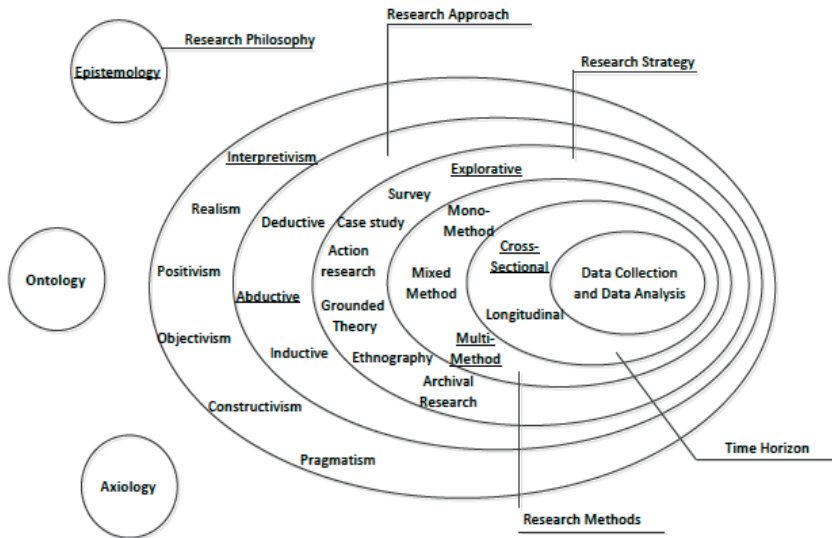
Figure 2.   Methodological choices (Source: Saunders et al., 2009)

Considering the aim of this research is to understand and interpret how social media enhances value cocreation and innovation, there is a strong focus on human interactions. By thus assuming that reality is always socially constructed, this dissertation presents a case example of interpretivist research. The interpretivist study approach emphasises the use of qualitative multi-method studies to ensure the comprehensive exploration of various different values, attitudes and assumptions regarding the studied phenomena (Bernard, 1994). In doing so, the final conception of the studied phenomenon is formed progressively during the research process (Turunen, 1978). In other words, a multiplicity of contextually changing conceptions of the same issue are introduced (Bernard, 1994). Altogether, the Research methodology used in this research is explained and justified below in Table 4.

Table 4. Research methodology explained and justified

Research methodology		Explanation	Justification
Research philosophy	Epistemology interpretivism	Is used to identify, connect and make sense of the acquired knowledge and data - and to eventually produce the final results and conclusions of this dissertation	This dissertation aims at understanding and interpreting the role of social media in value cocreation and innovation, not at defining a fixed description or explanation of it
Research approach	Abductive reasoning	By combining the aspects of deduction (i.e. the process of first building and then testing a theoretical framework) and induction (i.e. the process of creating insight through proposition building), abductive reasoning serves as a tool for balancing the empirical and theoretical reflections resulting from individual studies	Considering social media as a complex and relative system of meanings where multiple realities exist across time and place, abductive reasoning is used to construct the 'best possible explanations', not normative 'truths' about its role in value cocreation and innovation
Research strategy	Explorative	Helps to determine the appropriate research design, data collection methods and study subjects that support acquiring new insight into the studied phenomena and to develop a hypothesis or final propositions	The aim of this research is not to validate, but to gain insight about the roles and benefits of social media in value cocreation and innovation - currently very little studied and understood
Research methods	Qualitative, multi-method (case study, literature review, conceptual paper)	Refers to the overall strategy that is needed to effectively address the research problem - instead of firmly predefined content and methods, and proposition verification, the qualitative multi-method approach allows each individual publication to be built on the results of the former	Qualitative research methods are used to support the exploration of the various potential roles and benefits of social media from different viewpoints, and to thus provide a comprehensive understanding of social media as a resource and asset for value cocreation
Time horizon	Cross-sectional	In the absence of longitudinal data, provides a snapshot of the studied phenomena in the various study contexts	Each of the individual publications have their own aims and viewpoints, thus do not provide data about a particular phenomenon over time
Data collection and analysis techniques	Literature review, interviews, online observations Content analysis, conceptual analysis	Refers to the processes through which information is collected from several different and relevant sources in order to form holistic and versatile insight about the research problem	Given the abductive nature of this dissertation, knowledge and understanding of the studied phenomena is acquired through continuous dialogue between empirical data and literature

In comparison to positivism, which aims at explaining the world through objective facts and hypothesis verification, or realism, which sees the world as relatively unchanging and thus ignores any human perceptions or beliefs regarding the studied phenomena, interpretivist research always seeks to understand both the intention and the context of human actions. (Saunders et al., 2005; Schwandt, 2005). Most commonly used in organisational studies, an interpretivist research approach focuses on exploring the multiplicity of perspectives and meanings related to the studied phenomena. This study by no means tries to find 'the objective truth' with causal explanations, or to test any predefined hypotheses. Instead, by accepting that there are many potential explanations and views that are also true for the phenomena under investigation (Metsämuuronen, 2005), the study contributes to the underlying pursuit of contextual depth and the discovery of contextual uniqueness (Myers, 1997).

Having its roots in the philosophical traditions of hermeneutics and phenomenology, interpretivism is considered as a key research philosophy of epistemology (Alston, 1989; Schwandt, 2005). In hermeneutics, it is important to first look for any non-word-based artefacts, and then to understand their underlying meanings. In phenomenology, the focus is on first identifying and then observing the organisational processes that are used to make sense of the intersubjective relationships, lived experiences and prior knowledge within the studied organisations (Yanow & Ybema, 2009). In both cases, the aim is to form a systematic view of how meanings are created in given study contexts.

In epistemology, the main concerns are a) to determine the nature of knowledge, and b) to determine the extent of human knowledge. That is, given that the study of knowledge is one of the most fundamental aspects of a philosophical inquiry, epistemology does not (usually) focus on procedural knowledge or knowledge by acquaintance, but on propositional knowledge. (Saunders et al, 2009). What this means is that the knowledge is expressed in the form of declarative sentences, including a fact or a statement of affairs that propositionally expresses the nature and extent of the knowledge in question. (Casullo, 2015).

The sources for acquiring propositional knowledge may be either non-empirical or empirical. With regard to the non-empirical, a priori sources of knowledge, they refer to investigations of human experiences and are based on reasoning or logic, truth and abstract claims. The empirical, a posteriori sources of knowledge refer to knowledge that is always subsequent to experiences. Thus, epistemology mostly

makes reference to a philosophical analysis of the nature of knowledge and its relations to the concepts of truth, belief and justification. (Pollock & Cruz, 1999; Alston, 1989). In this research, both empirical and non-empirical sources of knowledge have been used. Where any references to individual experiences have been excluded from the analysis, the focus is on understanding the collective process of knowledge creation.

1.3.2   Research approach

In this research the world is seen as a complex and relative system of meanings (Hudson & Ozanne, 1988), where multiple realities can exist across time and place (Lincoln & Guba, 1985). Consequently, this dissertation does not focus on proposition verification, but rather on creating propositions that describe the premises that potentially lead to change. Therefore, each of the individual publications is thus considered as an essential resource for both identifying and understanding the various socially constructed realities that are affected by or affect the emerging practices of social media. In other words, this dissertation builds on abductive reasoning, a research approach that combines both the aspects of deduction – i.e. the process of first building and then testing a theoretical framework –- and induction – i.e. the process of creating insight through proposition building (Lincoln & Guba, 1985; Hudon & Ozanne, 1988).

The notion of abduction was first introduced by the American philosopher Charles Peirce, but it actually dates back to Aristotelian thinking (Aliseda, 2006). Often referred to as the best explanation or the sophisticated guess, abductive reasoning can be used both to draw conclusions and make predictions from given situations and data, and construct explanations and confirm the theoretical foundations of the studied phenomena (Aliseda, 2006; Walton, 2014). In other words, the use of abductive reasoning not only supports the creation of a logical progress and the quality of conclusions drawn from various both empirical and theoretical reflections, but it also supports the creation of valuable insight during the proposition building process (Eckstein, 1975; Hervé, 2013).

According to abductive reasoning, all human experiences have a logic which cannot be questioned. Since logic is a theoretical problem (Alvesson & Sköldberg, 2017) and all logic builds on norms (Grönfors, 1982), the scientific use of abductive reasoning is always based on observing things through a set of guiding principles. These principles both describe and control the empirical observations and the ways

in which the acquired knowledge and data are analysed. In other words, logical thinking is explained by using logical facts and experiences – or, on the basis of intuition which, eventually, may result in reasoning (Aliseda, 2006; Walton, 2014). If the guiding principles are fuzzy, or only intuitive concepts or well-refined hypotheses are available, particular attention should be paid to the ways to validate or challenge the emerging hypothesis. Hence, the observations should be connected with circumstances or issues that can then produce new ideas and visions - or even new theories. (Walton, 2014).

Since the first three publications were based on the theoretical foundations of innovation management (Schumpeter, 2004; Burns & Stalker, 1961) and the last two publications were strongly affected by the service-dominant logic view of innovation (Lusch & Nambisan, 2015), the sense-making of the acquired knowledge and data is now harmonised by using the service-dominant logic framework only. In this case, abductive reasoning is used as a tool for less biased sense-making, driven by a continuous effort to understand the connections among actors, events and actions (Kolko, 2010). In other words, considering social media as a complex and relative system of meanings where multiple realities exist across time and place, abductive reasoning is used to construct the best possible explanations about its role in value cocreation and innovation – i.e. to produce the final results and conclusions of this dissertation.

1.3.3   Research strategy, methods and time horizon

The role of the research strategy in determining the appropriate overall strategy includes everything needed to effectively address the research problem, research design and data collection methods. It also determines the study subjects that support the acquisition of new insight into the studied phenomenon and the development of a hypothesis or final propositions. All in all, research may be either explorative, descriptive or explanatory. (Saunders et al., 2009).

In descriptive research the aim is to understand 'what' is characteristic for the studied phenomenon. In explanatory research, the aim is to find reasons for 'why' it is as it is. In exploratory research, the aim is to understand a phenomenon that has not yet been fully discovered. Whereas the two first strategies are more likely to be connected with quantitative or mixed research methods, including frequencies, averages and other statistical calculations or surveys, exploratory research is most often of a qualitative nature. To create a good research strategy requires a clear and

feasible research aim, a decision on the form the research data will take and an actual strategy for conducting the research.

As the aim of this research is not to validate but to gain insight about the potential roles and benefits of social media in value cocreation and innovation – a subject still very little studied and understood – this dissertation follows an explorative research strategy. By choosing this strategy, a strong focus on qualitative research is required, to produce findings that are not arrived at by means of statistical procedures or other means of quantification (Strauss & Corbin, 1998). Therefore, qualitative research methods are used to support the exploration of the various potential roles and benefits of social media from different viewpoints, and to provide a comprehensive understanding of social media as an asset in value cocreation. Considering the sometimes contradictory and thereby confusing meanings of the concepts of research methods and data collection techniques, the definitions by Ghauri and Grønhaug (2005) are applied in this dissertation, i.e. whereas the research methods refer to what is done and why it is done, the research techniques refer to how things are done.

The qualitative nature of this dissertation is most visible in the individual publications, in their explorative nature and in the variety of research methods used. Instead of firmly predefined contents, methods and proposition verification, the qualitative multi-method approach allows each individual publication to be built on the results of the preceding publication. These qualitative methods were used in three case studies (Publications I, II and V), a literature review (Publication III) and a conceptual paper (Publication IV).

1.3.4   Choosing the data collection and analysis techniques

Even though this dissertation is not built on studying human experiences (Kupers, 2008), it is connected, to some extent, with features of phenomenology. That is, it explores the nature of innovation as an interactive process (Lundvall, 1988) and tries to understand how the use of digital technologies (i.e. social media) impacts on the practices and contexts of innovation. The explorative nature of this research is highlighted in the individual publications where a number of different techniques are used to make the overall data collection as comprehensive as possible. In other words, the data is collected from a number of different sources, including techniques such as literature reviews, interviews and online observations.

Altogether, the data collection represents a set of single, time- and context-sensitive snapshots of situations which give insight about the role of social media in value cocreation and innovation. With a focus on deepening the understanding of these social media impacts, the number of case studies and respondents remains rather low as more effort has been made to ensure the variety of respondents and the depth of the thematic interviews. By thus combining the aspects of deduction and induction, abductive reasoning has been used as a tool to balance the empirical and theoretical reflections resulting from the individual studies.

In order to analyse the collected data in the best possible way, the techniques of both conceptual analysis and content analysis have been used in this final analysis. Firstly, conceptual analysis was used to dissect the acquired understanding about the concepts of value cocreation and innovation. Secondly, content analysis was used to describe the identified social media impacts on value cocreation and innovation in ecosystems. Most importantly, these techniques of analysis are strongly related to the empirical case data including online observations and interviews (see Publications I, II and V). However, a continuous dialogue between empirical data and literature is needed to form a holistic and versatile knowledge and understanding of the studied phenomena.

Closely related to critical thinking, conceptual analysis examines the logic of structures. In addition, it critically scrutinises their logical relations, and identifies the assumptions and implications related to them. In doing so, it is used to test the clarity and coherence of concepts, terms, variables, constructs, definitions, assertions, hypotheses and theories. Specifically, in conceptual analysis, the interest lies in defining the conflicts between the intended meanings and the observed actions. As such, the use of conceptual analysis should never be restricted to a matter of language or language use only (Bennett & Hacker, 2003), but it should aim to describe what the linguistic expressions actually claim to mean within the contexts being studied. In fact, since conceptual analysis sometimes serves to expose the unconscious practical inconsistencies between what is said and what is meant (Bassham, Irwin, Nardone, & Wallace, 2008), it is often considered as the first step in scientific enquiry. For example, conceptual analysis may reveal that the respondent rejects a certain logic by means of a valid deductive argument (Triplett, 1988), or behaves like a realist while claiming to support antirealist perspectives (Lambie, 1991; Triplett, 1988). The use of conceptual analysis was of particular importance in analysing the results of Publications III and V, where the conflicts between the intended and actual changes in value cocreation and innovation are observed.

Content analysis refers to a technique of analysis that 'provides a systematic and objective means to make valid inferences from verbal, visual, or written data in order to describe and quantify specific phenomena' (Downe-Wambolt, 1992, p. 314), and its principal aim is to link results to the context or environment in which they are produced. As stated by Krippendorff (2004) and Neuendorf (2002), content analysis can be used both as a quantitative and a qualitative methodology (Downe-Wambolt, 1992; Catanzaro, 1988), and it can be also be used both inductively and deductively (Krippendorff, 2004). Whereas quantitative content analysis originates from media research, qualitative content analysis is grounded in social research (Neuendorf, 2002). The reason for using content analysis is not to detect and report every detail that is found in the data, but to create a summarised interpretation of the issues under study. With no standard requirements or criteria for data collection, its size and the number of respondents may vary greatly. In this study, in-depth interviews were carried out to ensure increased intensity in the discussions with the interviewees.

1.3.5   Research structure

In this first chapter, the motivation for the research, the research objective and research questions as well as the research scope and limitations regarding this dissertation were introduced. 'Research methodology and design' presents and justifies the different methodological choices, as explained in the 'research onion'. By presenting a case example of an interpretivist study, emphasis was placed on the use of qualitative multi-method studies. The dissertation is divided into five main chapters, and the contents of the remaining four chapters are as follows:

Chapter 2, 'Theoretical approach', introduces the study context and the theoretical framework of this dissertation. Firstly, the emerging systems view of innovation and the processual understanding of value cocreation are discussed briefly. Secondly, a review is presented of the existing knowledge and understanding related to service-dominant logic and thus to both the core literature and the theoretical foundations of this dissertation. Thirdly, the theoretical approaches used in the individual publications are described.

Chapter 3, 'Data collection and analysis', introduces the different research methods as well as the data collection and analysis techniques used in this dissertation.

Chapter 4, 'Summary of publications and their main results', summarises the major results from all five individual publications. The results are presented in a coherent manner that reveals their contributions to this dissertation.

Chapter 5, 'Discussions and conclusions', begins by examining and discussing the deeper meaning of the results of this dissertation. Firstly, the main conclusions from the individual publications are presented in terms of five propositions. Next, the academic and management contributions to value cocreation and innovation in ecosystems are discussed, including the presentation of a three-level approach to social media in enhancing value cocreation and innovation in service ecosystems. Finally, a short description of the evolution of the study, including research limitations and further research ideas, is provided.

2 THEORETICAL APPROACH

In this chapter, both the context of this dissertation and the theoretical framework used are introduced. In relation to the emerging systems view of innovation and the suggested processual understanding of value creation, an introduction to the core literature related to service-dominant logic is first provided. Next, the theoretical framework of this study is presented, which was built on the service-dominant logic view of value cocreation and innovation in service ecosystems. Finally, the theoretical approaches used in the individual publications are justified according to the research aims of this dissertation.

2.1 Introduction to service-dominant logic

2.1.1 Key concepts

For centuries, theories of value have focused on two different kinds of economic activities: productive and unproductive. Whereas productive activities have been connected with economic growth and wealth creation, investments in science, technology, skills and organisational renewal have been considered as unproductive activities (Mazzucato, 2018). Since the late 1960s, and especially since the beginning of the 1980s, there has been growing interest in theories and models that have challenged this view of value creation (Alderson, 1957; Kotler, 1977; Webster, 1992; Gummesson, 1995; Grönroos, 2000). Then, in 2004, an epoch-making contribution was made when 'Evolving to a New Dominant Logic of Marketing' was published, and the service-dominant logic view of value creation was first introduced.

According to this new meta-theoretical framework, a fundamental change of focus to service-for-service exchange was recognised. (Vargo & Lusch, 2004). As then introduced by Vargo and Lusch, value coreation was referred to as something that actualises at the intersection of the service providers, consumers, and the many other value creating actors. Driven by institutional complexity, it thus refers to an on-going creative reconstruction of social patterns which heighten the actors´ ability

to consciously consider the underlying assumptions, values and beliefs of multiple institutional arrangements (Wieland et al., 2016; Siltaloppi et al., 2016; Vargo & Lusch, 2011).

Despite the thought-provoking transformation from a goods-dominant logic to a service-dominant logic view of value creation, the lexicon that is used to explain the new meta-theoretical framework has remained largely the same. However, the concepts of service-dominant logic caused a lot of confusion since they have partially different meanings. As this resulted in many misconceptions and rejections regarding the adoption of this new logic, an increased need 'for a crisper and more precise delineation of the foundational premises and specification of the axioms of service-dominant logic' (Vargo & Lusch, 2016a, p. 5) was recognised. Hence, as shown in Tables 5 and 6, some updates and more advanced descriptions have lately been created to explain the fundamental premises and concepts of service-dominant logic. First, in Table 5, all five foundational concepts – service, resources, actor, value and institutions – are explained. Second, in Table 6, an additional lexicon for studying value cocreation and innovation is presented.

Table 5.   The key concepts of this research, part I

The key concepts, part I: the five foundational concepts of service-dominant logic	
Service	Service is the basis of exchange (Vargo & Lusch, 2004) and the application of resources that result in outcomes such as services and products (Vargo & Lusch, 2014).
Resource(s), resource integration	Resources refer to the actual sources of service provision; anything from knowledge, skills and networks to natural resources and industrial products (Vargo & Lusch, 2004; Akaka & Vargo, 2013). Resources can be either operand or operant resources. Resource integration thus explains the process through which all actors participate in offering and receiving value propositions (Vargo & Lusch, 2011; 2014)
Actor	An actor refers to any entity participating in service exchange and resource integration. Instead of differentiating the roles of producers, customers, suppliers etc. (Lusch & Vargo, 2011), actor-specific roles are considered as changing contextually and thus call for actor-to-actor orientation (Vargo & Lusch, 2016a).
Value (co)creation	Value creation is seen as the process of service exchange, meaning that value is always cocreated through the joint actions of the value-creating actors. Finally, value is always defined by the beneficiary. (Vargo & Lusch, 2004; 2008).
Institutions, institutional arrangements	Institutions refer to a set of rules, norms, meanings, symbols and practices that direct the process of value cocreation (Vargo & Lusch, 2016).

Table 6. The key concepts of this research, part II

The key concepts, part II: additional lexicon for studying value cocreation and innovation	
Agency	Agency refers to both human and non-human agency as well as both the coordinated intentions of individuals or organisations, and the ways in which different non-human resources can act due to human interventions. (Friedland & Alford, 1991; Koskela-Huotari & Vargo, 2016)
Autopoiesis	Autopoiesis refers to service systems as capable of reproducing and maintaining themselves. (Matruna & Varela, 1991; Maula, 2006)
Coupling, loosely coupled systems	Coupling refers to an intrinsic process where the interactions within a system adapt to continuous change, resulting in learning and structural changes within the system. Accordingly, the term loosely coupled systems describes the fact that systems can behave in highly different ways in different situations. (Maula, 2006)
Density (of resources)	The density of resources refers to the increasing number of resources that are available for resource integration due to the liquefication of resources. In this research, it specifically refers to the role of social media in increasing the density of actors and resources that are available for resource exchange and integration through social media. (Normann, 2001; Lusch, Vargo & Tanniru, 2010)
Emergence	Emergence implies to a process of resource integration that takes place within a multiplicity of actors, but where the sum of effects is more than the representation of its constituent parts. Emergence thus refers to situations when things happen without a clear explanation. (Akgun et al., 2014; Lusch & Nambisan 2015)
Liquification (of resources)	Liquification refers to the separation of information resources from a physical matter. As a result, an increasing density of resources are available for resource integration. (Normann, 2001; Lusch et al., 2010)
Resourceness	Since operand resources need to be acted upon, the term resourceness simply refers to the act of using operant resources to realise the potential benefit of operand resources. In doing so, access to the sometimes almost hidden benefits of the resources can be improved significantly. (Lusch & Vargo, 2014; Koskela-Huotari & Vargo, 2016)
Service ecosystems	Service ecosystems act as the emergent processes and relationships that enable value cocreation between a diversity of value cocreating actors, joined together for resource exchange and integration. These systems of service exchange emerge and unfold over extended periods of time. (Lusch & Nambisan 2015)
Service Innovation	Service Innovation refers to an on-going, creative reconstruction of social patterns which heightens the actors' abilities to consciously consider the underlying assumptions, values and beliefs of multiple institutional arrangements. (Lusch & Nambisan 2015; Witell et al., 2016)
Service platforms	Service platforms are the venues for the liquification and condensation of resources. They are the place where value cocreating actors meet one another. Lusch & Nambisan 2015)
Value destruction	Given that value is always cocreated through the joint actions of value-creating actors and that value is always defined by the beneficiary, the outcome(s) of service exchange may be either positive, negative or neutral. Whereas value cocreation is mainly understood as representing the positive outcomes of a service exchange, value destruction is used to describe the negative outcomes. (Echeverri & Skålén, 2011)

The concepts presented in Table 6 include the concepts of agency, autopoiesis, coupling and loosely coupled systems, density (of resources), emergence, liquefication (of resources), resourceness, service ecosystems, service innovation, service platforms and value destruction. Whereas the Table 5 helps to understand the foundational premises and axioms of service-dominant logic, the additional lexicon helps to make sense of all the different phenomena and acts that are affecting the processes of resource exchange and integration. Many of these concepts are originally studied in other domains of scientific literature, for example, in organisational theory or in complexity theory. Yet, they have been further elaborated within the service-dominant logical literature.

Originally, a total of eleven foundational premises were identified to highlight the use of these foundational concepts (Vargo & Lusch, 2004; 2008). Since some of them were considered to be derived from the others, they were condensed into five axioms to explain service-for-service exchange (Vargo & Lusch, 2016a). As shown in Table 7, with the axioms, a more holistic and explicit understanding of the service-dominant logic framework. Is provided. These five axioms are: 1) Service is the fundamental basis of exchange; 2) Value is cocreated by multiple actors, always including the beneficiary; 3) All social and economic actors are resource integrators; 4) Value is always uniquely and phenomenologically determined by the beneficiary; and 5) Value cocreation is coordinated through actor-generated institutions and institutional arrangements (Vargo & Lusch, 2016a; Vargo & Lusch, 2014). In the following three sub-sections, all the foundational concepts and axioms are discussed in more detail.

Table 7.   The five axioms of service-dominant logic

Axiom 1	Service is the fundamental basis of service exchange.
Axiom 2	Value is cocreated by multiple actors, always including the beneficiary.
Axiom 3	All social and economic actors are resource integrators.
Axiom 4	Value is always uniquely and phenomenologically determined by the beneficiary.
Axiom 5	Value cocreation is coordinated through actor-generated institutions and institutional arrangements.

2.1.2   Defining value cocreation

When considering service exchange as the application of resources for the benefit of others, according to the first axiom, 'service is the fundamental basis of exchange'

(Vargo & Lusch, 2004). In service-dominant logic terms, a service (in the singular) refers to resources such as knowledge and skills – whereas goods and services (in the plural) refer to the outputs of a service exchange. That being the case, understanding of resources is considered to be limitless with regard to potential and dynamics. Most importantly, the service-dominant logic notion of value extends far beyond the reductionist terms of added value or embedded value, which are often fixed or limited in supply. (Vargo & Lusch, 2008; 2011.)

Given the great variety of resources, they are differentiated into two major categories using the terms operand and operant resources. Operand resources are most often tangible and static, consisting of resources that enable or facilitate the value cocreating actors to act. In other words, they consist of a number of natural and produced static components. By contrast, operant resources are mainly intangible and refer to dynamic mental or physical human skills that make it possible to act or operate on other things rather than being operated on (Maglio, Kieliszewski & Spohrer, 2010; Vargo & Lusch, 2014; Skålen & Edvardsson, 2016). Hence, according to service-dominant logic, mobile phones should actually be considered as an operand resource enabling communication between different value cocreating actors (Lusch & Nambisan, 2015), and operant resources refer to the technology in them, thus referring to the appropriate knowledge and skills that are needed to both develop the devices and derive value from them. For example, with regard to the role of social technologies in initiating new forms of communication, they are also regarded as operant resources.

As for the second axiom, 'value is cocreated by multiple actors, always including the beneficiary' and the fourth axiom, 'value is always uniquely and phenomenologically determined by the beneficiary' (Vargo & Lusch, 2004), they both highlight the fact that the actualisation of value only occurs when a product or service is being used rather than when it is being manufactured and delivered (Vargo, Maglio & Akaka, 2008). In other words, compared to the early focus of service-dominant logic on the dyadic relationships between service providers and their customers (Vargo & Lusch, 2004), it now emphasises the more holistic and dynamic understanding of the service experience. Value is always cocreated by multiple actors encompassing many disciplines and perspectives. As stated by Edvardsson et al. (2011), value has a collective and intersubjective dimension and should be understood as value-in-social-context.

2.1.3   Innovation as an emergent process

During the last few decades, a number of definitions have been introduced to describe the concept of innovation (Koskela-Huotari et al. 2016; Anderson et al. 2014; Reinert & Reinert 2006; Angle 1989). Innovation has most commonly been used to describe either a) the formation of something original, unexpected and contextually useful (Sternberg 2006), b) a new idea, device or method, or c) the application of new value-creating products, processes, services or technologies (Vargo et al., 2015; West & Farr, 1990). While the term innovation has mostly been used only to refer to successful implementation of creative ideas within an organisation (McLean, 2005), it has also been utilised to include the entire process, from problem solving to using newly created solutions and value propositions (Sternberg, 2006).

For a long time, the majority of innovation studies were conducted in the fields of manufacturing and high-tech industries (Djellal & Gallouj, 2016). Since 1993, several theoretical frameworks and models have also been introduced to define the concept of service innovation (Miles, 1993; Witell et al., 2016). However, they have been mostly related to overcoming problems in customer care or inventory stocking (Miles, 1993). As a result, the concept of service innovation has been mostly used to describe either a) the act of innovating services as intangible products with an economic interest or b) the processes of creating new or improved ways to design and produce services. (Djellal & Gallouj, 2016; Djellal et al., 2013; Rajala, et al., 2016).

It was not until the introduction of service-dominant logic that a more integrative view of innovation emerged (Djellal & Gallouj, 2016; Djellal et al., 2013; Rajala, et al., 2016). Instead of the earlier focus on firm-centric views of innovation, increasing attention was drawn to innovation as a collaborative process. Firstly, the concept of service platforms was used to describe the venues for innovation where the liquification and condensation of resources can develop. Secondly, the concept of service ecosystems was introduced as the emergent processes and relationships that enable value cocreation between a diversity of (individual or organisational) actors. This refers to the resource-integrating systems of service exchange (Lusch & Nambisan 2015), emerging and unfolding over extended periods of time (Vargo and Lusch 2011). In other words, value cocreation is explained as something that is actualised at the intersection of the service providers, consumers, and the many other value-creating actors (Vargo & Lusch 2016; Vargo and Lusch 2011; Wieland et al., 2016).

In comparison to systems technology, which observes complexity in technological systems, or systems philosophy, which conceptualises the organised nature of the world (Hammond, 2010), the emerging systems view of innovation has contributed significantly to the increasingly unified understanding of the nature and purpose of organisations, markets and society (Koskela-Huotari et al., 2016; Vargo & Lusch, 2016a; Vargo, Wieland, & Akaka, 2015). This means that, by applying the service-dominant logic view of innovation as an emergent process, organisations become more aware of the evolving changes in their operational environments and systematically develop their resource exchange and integration practices.

2.1.4 Resource density and resource integration

What makes the service-dominant logic perspective of value cocreation even more different from the many earlier views of value creation (Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2011; Vargo, 2009) is its third axiom, 'all social and economic actors are resource integrators' (Vargo & Lusch, 2004). As value is no longer connected to goods or services, the role of all actors participating in offering and receiving value propositions (Vargo & Lusch, 2014) through many forms of resource integration (Vargo & Lusch, 2011) takes centre stage. This means that service-dominant logic looks at value creation from the point of view of offering a solution to the consumers' existing and future needs, not satisfying them with products or services that have a certain feature. When both producers and consumers derive value by integrating resources from their individual service systems, they create value-in-use.

Moreover, as we can see below in Figure 3, value creation can occur either directly or indirectly – or even when the beneficiary is unaware of the value creation process. Taking this into account, the service-dominant logic view of value creation also strongly applies the ideas based on the theory of autopoiesis (Maturana & Varela, 1991; Maula, 2006), thereby referring to service systems as capable of reproducing and maintaining themselves. Each interaction that then occurs in the system through coupling - meaning that it intrinsically adapts to a continuous change - results in learning and structural changes within the system. Triggered by the changes in the environment, these loosely coupled systems can behave in highly different ways in different situations. (Maula, 2006).
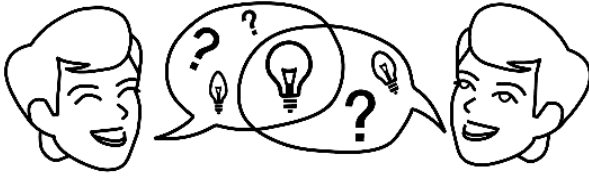
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Figure 3. The process of 'coupling', referring to dyadic relationships

It is important to remember that none of the qualities exist alone but only in interaction with one another and the surrounding world. A lot thus depends on the abilities of the value cocreating actors to either provide resources or use the resources available, or on whether these resources are of a complimentary or inhibiting nature. It is not the environment that rules or requests the changes; it only responds to the opportunities for learning and transformation. In other words, the resources are invariably contextual and waiting to 'become' something. (Vargo & Lusch, 2004; Koskela-Huotari & Vargo, 2016). Besides focusing on the liquification of resources, more knowledge and understanding are needed about the integrative structures that can foster resource density (Lusch & Nambisan, 2015) and about how to activate the benefits of the available resources (Koskela-Huotari & Vargo, 2016).

2.1.5   Resourceness through institutional complexity

Driven by institutional complexity, service-dominant logic represents value creation as an on-going creative reconstruction of social patterns which heighten the actors' ability to consciously consider the underlying assumptions, values and beliefs of multiple institutional arrangements (Wieland et al., 2016; Siltaloppi et al., 2016; Vargo & Lusch, 2011). Accordingly, the fifth axiom declares that 'value cocreation is coordinated through actor-generated institutions and institutional arrangements' (Vargo & Lusch, 2016). Given the complex, multidimensional and dynamic nature of resource integration, it is essential to understand how different contexts emerge and evolve continuously. As the actors connect with one another, unique constellations of resources become available. However, in order to benefit from these resources, it is important to look more closely at the institutional arrangements that enable and constrain the resource integration process. In other words, by referring to institutions as comprising 'regulative, normative, cultural and cognitive elements that, together with associated activities and resources, provide stability and

meaning to social life' (Koskela-Huotari & Vargo, 2016, p. 4), their role is to guide the contextual resource integration processes.

The role of an organisation is to provide a frame of reference for contextual resource integration - not in isolation, but through the dependencies and interdependencies generated by service exchange. This means that each instant of a resource integration process, and each service provision and actualisation of value cocreation changes the nature of the system to a certain extent. Once the unique sets of practices, symbols and organising principles are included in the process, the more potential the ecosystem has in terms of making sense of the complexity at hand. For that reason, service ecosystems are to be regarded as interinstitutional systems which act as shelters for multiple institutional arrangements. (Koskela-Huotari & Vargo, 2016). In doing so, they offer sources and opportunities for choice, agency and change (Friedland & Alford, 1991), which then enable the resources to become more value-laden (Koskela-Huotari & Vargo, 2016). As the understanding of these semi-autonomous members in organisations increases, the potential of resourceness grows accordingly (Edvardsson et al., 2011; Koskela-Huotari et al., 2016).

Simply put, the ways in which actors, activities and resources take form are being continuously changed and transformed. Guided by enduring social elements called institutions, referring to the process of intertwining and associating individual institutions together through shared rules, norms, meanings, and symbols (Vargo & Akaka, 2009; Vargo & Akaka, 2012), these resource-integrating actors represent a key role in framing the processes of value cocreation (Akaka & Vargo 2014; Edvardsson et al., 2011). In addition, the contextual nature of value cocreation processes, as well as the necessity of continuous interactions between and among different service systems cannot be overemphasised (Siltaloppi et al., 2016).

2.2   The service ecosystems perspective

2.2.1   The service-dominant logic view of service ecosystems

The service-dominant logic view of value creation as the theoretical framework of this dissertation is highly conditional on an adequate understanding of the relationships between the concepts of value cocreation, innovation and ecosystems. Therefore, in Figure 4 (see next page), two different models for explaining innovation are introduced.

To begin with, both of these models highlight the importance of a clear separation between the concepts of (service) platforms and (service) ecosystems. The former term refers to a 'place' where different actors interested in value cocreation first meet and become aware of one another. In other words, platforms are represented as tools to build up the modular architecture and rules that enable the formation of value exchange. Alternatively, they may be presented as the venues for the liquification and condensation of resources (Lusch & Nambisan, 2015). The latter term refers to the fact that service ecosystems act as the emergent structures and processes that enable the value cocreating resource exchange and integration within the multi-actor networks that are built on the service platforms. Hence, value cocreation means the resource integration process within the service ecosystem.

As we can also see below in Figure 4, what makes these two models different is how they give weight to certain characteristics within the innovation process. Whereas the first model tends to emphasise the adaptation of structural flexibility or integrity in the creation of a shared worldview (Lusch & Nambisan, 2015), the second model highlights the importance of seeing value cocreation as a multi-layered process consisting of four major phases of interaction (Galbrun & Kijima, 2009; Kijima & Arai, 2016). In other words, where Lusch and Nambisan (2015) offer a more theoretical, but in-depth view of the roles and functions regarding the focal concepts, Kijima et al. (Galbrun & Kijima, 2009; Kijima & Arai, 2016) focus on providing a multidimensional approach to the trajectory of actions that make value cocreation possible in practice.
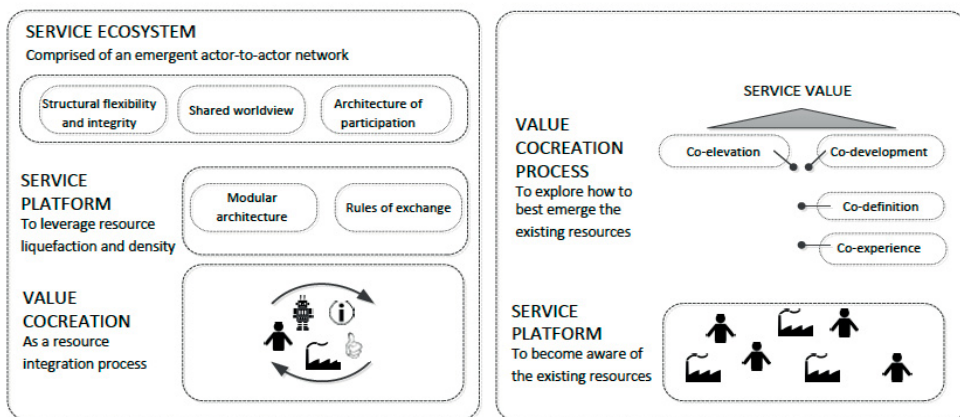

Figure 4.   Frameworks for innovation (Sources: Lusch & Nambisan, 2015; Galbrun & Kijima, 2009)

Earlier presented as two separate frameworks – namely the Value Orchestration Platforms and the Four-Phase Model of the Value Cocreation Process (Galbrun & Kijima, 2009), the two-part model approach to value creation (Galbrun & Kijima, 2009) consists of four layers. Firstly, in the layer of co-experience, the focus is on reducing the gap between the needs and expectations the value cocreating actors have toward the process, as well as in co-defining what an individual person or organisations actually mean by service. Secondly, in the layer of co-definition, the actors become aware of each other's capabilities and expectations and share their common internal models about value cocreation. Thirdly, the layer of co-elevation is about strengthening the communication between the actors through developed, high-quality value propositions. Fourthly, the layer of co-development takes place when the cocreation of innovation is being implemented and evaluated. (Kijima, Rintamäki & Mitronen, 2015; Galbrun & Kijima, 2009). In the Value Cocreation Process, more attention is given to the synchronisation of emerging worldviews.

In this dissertation, these two frameworks for innovation form the grounds on which the final analysis of all research findings, as well as the final discussions and conclusions are based. Thus, this service-dominant logic framework for innovation serves as a guideline for understanding the potential roles and impacts of social media in value cocreation and innovation in service ecosystems.

2.2.2   The growing importance of social media for service ecosystems

In its early definitions, technology was considered as an assemblage of practices and components (Arthur, 2009, p. 28) or as the reconfiguration of resources to solve a variety of problems (Layton, 1974). It is only recently that the elaboration and conceptualisation of the role of digital technologies, and of social media in particular, has become an integral part of ecosystem evolution (Kim, 2016; Vargo et al., 2015). However, the focus on technological innovations remains far too narrow. In particular, understanding of technology as potentially useful knowledge that provides solutions to both novel and existing problems is still rather scarce. (Akaka & Vargo, 2014; Vargo et al., 2015). For example, understanding the role and impacts of social media in institutions and in ecosystems is an important research area to be further elaborated (Lusch & Nambisan, 2015; Koskela-Huotari et al., 2016).

In fact, as the boundaries between users and producers of value are becoming more and more blurred, the possibilities and speed of value creation through social media are increasing significantly. Instead of viewing technology solely as a means

to create new tangible products (such as mobile phones) or as product-related intangible properties enabling communication regardless of time and place (such as social media) (Letaifa et al., 2016; Vargo et al., 2015), it has become exceptionally interesting to examine the actualisation of value cocreation in changing the role(s) and impacts of technology (Lusch & Nambisan, 2015). For example, crowdsourcing is estimated as one of the most promising methods to evoke fundamental changes in idea generation in both the private and public sectors (Poetz & Schreier, 2012; Estelles-Arolas & González-Ladrón-de'Guevara, 2012; Howe, 2006). In other words, given the evolutionary context of technology development, the rapid adoption of social technologies has undoubtedly had impacts beyond our current understanding of social media use.

Despite the emerging interest in studying technology, the focus is still largely limited to studying advanced marketing and customer experiences, i.e. how social media affects the behaviour of individuals (Isotalus, Jussila & Matilainen, 2018; Andersson et al., 2017; Jalonen & Jussila, 2016). In other words, most of social media is restricted to examining the new tools or applications that enable user-generated content creation and sharing (El-Darwiche, Hertzog, Singh & Malouf, 2018; Andersson, Boedeker & Vuori, 2017; Cawsey & Rowley, 2016; Rintamäki & Mitronen, 2015; Kohli et al. 2015; Peters et al. 2013; Smith et al. 2012), communication channels that support social networking (Olshannikova, Olsson, Huhtamäki & Kärkkäinen, 2017; Huhtamäki & Russell, 2015) and strengthen different marketing and branding activities (Hoffman, Novak & Kang, 2016; Agnihotri, Kohhandaraman, Kashyap & Singh, 2012) or, to social media as a tool for business analytics (Fan & Yan, 2015; He et al., 2015). Considering that studying value creation as an endogenous part of value creation has not really taken off yet (Akaka & Vargo 2014; Vargo & Lusch 2016b; Vargo, Wieland and Akaka 2015), more studies are needed about the broadened view of innovation in the digital age (Kim, 2016; Lusch & Nambisan, 2015).

With the current focus on estimating cost structures and potential profits, as well as on gaining and maintaining competitive advantage over rivals (Chesbrough & Rosenbloom, 2002; Chesbrough, 2010), there is growing interest however in value creation through resource integration and service-for-service exchange. By thus offering boundless and flexible alternatives for re-examining the current understanding of management practices and learning experiences (Schneider and Somers 2006), the service ecosystems view (Maglio & Spohrer, 2008; Nilsson and Ballantyne, 2014) both a) elevates the actors' conscious and reflective problem solving by reducing the taken-for-grantedness of institutional arrangements and b)

makes available multiple institutional 'toolkits' consisting of cultural norms, meanings and material practices (Siltaloppi et al., 2016; Vargo & Lusch, 2016). In so doing, it regards resource integration as the means to connect people and technology within and among service systems (Akaka & Vargo, 2014; Geels, 2002; Spohrer, Siddike, & Kohda, 2017). Resource integration also seeks to understand the logic and wellbeing of the entire service ecosystem (Vargo & Lusch, 2016) in terms of whether social media can enable the potentially transformative assemblages of institutional arrangements and whether it could shape the current practices of value cocreation.

While little understanding exists about the ways to use social technologies to provide new opportunities for enhancing the service-dominant logic view of innovation (Lusch & Nambisan, 2015; Tilson, Lyytinen & Sorensen, 2010), applying it as the framework in this dissertation is a good start. As several recent studies have pointed out, it is not the technology aspects that determine the size and depth of technology-mediated interactions, but the quality and strength of social ties between individuals and organisations (Torro & Pikkalainen, 2017; Huhtamäki, 2016). In this respect, the service-dominant logic framework offers a great way to bridge the aspects of human interaction and technology-mediated resource integration.

2.3   Theoretical approaches used in the individual publications

An abundance of (background) theories were used in the five publications of this dissertation. Regarding the research design, by and large, Publications I, II and V are all case studies, Publication III is a literature review and Publication IV is an example of conceptual research. As we can see below from Table 8, the case studies are used both for exploring and confirming the results of this dissertation. When used for exploration, the research focus is on context-dependent variables such as the number and quality of value networks and resource exchange. When used for confirming the results of this dissertation, the research focus is on understanding the magnitude of the contextual changes taking place during the value cocreation processes. Subsequently, the contributions of the literature review (Publication III) and the conceptual research (Publication IV) in the middle of this dissertation have an important role in a) gathering the accumulated understanding and b) expanding the researcher's perspectives regarding the ways to proceed with the research.

Table 8.   (Background) Theories

Research focuses	Research methods	(Background) Theories
I. Value networks and resource density	Case study	Open Innovation (Cohen & Levinthan, 1990)
II. Resource exchange and integration	Case study	Open Innovation (Cohen & Levinthan, 1990) in the context of task and product complexity (Schenk & Guittard, 2011)
III. Value cocreation and resource integration	Literature review	The 5C framework model (Vuori, 2011)
IV. Value networks and institutional complexity	Conceptual research	Complex Adaptive Systems (Akgun, Keskin & Byrne, 2014; Schneider & Somers, 2006; Dooley, 1997) and Service-Dominant Logic (Vargo & Lusch, 2004)
V. Value cocreation and resource integration	Case study	Two-part model approach to value creation (Galbrun & Kijima, 2009)

Even if all the background theories and research methods used represent common methods in economic sciences, they also have strong links to social sciences, i.e. to behavioural sciences (value network analysis), systems theories (complex adaptive systems) and futures studies (causal layered analysis). The background theories and research methods were all carefully considered and justified according to the research focus of the individual publications - and the two research questions. Although this chapter is limited to studying the service-dominant logic view of value cocreation and innovation in ecosystems, all the publications had their own scope of research that defined the use of a variety of (background) theories.

In Publications I and II, the concept of open innovation (Chesbrough 2003; Chesbrough & Rosenbloom, 2006) was used as a theoretical framework that provided the correct 'mindset' and guidelines for understanding the basic requirements and characteristics of an open ecosystem. The reasoning behind the use of open innovation – as stated by Bror Salmelin, one of the leading advisors for innovation systems in the European Commission – was 'to see innovation as ecosystem-driven, including all stakeholders as active players in jointly creating and experimenting in the new ways of doing things and creating new services and products' (Salmelin, 2015, p. 4). That is, the importance of value cocreation as an essential part of business competitivity is put in front (Adler, 2015; Salmelin, 2015).

In order to understand the requirements for and characteristics of increased resource exchange and integration, in Publication II, the concept of open innovation was applied in the specific context of task and product complexity (Schenk & Guittard, 2011). In other words, considering that companies tend to be challenged

in managing innovation that represents something outside their previous experience and understanding, the main idea behind open innovation lies in its request for more advanced and more diverse exchange of resources. Given that the challenges and impacts of diversity have been widely discussed in relation to strategic growth (Ansoff, 1957; Chandler, 1990), 'open innovation is also perceived as a generic disruptor the same way as Big Data/AI' (Sommarberg, 2016, p. 165), it certainly is one of the most important theoretical frameworks to be used for increasing the understanding of resource exchange and integration.

In Publication II, a framework adapting the 5C framework model by Vuori (2011) was developed to organise the reviewed literature in a way that allowed assessment of whether or not the articles discussed service-based thinking. To be specific, the 5C model, described below in Table 9, was used to identify the different social media functions within the studied articles. It was assumed that some of the functions of social media, such as communicating, collaborating and completing, would be better aligned with value cocreation, whereas other social media functions, such as connecting and combining, would be more typical of value creation. Separate columns for value creation and value cocreation were added to position the existing studies into an emphasis on product-oriented and/or service-oriented thinking.

Table 9.   The 5C framework model

5C functions	Typical social media applications	Purpose
Value cocreation		
Collaborating: collective content creation	Wikis, shared workspaces	To create content together, to collaborate, to produsage (Bruns, 2006)
Communicating: publishing and sharing content	Blogs, media sharing systems, discussions forums, micro blogs, instant messaging	To publish, discuss, express oneself, show opinions, share, influence, store
Completing: adding, describing and filtering	Tagging, social bookmarking, syndication, add-ons	To add metadata, to describe content, to subscribe to updates, to combine, to experience serendipity
Value creation		
Connecting: networking	Social networks, communities, virtual worlds	To socialise, network, connect (sometimes also to play and entertain)
Combining: mixing and matching	Mash-ups, platforms	To combine other tools and technologies according to situations and needs

In Publication IV, both complex adaptive systems thinking and service-dominant logic were applied to create a theoretical, yet practice-oriented framework to understand the required fundamental shifts that are emerging in the rigorously changing contexts for value cocreation. Indeed, according to complex adaptive systems thinking, the effectiveness and productivity of organisations are highly dependent on: 1) the emergence of variables that make these systems complex, 2) the different contexts in which these variables can occur, and 3) the relationships among the various independent actors involved in the systems (Akgun et al., 2014).

As changes in complex adaptive systems are impossible to comprehend or predict, social interactions and a certain sense of community among the employees within the studied systems is encouraged. In fact, the use of complex adaptive systems can offer great insight into both the principles of emergence and the self-organisation of networks formed by creative individuals. Hence, together with service-dominant logic, the ideas and understanding of complex adaptive systems serve as a concrete tool to support both managers and employees in their search for new customer-based approaches to value creation (Nuutinen & Lappalainen, 2012). It is a great stepping-stone for adopting the numerous requirements of digital business environments for individual skills and competences.

In Publication V, the service-dominant logic view of value cocreation and ecosystems is applied as the theoretical background of the study. As shown below in Table 10, the two-part model approach to value creation (Galbrun & Kijima, 2009) is used to distinguish the functionalities of the physical service platform and the actual value-cocreating process occurring among the service ecosystem actors. With this clear distinction, the framework emphasises the role of the service platform in creating new possibilities (i.e. resources) to accelerate collaboration (i.e. resource integration).

Table 10.   The four-phase framework for analysis used in Publication V

The four phases of value cocreation	The four layers of causality	Description
1) Co-experience	Litany	Current perceptions about how the platform supports value cocreation
2) Co-definition	Social causes	Co-defining the system-level behaviours and rules that direct the ecosystem development
3) Discourse	Co-elevation	Co-elevation of the worldviews and values with (hidden) impacts on attitudes and behaviour
4) Co-development	Metaphors and myths	Co-elevation of the worldviews and values with (hidden) impacts on attitudes and behaviour

As explained in section 3.2.1., in this model, value cocreation is seen as a four-phase process during which both the awareness of the resources and of the possibilities of resources integration are increased. Whereas in phase 1 (co-experience) the focus is on reducing the gap between the needs and expectations of the value cocreating actors, in phase 2 (co-defining) the actors gradually become aware of each other's capabilities and expectations related to value cocreation. In phase 3 (co-elevation) collaboration is strengthened through high-quality value propositions, and in phase 4 (co-development) the actual cocreation finally takes place and is evaluated (Kijima et al., 2014; Galbrun & Kijima, 2009). What makes this framework in Publication V unique is the fact the four phases presented in the two-part model approach to value cocreation are merged with the four layers of causality presented in the framework used for causal layered analysis (Inayatullah, 2008; Inayatullah & Milojević, 2015).

3 DATA COLLECTION AND ANALYSIS

In this chapter, an overview of the various different research methods and data collection and analysis techniques of this dissertation is presented and justified. Although abductive reasoning is often based on interviews as the primary source of data, in this study, the research methods, data collection and analysis techniques were chosen to support the exploration of the various potential roles and benefits of social media. In other words, the different choices were based on providing a comprehensive understanding of the use of social media in value cocreation and innovation.

3.1 Research methods used

As shown in Table 11, a qualitative multi-method approach was used in this dissertation. The research methods used were case studies, literature review and conceptual research together with an abundance of data collection and analysis techniques that are presented in the next section. In this way, the researcher was determined to ensure that these research methods would support the exploration of the potential roles and benefits of social media from various different viewpoints.

Table 11.   Research focuses and methods

Research focuses	Research methods
I. Value networks and resource density	Case study
II. Resource exchange and integration	Case study
III. Value cocreation and resource integration	Literature review
IV. Value networks and institutional complexity	Conceptual research
V. Value cocreation and resource integration	Case study

3.1.1 Case studies

Since the role of case studies is to examine the chosen theoretical approaches in practice (Stake, 2005), they are best used when the aim is to find out 'why' things are as they are or 'how' things are perceived and developed. Often used in real-life research situations where the researcher has little or no control at all over the studied phenomenon (Yin, 1994), case studies are specifically useful when developing or testing theories or hypotheses (Ghauri & Grønhaug, 2005). Although several different categorisations for case studies exist (Stake, 2005; Ghauri & Grønhaug, 2005; Yin, 2003), according to Stake (2005) the three key categories are intrinsic, instrumental and multiple case studies.

Whereas in intrinsic case studies, the aim of the research is to form an understanding of a particular case, the instrumental case study refers to situations where the case study only provides insight about a specific issue the case relates to. In turn, a multiple case study refers to situations where a set of different case studies are used to enhance the understanding of a common issue. (Stake, 2005; Koskinen, Alasuutari & Peltonen, 2005). In this study, the multiple case study approach was applied, to seek exemplary or contrasting results that help in explaining and justifying the topics raised by the research questions.

Besides ethnographic observations and interviews, the data sources used may vary from documents (i.e. reports, white papers, guidelines etc.) to physical artefacts (Baxter & Jack, 2008). While case studies are highly flexible to implement, it is important to carefully plan the case designs and to justify the selected cases in relation to the research aim and questions. Moreover, as argued by Yin (2003), it is also possible that the case designs change along the way, due to new insightful knowledge and information discovered during the data collection. The use of multiple case studies supports the nature of this dissertation well, i.e. to explore different issues by building on top of the preceding study. Effectively, in Publications I and II case studies were used to explore the impacts of social media on resource density and to identify the key indicators for value cocreation through social media-enabled resource exchange and integration. In Publication V, a case study was chosen to study the impacts of increased institutional complexity for advancing innovation in service ecosystems, i.e. validate the answers to the first research question that had been found by that point and to explore possible answers to the research question.

3.1.2 Literature reviews and a conceptual study

A literature review (Webster & Watson, 2002) is regarded as an essential part of any scientific research, enabling the researcher to position and debate the research aim to the chosen research field. Therefore, in this dissertation, a literature review was used to help the researcher to reveal potentially new research gaps that were not identified in the first place, or that were detected during the first empirical case studies. Conducting an exhaustive systematic literature review (Fink, 2005) avoids any bias in selecting and analysing the literature (Petticrew & Roberts, 2006; Metsämuuronen, 2005). As found in Publication III, the use of a literature review offered an important insight into the gap between the theoretical views and the practical implementations regarding the use of social media in value creation.

In Publication IV, conceptual research (Greene, Caracelli & Graham, 1989) was used. By definition, conceptual research refers to observing and analysing knowledge and information from existing studies without any practical experimentation. Consequently, it refers to the formation of abstract concepts and ideas that support the development of new theories or interpret existing theories from a new perspective. It aims for a systematic explanation of the studied issue and serves as the basis for validating or redirecting the conduct of a research.

In Publication IV, the focus was on discovering the concept of innovation from a new perspective. With the support of an umbrella review, any relevant literature regarding the chosen issue was searched for a) to identify the specific variables (i.e. frameworks, themes and topics) related to the studied issue and b) to generate a conceptual framework to help in using the acquired knowledge and information in the following phases of the overall research – in this case Publication V. Ultimately, Publication IV served as a background study for this dissertation, helping the researcher to make the shift from one study approach to another, i.e. from studying product innovation to understanding value cocreation and innovation. As discussed later in chapter 5, the literature used in making this particular conceptual framework as well as the concepts used in the created framework were somewhat deficient. However, the framework does significantly support the researcher's interest and abilities to find a more suitable theoretical approach for using the insights gained and for answering the research questions.

3.2 Diversity of data collection techniques

As shown below in Table 12, the concrete techniques used for data collection included online netnographics, interviews and literature reviews. Special attention was paid at all times to the quality aspects of the acquired data. For example, to emphasise the plausibility, contextual relevance, uniformity and investigator-free nature of the interviews, prolonged engagement with the interviewees as well as persistence and depth of observations were highlighted during the interviews.

In addition, serious consideration was given to aspects such as the credibility, transferability, dependability and confirmability of both the interviews and of the literature reviews (Guba, 2012). Regarding the interviews, their structural coherence was ensured by comparing the answers against the overall data by using transcriptions throughout the entire process of analysing the results of the interviews. Regarding the literature reviews, both the keywords and search strings as well as the selection of journals were comprehensively considered to ensure sufficient coverage.

Table 12.   Techniques for data collection and description of data

Techniques for data collection	Description of data
I: Online observations, interviews (online netnographics and semi-structured in-depth interviews)	Altogether 280 screen captures from interactions on the platform, 44 downloaded entries (i.e. CAD designs). 1 interview lasting 80 min with two people representing the case company
II: Online observations, interviews (online netnographics and semi-structured in-depth interviews)	Altogether 280 screen captures from interactions on the platform, 44 downloaded entries (i.e. CAD designs). Altogether 3 interviews with the case company representatives and 1 interview with the platform owner, of 45-90 min.
III: Literature review (systematic literature review)	Altogether 549 articles were collected from the databases (125 from Scopus, 230 from EBSCO, 194 from ABI-Inform), of which 23 articles were included in the final synthesis.
IV: Literature review (umbrella review)	A collection of the key literature on complex adaptive systems and on service-dominant logic.
V: Interviews (semi-structured theme interviews)	Altogether 22 interviews, of 35-90 min, with the members and stakeholders of a real-life service ecosystem.

3.2.1　Online netnographics and interviews

Online netnographics were used in Publications I and II to enable the observation of technology-mediated interactions in online networks and communities (Kozinets, 2007, 2010). Online netnographics actually refers to a qualitative research approach that extends the traditional notion of field and ethnographic studies. It is a simple and quick method that supports the collection of more naturalistic and unobtrusive data than surveys and interviews can provide (Kozinets, 1998, 2010). The five main steps for using online netnographics for data collection are: 1) defining the research questions, topics and social sites to be investigated, 2) identifying and selecting communities within the chosen social sites, 3) collecting data while observing the participants and communities, 4) analysing the data and 5) sharing the findings as well as their theoretical implications and policy indications (Kozinets, 2010).

In this study, the data for Publications I and II was collected from www.grabcad.com, an online crowdsourcing platform and community of professional designers, engineers, manufacturers and students. Altogether 280 screen captures, and 44 downloaded copied entries of computer-aided designs were collected from interactions on the platform. The data collection was made by the co-authors of Publication I in a project prior to this dissertation. None of the researchers participated in the interactions or performed other actions on the studied crowdsourcing platform, thus ensuring the authenticity of the collected data.

In both Publications I and II, additional semi-structured in-depth interviews were conducted to enrich the data. In Publication I, only one semi-structured and in-depth interview was held to complement and confirm the preliminary analysis based on the online netnographic data. However, the interview was conducted with two company representatives simultaneously and lasted for 80 minutes, thus adding to the informative nature of the interview. In Publication II, altogether three semi-structured in-depth interviews were conducted to provide the required specification of the earlier collected data and to support the research aims of Publication II. Of these interviews, two were held with the case company representatives and one with the platform owner, and each lasted from 45 to 90 minutes.

3.2.2　A systematic literature review

The systematic literature review, used in Publication III, was an exact replication of Fink's (2005) model for systematic literature review, accomplished in seven stages: 1) selecting research questions, 2) selecting the bibliographic or article database, 3)

choosing search terms, 4) applying practical screening criteria, 5) applying methodological screening criteria, 6) performing the review and 7) synthesising the results.

A total of 549 articles were collected from three large interdisciplinary databases (Scopus, EBSCO and ABI-Inform) to guarantee a comprehensive sample covering the most important articles on social media-based business and/or value creation models. After the first screening, and the exclusions of duplicates, the number of articles was decreased to 117. Several keywords and search strings were used to cover all articles related to social media, including the different terms (i.e. 'Web 2.0', 'enterprise 2.0' and 'social media') and spelling options used at different stages of the technology development. In addition, the following screening criteria were applied to exclude articles that did not match the research aims: 1) include only studies in English, 2) include studies focused on social media, Web 2.0 or Enterprise 2.0, 3) include studies focused on value creation, value capture or business models, 4) include studies conducted from January 2005 through the end of 2014, 5) exclude studies focused on public or non-profit organisations and 6) exclude duplicates.

Table 13. The practical screening criteria used in Publication III

Inclusion criteria	Type
Include only studies in English	Publication language
Include studies focused on social media, Web 2.0, or Enterprise 2.0	Content
Include studies focused on value creation, value capture, or business models	Content
Include studies conducted from January 2005 until the end of 2014	Duration of data collection
Exclusion criteria	**Type**
Exclude studies focused on public or non-profit organisations	Setting
Duplicates	Content

As can be seen iabove n Table 13, after having applied all the inclusion or exclusion criteria, only 26 articles were left for the final synthesis, based on titles, abstracts and keywords. During this more intensive examination, some articles were determined as not fitting our research focus. For example, a few of them were focused on public or non-profit organisations. Hence, three more papers were excluded as they did not match the inclusion criteria when examined in more detail. The final number of articles for our review was thus reduced to 23 research papers. Most of the selected papers were published between 2010 and 2014. The synthesis of the results was developed to 1) describe current knowledge about a topic or body of research, 2)

support the need for and significance of new research, 3) explain research findings and 4) describe the quality of a body of research.

3.2.3   An umbrella review and interviews

In Publication IV, an umbrella review (Ioannidis, 2009; Aromataris, Fernandez, Godfrey, Holly, Khalli & Tungpunkom, 2015) was made to collect all the key literature on complex adaptive systems and on service-dominant logic. The umbrella review consisted of research articles published within the past 5 -10 years in the most valued academic journals with an interest in service science, including for example Service Science, Journal of Service Research, Journal of Marketing and Journal of the Academy of Marketing Science.

Looking at the wide picture obtainable from an umbrella review is ideal for gaining a clear understanding of a broad topic area. To put it another way, conducting an umbrella review represents an opportunity to address a broad scope of issues related to a topic of interest. As such, it is a synthetisation of several distinctive forms of research, with the aim of generating new, versatile knowledge about the research topic in question. By emphasising the strengths and by identifying possible deficiencies in the existing literature, it does not represent a summary of the existing research on the topic, rather a creative process which aims at new insights and better understanding of the topic.

The success of an umbrella literature review depends on many different factors. Firstly, it needs to address the chosen topic or problem. Secondly, the review is all about searching for and retrieving the appropriate literature. Thirdly, the chosen literature must be analysed and criticised. Fourthly, a synthesis must be made to create new understandings of the topic. (Russel, 2005). An integrative umbrella literature review shares many common traits with a systematic literature review, and it benefits from a systemic data collection. In addition, it offers a holistic, yet novel way to review, critique, and to potentially reconceptualise the increasingly diversified knowledge base of the continuously evolving topic. (Aromataris et al., 2015). With the focus on finding the key literature, the exact number of articles was irrelevant. The quality of the umbrella review is most likely proportional to the level of Publication IV.

Finally, a total of 21 thematic interviews with 22 individuals were conducted to provide the empirical data for Publication V. The focus of attention was Kampusareena, a recently built ecosystem-level university-industry collaboration

located in the middle of the Tampere University of Technology campus in Hervanta (Finland). With only a few exceptions, all the interviews occurred in face-to-face situations in order to better adjust and specify the questions according to the context and situational conduct of the individual interviews. Depending on the interviewee, the interviews lasted from 35 to 90 minutes.

Table 14.   Background variables of the interviewees

	All public organisations	Partner university only	Companies	Partner company only
Number of interviewees (total)	11	7	11	5
Position in top/middle management	3	4	6	2
Position as an expert/researcher	4	2	5	3
Active participation in the service platform concept development	3	1	6	4
Expertise in innovation related research and development	8	4	6	4
Office (mainly) at the service platform	2	1	9	5
Active in cocreation at an innovation hub	7	5	5	3

As shown above in Table 14, half (11) of the respondents were currently employed by a public organisation, including the representatives of Tampere University of Technology as the partnering university (7). Another half (11) of the respondents were employed by companies, including the representatives of 'The University Properties of Finland Ltd' as the partnering company (5). In other words, half of the respondents represented the university partner, whereas the other half represented their various stakeholders, including both companies (6) and public, non-profit organisations (4).

With several innovation hubs within the hub itself, each of them helping companies to solve their business problems, and by offering various different networking opportunities, a service ecosystem was built to bridge the gap between companies and the university. With a mix of both free and paid services to support industrial research and development, it represented an ideal case study for examining the emergence of cocreation in a complex, multi-actor service ecosystem between university and industry.

3.3   Conducting the data analysis

With regard to the processes through which information is first collected from all relevant sources and then analysed to answer the overall research problem, several overlapping methods for data collection were used in this dissertation to avoid the possibility of bias and to reduce the unreliability of the results (Guba, 2012; Shenton, 2004). Due to the explorative nature of this study, knowledge and understanding of the studied phenomena have been acquired through continuous dialogue between empirical data and literature.

Table 15.   Research focuses, methods and techniques for data analysis

Research focuses	Research methods	Techniques for data analysis
I. Value networks and resource density	Case study	Content analysis based on Value Network Analysis (Allée, 2002, 2008, 2009)
II. Resource exchange and integration	Case study	Content analysis based on using the theoretical framework of open Innovation (Cohen & Levinthan, 1990) as a guideline for the analysis
III. Value cocreation and resource integration	Literature review	Conceptual analysis based on the 5C framework model (Vuori, 2011) and the theoretical framework of service-dominant logic (Vargo & Lusch, 2004)
IV. Value networks and institutional complexity	Conceptual research	Conceptual analysis based on an umbrella review (Ioannidis, 2009; Aromataris, Fernandez, Godfrey, Holly, Khalli & Tungpunkom, 2015)
V. Value cocreation and resource integration	Case study	Content analysis based on the use of Causal Layered Analysis (Inayatullah, 2008; Inayatullah & Milojevíc, 2015) and the two-part model approach to value creation (Galbrun & Kijima, 2009)

As shown above in Table 15, more emphasis has been placed on the quality rather than the quantity of empirical data. That is, the techniques of both content analysis and conceptual analysis have been used in this dissertation. In conceptual analysis, the theory-based data is broken down to acquire a more thorough understanding of the studied phenomena. The use of content analysis is mostly connected to identifying the emerging themes of interest within the studied data. With the exception of Publications II, II and IV, where the analysis was made based on using the theoretical approaches as a guideline, the following two methods of analysis were used:

In Publication I, value network analysis (Allée, 2008; 2009) was used as a visual method for understanding different internal and external value networks or complex

ecosystems. Having many shared characteristics with social network analysis, which is considered one of the key techniques in modern sociology, the differences are sometimes hard to observe. However, whereas the focus of social network analysis is on the social structures that (potentially) emerge between different individual actors or things, value network analysis is more interested in the quality and impact of the identified relationships. In this case study, these actors included the experts of the crowdsourcing platform, the case company experts and the participants.

By using value network analysis, attention was drawn, not to the various ties or links between the actors as such, but to understanding the dynamism of the relationships. Once this 'whole systems perspective' of the relationships was formed, i.e. the actors and their roles were identified, attention was directed towards visualising the quality of the value exchange between them. Slightly updating Allée's (2000) view of value that highlights the division of value networks into monetary and non-monetary issues, in this study the division was made on the basis of the resources' tangibility. Hence, the following divisions were obtained: 1) goods, services and revenue, 2) knowledge and 3) other intangible benefits. The first division is based on material exchanges that are usually easier to measure in monetary terms, and the third division is restricted to intangibles, which are not countable in the financial sense. In addition to identifying the actors, their roles and the tangible and intangible exchanges between them, the process usually includes an impact analysis that reveals the created value to each of the actors, conducted through analysing the trade-offs of benefits and sacrifices. This was beyond the scope of this study.

In Publication V, the method of causal layered analysis was used to identify and develop constitutive narratives that support the service ecosystem's long-term strategic planning and value cocreation practices (Inayatullah, 1998; Inayatullah & Milojevíc, 2015). Causal layered analysis represents a modern technique for strategic planning and critical futures research. By combining several research traditions and practical tools such as emerging issues analysis, scenarios and back-casting, the focus of causal layered analysis is to first examine past and present value-creating practices and then reveal any conscious and subconscious preconceptions related to the issue under study (Inayatullah, 1998; Riedy, 2008).

The layers used in causal layered analysis are as follows: 1) the litany, which refers to issues that are often collectively shared as 'facts', yet rarely questioned or confirmed with real data; 2) social causes, which focus on the system's perspective on economic, social, political and cultural factors and thus explain the behavioural rules behind the litany; 3) discourse, which reveals the significant impact that our

historical, social and spatial settings have on our common sense and thinking, including how we build structures and discourses around our values and worldviews; and 4) metaphors and myths, which expose narratives and false information that we use to justify ourselves to our inner selves (Inayatullah, 2008; Inayatullah & Milojević, 2015). In Publication V, a unique combination was implemented in the framework of analysis, by integrating causal layered analysis with the two-part model approach to value creation (Galbrun & Kijima, 2009).

Whether conceptual or content analysis was used, special attention was paid to the aspects of the credibility, transferability, dependability and confirmability of the analysis. In Publications I, II and II, this was ensured by the collective concern and verifications enabled by the circle of co-authors. In Publications IV and V, the researcher was supported by valuable feedback from peer-reviewers and the editorial team. Overall, supported by a well-established research methodology, the researcher was able to ensure that the most suitable research methods and data collection and analysis techniques were used throughout this dissertation – thus enhancing the quality of the research process.

4 SUMMARY OF PUBLICATIONS AND THEIR MAIN RESULTS

In this section, the results of each of the five publications are summarised. The results are presented according to the two consecutive and interconnected research questions. With reference to the first research question of this dissertation, i.e. 'How does social media enhance the organisational practices of value cocreation in innovation?', an organisational perspective of the ways how social media enhances value cocreation and innovation is provided as the first level of analysis. Next, the results of the second research question, i.e. 'How does social media enhance value cocreation and innovation in ecosystems?, are presented similarly as the second level of analysis, shedding light on the ways how social media enhances value cocreation and innovation in service ecosystems. All in all, the aim of this chapter is to form a narrative entity where each individual publication receives a new meaning as part of the whole.

4.1 First level of analysis – organisational perspective

4.1.1 Social media impacts on resource density

When conducting the first empirical study of this dissertation, the main research aim was to study the role of social media in generating more value during the new product development process of business-to-business companies. In practice, the focus was on exploring the use of crowdsourcing as a new tool to foster innovation. In a theoretical sense, the focus was on understanding novel, systemic ways of generating value. Thus, attention was paid to both the indirect and direct benefits of crowdsourcing. Based on an extensive study on crowdsourcing literature, the definition of crowdsourcing by Estelles-Arolas and González-Ladrón-de-Guevara was used: 'Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organisation or company proposes to a group of individuals of varying knowledge, heterogeneity and number, via a flexible open

call, the voluntary undertaking of a task.' (Estelles-Arolas & González-Ladrón-de-Guevara, 2012, p. 197)

The crowdsourcing challenge was held at www.grabcad.com, an online platform which represents a community of over one million professional designers, engineers, manufacturers and students – GrabCAD. As the platform has been designed to serve as a collaborative tool for editing and sharing as well as for organising competitions, it offers the community members an open source library of computer-aided designs and access to industrial and mechanical design tools. The challenge was launched by a world-leading company in the manufacturing industry, interested in experimenting with all kinds of new tools and methods to improve their innovation activities – and the resulting corporate competitiveness.

Using Verna Allee's value network analysis (2002, 2008) to identify the different value transactions modelling the complex value flows and human collaborations taking place during the crowdsourcing process, this study represented a unique opportunity to observe the role of social media in enhancing the resourceness of the value creation process. Based on the netnographic data (Kozinets, 1998, 2010) gathered from the online environment and the semi-structured interview held with the case company's engineering director, several different actors were identified as being involved in the process. These actors included the GrabCAD experts, the GrabCAD company, the case company experts, the case company, the participants and the non-participating community members.

Important specifications concerning the rules were implemented during both the call formulation and the early stages of the crowdsourcing challenge. In addition, updates on the challenge-related information were exchanged during a) the crowdsourcing process, b) the final examination of the created solutions and c) the adoption of the complex solutions. According to the interview with the case company's engineering director, the nature of the value transactions was systemic, and the discussions curated (or facilitated) by the GrabCAD experts played an important role as a 'value-adding link' between the case company and the CAD engineers participating in the challenge. In other words, the GrabCAD experts had an important role in increasing the quality of the value propositions by bringing their expertise and experience in formulating the complex crowdsourcing task and in steering the concepts towards the case company's goals. This had significant impacts on the case company experts' abilities to intensify the sharing of knowledge and innovative ideas.

A visual analysis of the most important value transactions was created, based on a total of 280 screen captures that were transcribed in the form of value transactions.

As shown in Figure 5, the purpose of the created visual analysis was to demonstrate the resource exchange that occurred during the crowdsourcing challenge. Next, the impacts caused by both the tangible and intangible transactions were examined. As demonstrated in the figure showing the multiplicity and nature of the actualised value transactions, the direct contacts between the case company and the crowd were practically non-existent, i.e. they were focused on the exchange of tangible goods, such as the product prizes and cash for winning designs. The exchange of information, knowledge and advice, i.e. intangible resources, seemed only to occur in exchanges between the GrabCAD experts and the case company experts, or between the GrabCAD experts and the participants.
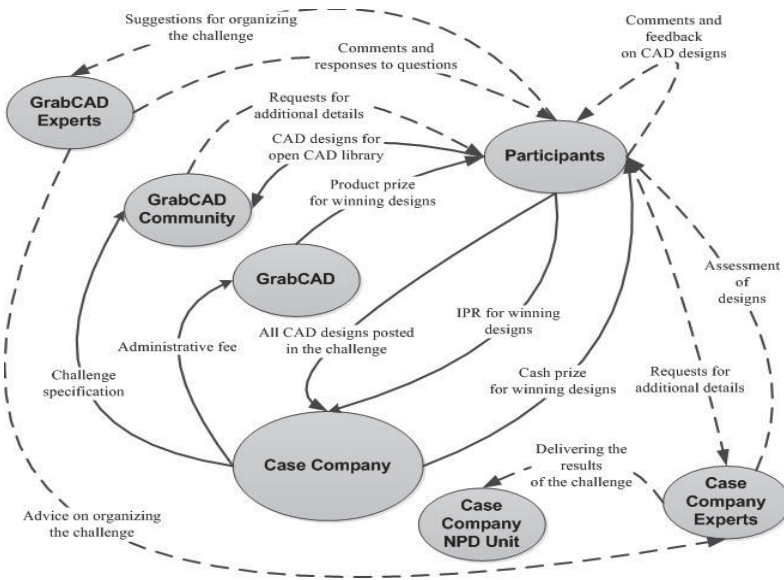
Figure 5. Value transactions identified during the crowdsourcing process

The main result of Publication I was that the use of a social media-enabled online platform was reported to have significantly increased both the density and the resourceness of the exchanged resources. First of all, by bringing together a diverse set of knowledge and skills from around the world, regardless of their geographical location or time zone, the GrabCAD online platform enabled different actors to meet, discuss and learn from each other in completely new ways compared to offline environments – thus significantly increasing the density of resources. Further, by offering the participants open access to the GrabCAD online library, with tools and designs to support continuous interactions between the participants, the GrabCAD

online platform was able to expand from its role as a simple technical platform to a major contributor in facilitating the increased resourceness of the exchanged information and knowledge. All in all, due to the increased resource density and the resulting resourceness of the resources, the case company experts were able to utilise the shared knowledge and innovative ideas in more intensive and cost-efficient ways. According to the case company's engineering director, with relatively little monetary investment, the challenge cost them about half of what would have been the case if they had accomplished it completely by using their in-house development resources. It would also have taken them a couple of more years to run the challenge and to contact skilful designers by themselves.

However, despite improving the quantity and quality of the resource exchange, no actual commitment to value cocreation between the case company experts and the community members was observed. The use of social media did not guarantee a good process or excellent outcomes. Nor did it have any impacts on the social structures between the case company experts or the participants representing the GrabCAD community. With the exception of the GrabCAD experts, none of the value cocreating actors seemed to have any interest in developing the value networks.

4.1.2 Optimisation of resource exchange and integration

When finalising Publication II in late 2015, very little was known about the benefits and challenges of crowdsourcing in the context of business-to-business companies and industrial companies in particular (Franzoni & Sauermann, 2014; Kärkkäinen, Jussila, Erkinheimo, Hallikas, Isokangas & Jalonen, 2014). Hence, the aim was set to identify the ways in which the use of social media enables more resource exchange and integration in value cocreation. Whether the use of crowdsourcing had effects on the case company's innovation activities in general or whether it was to be regarded as more beneficial for value creation than any other forms of ideation was not included in this study. Therefore, a blueprint was drawn up from the studied crowdsourcing process for understanding better the ways in which the case company tried to optimise their resource exchange and integration.

As already shown in Publication I, the interactions between the case company experts and the participants were almost entirely related to tangible resources, such as exchange of finalised CAD designs and the handing out of the winning prize, and a lot of the potential for resource exchange and integration was not fulfilled. However, the crowdsourcing challenge appeared to be an opportunity for the case

company to evaluate their own employees' abilities to assess external resources and to integrate those resources in their own work. This was supported by the results of Publication I, highlighting the facilitating role of the GrabCAD experts in increasing the case company's abilities to benefit from the increased density of resources – as well as their increased resourceness. In other words, in comparison to Publication I, more emphasis was placed in Publication II on the ways to integrate the available resources into the case company's innovation process. When doing this, the concept of open innovation by Cohen and Levinthal (1990) was applied as the overall study approach, in accordance with West and Gallagher's (2006) observations of three practical challenges in internal and external innovation. The data in Publication II was largely derived from the same data as that used in Publication I. However, two additional interviews were made - one with the GrabCAD platform owner, and one with a manager representing the case company's innovation unit.

Once the call for the crowdsourcing challenge had been well formulated, the case company's innovation unit decided to launch the exact same crowdsourcing challenge on the company's internal social media platform. The crowdsourcing challenge was thus used to stimulate the case company employees' interest in the process and to challenge them in a similar process of assessing external resources and integrating them in their own work. In addition to testing the benefits of crowdsourcing in relation to the case company employees' own innovation capability, participating in this process also encouraged them to maximise their abilities to recognise and assimilate newly created information and knowledge.

The observations of Publication II were divided into three consecutive phases: 1) ideation (i.e. 'What happened before launching the challenge?'), 2) increasing resourceness (i.e. 'What was done during the crowdsourcing process to affect the resourceness of the resources?') and 3) resource integration (i.e. 'How was the resource integration actualised after the crowdsourcing challenge?'). This is depicted in Figure 6, which represents an updated and extended version of the figure in the original publication, identifying the various process-specific rules and guiding principles that contribute to the resourceness (i.e. the value-in-context) of the crowd-sourced information and knowledge (i.e. the resources) – as well as to the success of the crowdsourcing process.
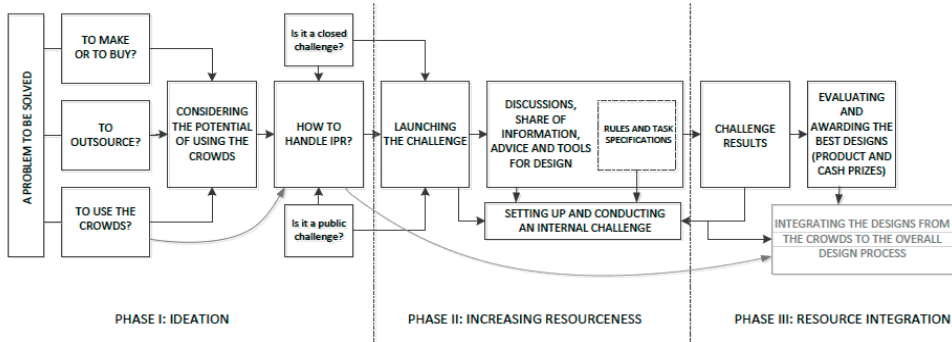
Figure 6. From ideation to increased resourceness and resource integration

During the first phase, it became clear that careful consideration was needed regarding the expected feasibility of the online environment(s). In addition, by attracting a large number of highly skilled engineers (i.e. the crowd) to take part in the global online community and to communicate regardless of their geographical location, the use of social media relieved the case company from a series of tasks starting from recruiting the needed crowd to the orchestration of value. However, in Publication II, the differences between the different options of buying or making to outsourcing or crowdsourcing were not studied.

Next, during the second phase, the use of social media played an essential role in initiating new value networks, where the GrabCAD experts had an important role in orchestrating the value at hand. Thanks to social media, the resource exchange seemed less dependent on the number of actors involved in the process than on ensuring that sufficiently numerous and skilled members of the crowd were motivated to participate in the process. Nevertheless, use of social media-enabled value networks and the thereby increased resource density was neglected far too much. Despite active work by the service intermediaries, i.e. the GrabCAD online platform and the GrabCAD experts, the exchange of ideas and knowledge between the case company and the crowd never took off. According to the interviews, the benefits from the abundant and diverse knowledge and skills were mostly related to the quality of the end results – and the resulting creation of absorptive capacity (see Cohen and Levinthal 1990) among the case company's own employees.

Thirdly, even though the use of social media provided a low threshold for resource exchange, these resources were not fully recognised or integrated. With a strong focus on understanding resource exchange as an event where the best designs are handed over and rewarded, none of the actors seemed to miss any deeper form of resource integration. From the case company's point-of-view, the main success

criteria were a reduced investment of time and money for administration of the process, thus regarding the crowd as a new form of outsourcing. Had there been more resource integrating interactions between the case company experts and the participants, even better designs or more new knowledge could have been developed during the crowdsourcing challenge. With that in mind, Publication II serves as a good reminder that in order to enhance the resourceness in value creation, special attention should be paid to encouraging open communication and diversity of resources.

Moreover, the studied crowdsourcing process seemed to follow a rather firm-focused resource optimisation where the main focus remained the optimisation of resourceness for the benefit of the case company, not the value cocreation process itself. Considering that the main outcome of Publication II was to provide leveraged understanding of the preconditions for successful resource integration, it called for more attention to the ways in which the institutional arrangements between different value cocreating actors could be developed and the quality of the resource exchange could be further intensified. Although the case company was highly satisfied with the results of the crowdsourcing process, and the increased absorptive capacity of their employees, the results of Publication II did not directly confirm that resource integration had been fully optimised.

4.1.3   The untapped potential of social media

Based on the results of Publications I and II, indicating the untapped potential of social media in value creation, the researcher's aim in Publication III was to review the impacts observed so far of social media on remodelling the existing value cocreation practices and business models. An extensive literature review consisting of altogether more than 500 academic journal articles published in 2005-2014 was completed in spring 2015. The aims of this research were supported by several earlier studies, with reference to estimations that social media would not only affect the relationships between the various independent actors involved in the resource exchange (Akgun et al., 2014; Norman, 2001), but that it would also result in significant new possibilities for organisations to transform their businesses or pursue new innovations and services (Fan & Yan, 2015; He et al., 2015; Mayer-Schönberger & Cukier, 2013).

The results were surprisingly moderate. With snapshot-like analyses of value(s) experienced at certain moments of time, most of the business models found were

still based on models that already existed before the reign of social media or even before the Internet. Most importantly, the use of social media in value creation had rarely been analysed. On the contrary, it was only described as a new context for value creation to take place. These results seemed to be quite similar to the five-year-long study on novel business model innovations published by Swiss researchers Gassman, Frankenberger and Csik at the time when Publication III was under peer review. After having analysed 250 different business models that had been commonly applied within the previous 25 years, they had recently developed a methodology that identified the 55 most common patterns of business models. According to their studies, about 90 % of all business model innovations merely represented new combinations of existing concepts and patterns (Gassman et al., 2015).

From the total of 549 academic journal articles that were retrieved from the databases, only 23 articles were included in the in-depth analysis. The value-creating and value- cocreating aspects of the articles were analysed in two different ways. Firstly, they were based on (a) the degree to which the articles described social media in terms of value creation and value cocreation and (b) the extent to which the articles recognised the different roles of social media. Then, the 5C framework was used to analyse social media functions in more detail and to determine whether they showed any evidence of the level of service orientation in the studied articles.

About half of the articles were focused on social media-based value creation (12 out of 23), while the other half of the articles were focused on social media-based business models (11 out of 23). Representing a number of different theoretical approaches and models, most of the articles were centred around the business-to-consumer markets or they had no specific market focus at all. In contrast, only one of the studies focused on the business-to-business market. The themes of the studies found on value creation related to research areas like the characteristics of value creation (mostly in terms of the symbolic role of social media as the representation of novelty, efficiency and complementarity), the phenomenon of social media-mediated lock-in effects (Lehmkuhl & Jung, 2013), the conceptualisation of customer-perceived value (Agnihotri, Kothandaraman, Kashyap & Singh, 2012), the benefits of social media-based relationships (Möller & Törrönen, 2003; Walter, Ritter & Gemunden, 2001), the effects of social media on business model components in traditional business organisations (Lee, 2011) and the business values associated with Web 2.0 technologies (Nath, Singh & Iyer, 2009). Correspondingly, the themes of the studies found on social media-enabled business models mostly related to the analyses of the role of social media in supporting the major building blocks of

business models (Ramdani & Rajwani, 2010; Wikström & Ellonen, 2012), analyses of the social media mechanisms specifically supporting the revenue models of social networking sites (Enders, Hungenberg, Denker & Mauch, 2008), and concepts and frameworks for social commerce enabled by social media (Baghdadi, 2013).

Furthermore, the most commonly used research models and frameworks were rather generic, including a preliminary framework for understanding the impacts of social media use in customer support services (Agnihotri et al., 2012), an enterprise architecture for supporting social commerce through the actions of value cocreation (Baghdadi, 2013), and a 4C typology of Internet business models involving examples of how to cocreate value when providing services (Wirtz, Schilke & Ullrich, 2010). In addition, the importance of theoretical foundations and opportunities when cocreating value with customers in online communities was emphasised by Hajli and Hajli (2013).

Although value creation was extensively discussed in many of the articles, the role of value-related social media use was often analysed in relation to communication (i.e. publishing and sharing content) and connection (i.e. networking with people). Among the 23 articles studied, only one of them (Lee, 2011) was related to collaborative content creation and only a few more studies analysed the roles of social media in terms of connecting people and content - or in terms of combining different types of content (Enders et al., 2008; Lee, 2011; Lehmkuhl & Jung, 2013). Almost none of the articles mentioned both service providers and users in one paper. As a matter of fact, the cocreation of value, as well as the potential roles and impacts of social media in new business model creation, were largely unexamined. Only two articles out of the 23 (Lee, 2011; Wielki, 2010) had identified significantly social media-specific business models, and only one of them incorporated the perspectives of both service providers and users (Lee, 2011).

Most importantly, there were no articles providing in-depth evaluation of social media in value cocreation. Even when value creation was extensively discussed in the articles, the observations related to social media were often either incomplete or fallacious. It was obvious that more descriptive elements were needed to broaden the scope of analysis and that greater understanding was needed regarding the various implications of the collaborative value networks connecting companies, customers and their stakeholders. Considering that only one study applying service-dominant logic was found (Yuan, Cai & Zhou, 2014), it was surprising that the self-contained and self-adjusting nature of the novel value networks had been by then largely neglected. As stated in the final conclusions in Publication III, the results suggested there was a striking lack of understanding the impacts of social media in

varied study contexts and with different research approaches. As a result, the understanding of the differences and challenges related to the inter-personal and inter-company interactions or networks was limited and led to a rather superficial view of the roles and impacts of social media on value cocreation and future business models. Surprisingly, the impacts of social media in reconstructing and changing the value cocreation practices were almost non-existent.

4.2   Second level of analysis – service ecosystems

By early 2016, rapid advancements of the Internet and of social media had begun to finally contribute to the growing effectiveness and continuous regeneration of creating and sharing new information and knowledge. The ways in which information and knowledge were virally transferred throughout our society were becoming increasingly transformed (He et al., 2015; Hu & Wang, 2015). A vast amount of globally interconnected actors and resources were brought together, and new ways to deal with changing institutions and institutionalised patterns of behaviour were emerging (Koskela-Huotari et al., 2016; Vargo & Lusch, 2016). More and more attention was paid to viewing social cognition and connectivity - both of them actualised in emotions and experiences - as the basis of all intangible resources and actions. (Knyazev et al., 2018; van Overwalle et al., 2015). In order to consider social media beyond the role of merely one of many technology developments, it was becoming increasingly important to understand how digital networks were spanning different service ecosystems, and their impacts on the related institutional arrangements.

While in publications I, II and III the focus was on studying the ways how social media enhances organisational value cocreation, in this section, the focus is shifted to studying how social media enhances innovation in service ecosystems. Hence, the results of publications IV and V are discussed, with the aim of a) forming a conceptual understanding of social media's role in increasing institutional complexity, and b) studying the impacts of institutional complexity for advancing innovation in service ecosystems. In doing so, this chapter gradually discusses ways to enhance value cocreation in service ecosystems.

4.2.1   Understanding institutional complexity

As observed in Publication III, the common understanding of organisations was still largely based on the ways to control their physical and social environments. However, the first signs of the growing liquification of many previously tangible products and services were already emerging (Lusch & Nambisan, 2015), and the growing need for companies to re-evaluate their organisational structures and management practices, as well as the underlying patterns of behaviour (Anderson, Potocnik & Zhou, 2014; Bilton, 2014) was significantly increasing. In order to understand the underlying complexity of the ongoing change as well as its impacts on various different informal and collaborative practices, the aim of Publication IV was to manifest the role of social media in increasing institutional complexity.
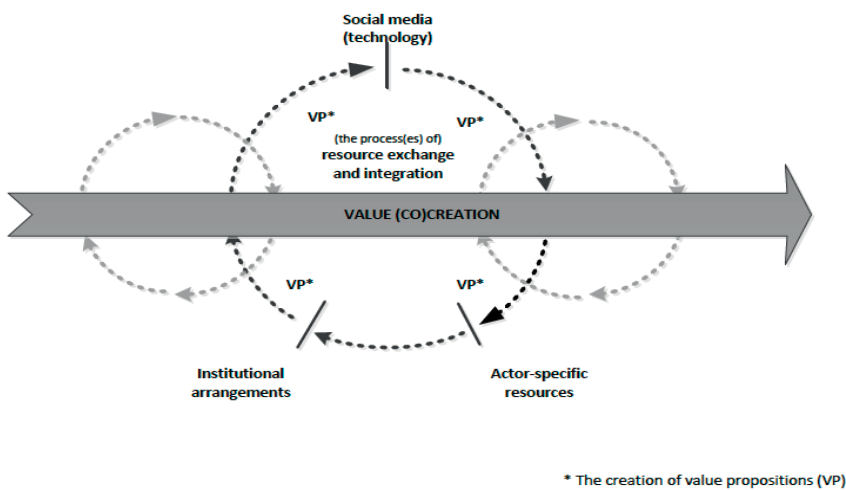
Figure 7.   Framework for explaining the elements of value (co)creation

Originally written as an idea-generating conference paper, followed by an invitation to join a book-writing process, Publication IV was rather quickly elaborated into a book chapter. At that time, in 2016, the debate related to institutional logics had already started among the leading service scientists, but when the researcher had been introduced to service-dominant logic a few months earlier, the use of service-dominant logic concepts and definitions was still seriously undeveloped. As a result, in this chapter, the framework for conceptualising creativity and innovation in a digitalised, service-based working culture that was created at that time is both updated and partly corrected. As shown below in Figure 7, the ideas presented in

Publication IV have now been refined and the expressions used updated according to the definitions and concepts of service-dominant logic.

In the original article, the focus was on understanding the impacts of the organisational working culture on innovation. By referring to the earlier work of, for example, Amabile and Kramer (2011) and Senge (2009), the discussion was built around creativity as the initial phase and an important driver for innovation. With a more developed understanding of service-dominant logic, the framework is now renamed the framework for explaining the elements of value (co)creation. Despite the similarly rephrased focus on understanding the impacts of social media in increasing institutional complexity, the main idea behind this conceptualisation remains the same. The framework highlights the importance of seeing both organisations and ecosystems as complex and continuously evolving systems in which different actors with conflicting views and perceptions join together for mutual resource exchange and integration (Siltaloppi et al., 2016; Koskela-Huotari et al., 2016).

By replacing the earlier notion of organisational working culture with value (co)creation, the new framework is more in line with the identified impacts of social media on resource density (see Publication I) and resource integration (see Publications II and III). In other words, where resource integration is now described as a process with no beginning or end (see the dashed circle), and the earlier reference to communication and information sharing is now replaced with the creation of value propositions, the new conceptualisation discloses the importance of balancing between a) institutional stability and b) continuous change.

The framework describes organisations as flywheels of resources: as concluded in Publication II, in order to maximise the speed and scope of resource integration, organisations need to adopt completely new ways of knowledge and information sharing. Then, as discussed in Publication IV, both online and offline resources need to be incorporated. Therefore, as already mentioned in Publication III, the framework highlights the need to re-evaluate the impacts of the current understanding of the role of social media and of technology more broadly on increasing institutional complexity. In other words, as discussed in Publication IV, given the growing density of actors and the increased resourceness of both tangible and intangible resources, more attention should be paid to the fundamental shift in thinking in terms of the rigorously changing contexts for value cocreation.

However, by combining the complex adaptive systems thinking and the framework of service-dominant logic, it became clear that modern organisations are still far too excessive regarding their need to fragment, compete on and react to their

cultural surroundings. As stated in Publication IV, a shift in perspective is needed to rebuild the ways in which the newly developing institutional arrangements can be best supported. In other words, more awareness of the self-contained and self-adjusting nature of interactions is needed to increase the organisational awareness of the various interconnections and interdependences between internal and external value (co)creating actors. What is then suggested by the lighter circles on either side of the main circle in Figure 7 is that companies should become more aware of their role as microcosms of their larger societies. By thus increasing understanding of the underlying attitudes and assumptions that prevent companies from taking full advantage of resourceness, understanding of value cocreation as something far beyond building the firm-specific performances such as absorptive capacity will also be increased (Cohen & Levinthan, 1990). In other words, according to the framework for explaining the elements of value (co)creation, more effort should be made to enhance diversity in organisations and to accelerate the contextually changing resourceness in innovation.

4.2.2   Building shared narratives

As presented in Publication IV, both the explicit and symbolic (inter)relationships between the different actors involved in the value cocreation process have been gradually transforming, due to the growing complexity of institutional arrangements. Hence, the aim of Publication V was to study the impacts of the increased institutional complexity in advancing innovation in service ecosystems. In other words, the focus was directed towards exploring the ways in which both individuals and organisations could apply a more systemic approach to their service ecosystem development.

Built on the ideas and concepts of service-dominant logic, an empirical case study was therefore conducted in a real-life ecosystem, in the context of university-industry collaboration. Officially launched in September 2015, the Kampusareena building and concept, situated at the Tampere University of Technology campus in Finland, was purposely designed as a platform of engagement to support value cocreation between the university and a number of its stakeholder organisations. Considering that the concepts and forms of service exchange were connected to a physical building, they were coupled with high expectations in terms of productivity and thereby an interesting target for studying innovation. Hence, the method of causal layered analysis (Inayatullah, 1998; Riedy, 2008) was used to first identify and then

analyse the impacts of the service ecosystem actors' underlying attitudes, ideologies, values and myths on value creation.

Representing a combination of integrated empirical, interpretative and critical research traditions, causal layered analysis provided a concrete tool for understanding reality through different layers of knowing and observing factors within the studied service ecosystem. That is to say, by means of causal layered analysis, the empirical findings resulting from a set of 22 thematic interviews were not only exposed to any perceptible tensions, contradictions and vagueness in the collective discourse being represented and internalised, but they were also linked with the desired systemic changes in the studied social systems and structures. In addition, by then building on the two-part model approach to value cocreation first initiated by Galbrun & Kijima (2009), the analysis was strongly connected to the ideas of value creation as a systemic process, consisting of two separate concepts: 1) value orchestration platforms and 2) the four-phase model of the value cocreation process (Galbrun & Kijima, 2009). The notions of effectiveness and productivity were seen as significantly dependent on a) the emergence of variables that make the system more complex and the context where these variables can occur, and b) the relationships among the various independent actors involved in the system (Vargo & Lusch, 2004).

Firstly, each of the four layers of causal layered analysis were amalgamated with the four phases of the value cocreation process. Secondly, the research questions were specifically designed for each layer. As demonstrated below in Table 16, the first layer (i.e. litany & co-experience) was built around the interviewees' current perceptions about the platform functionalities, with a focus on reducing the gap between the needs and expectations of the value cocreating actors. The second layer (i.e. social causes & co-definition) described the system-level behaviour and rules that direct the ecosystem development, thus referring to how the interviewees actually perceived 'service' and how they became aware of each other's capabilities and expectations related to value cocreation. At this time, the impacts of institutional complexity were the most tangible.

The third layer (i.e. discourse & co-elevation) collected the worldviews and values with (hidden) impacts on the interviewees' attitudes and behaviour toward value cocreation, thus aiming at strengthening collaboration through high-quality value propositions. Finally, the fourth layer (i.e. metaphors and myths & co-development) revealed the mindsets and concepts that were perceived as directing service ecosystem development in reality, thus referring to the phase where cocreation is

finally achieved and evaluated. (Inayatullah, Izgarjan, Kuusi & Minkkinen, 2016; Inayatullah, 1998; Kijima et al., 2014; Galbrun & Kijima, 2009).

Table 16.   Summary of results in Publication V

Layers and phases		Research questions and the main themes of the results
1) Litany	Co-experience	*How do the platform functionalities and location support value cocreation?* • High brand value • Positive feedback vs. scepticism • Open vs. closed system • Low awareness of the platform
2) Social causes	Co-definition	*What are the system-level behaviours and rules that direct service ecosystem development?* • Supportive attitudes towards collaboration and engagement • Lack of experimentation • Need for more facilitation • Unclear concept
3) Discourse	Co-elevation	*What are the values and worldviews that drive forward service ecosystem level collaboration?* • The role of pioneers • A showroom vs. shared processes • Ecosystem development takes time • Old habits die hard • Platform facilitation and marketing
4) Metaphors and myths	Co-development	*What are the underlying mindsets and concepts that direct service ecosystem development in reality?* • Focus on systems dynamics • Continuous renewal • Power of mindsets

As a result, a significant disequilibrium was found between the service ecosystem actors' a) understanding of the systemic nature of value cocreation and resource integration and b) the actual practices of value cocreation. On the whole, both successes and challenges were observed in resource exchange and resource integration. On the one hand, even if the platform was seen as an attractive place with a lot of potential for service exchange, the high expectations were not sufficiently met. Most importantly, many of the activities in the different actor- or theme-specific hubs located on the platform were not freely accessible and thus seemed to prevent effective resource exchange.

In addition, the common awareness of the platform was either surprisingly weak or out-of-date, resulting in lower than expected levels of new networks and partnerships to support service exchange. On the other hand, the actual level of the value cocreation practices was almost non-existent and the perceptions of the concept of value cocreation were based on limited knowledge and understanding of resource exchange and integration in multidisciplinary settings. In other words, more awareness was clearly needed to understand the changing institutional arrangements within the growingly complex and heterogeneous pool of actors, relationships and resources. More facilitation was also needed to reveal the many unintentional barriers to knowledge creation, exchange and integration between the various different actors (interested in) taking part in the service ecosystem.

According to the layer-specific results, much of the potential in interdisciplinary collaboration was still awaiting to be activated. More systemic and service-based thinking is therefore needed before the benefits can be enjoyed. For example, the possibilities of using social media tools for connecting people – both offline and online – were completely neglected and the flow of information was solely based on random face-to-face encounters. Only a small minority of the interviewees had any interest in social media and only 2-3 of them actively used social media in connection with their offline activities in the service ecosystem. Regarding this study, the role and impacts of social media in increasing institutional complexity or on advancing innovation in ecosystems were only suggested and not supported by the interview data.
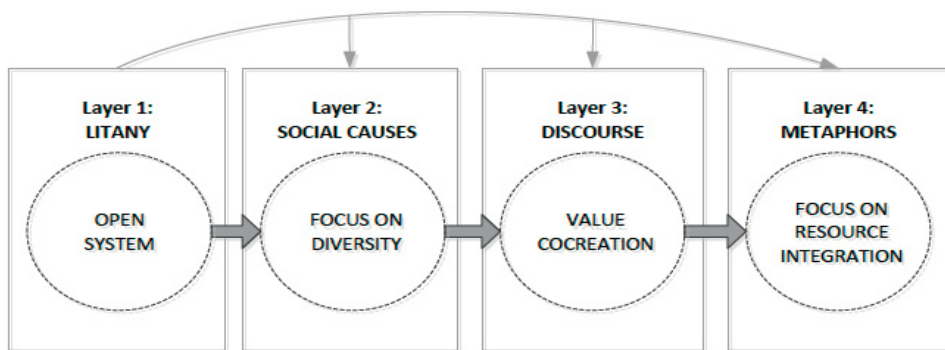

Figure 8.   Competing narrative no 1: 'Breaks barriers'

In order to summarise the results of Publication V in a more concrete way, two alternative narratives were constructed. As shown above in Figure 8, the first

narrative, termed 'breaks barriers', focuses on cocreation as a method and a process where active participation in discussions and events results in increased levels of resource exchange and integration. It represents an open system with a strong focus on disruption through the diversity of actors involved in it. This narrative is built on the ideas of resilience (Inayatullah & Milojevic, 2015) and continuous renewal (Inayatullah et al., 2016), thus strongly supporting the service ecosystems view of innovation.
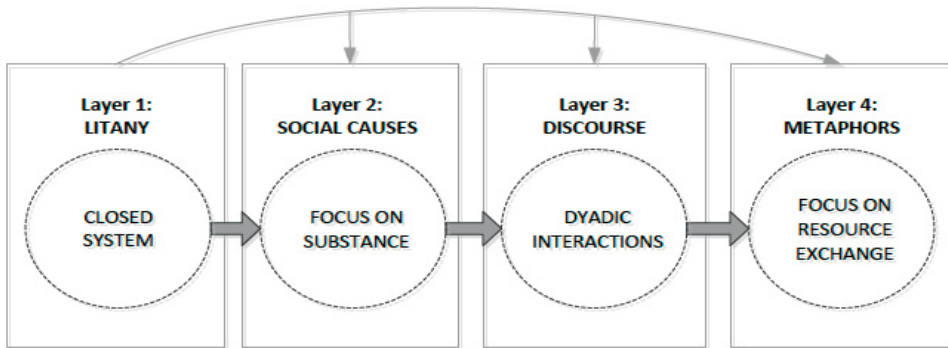
Figure 9. Competing narrative no 2: 'Control driven'

As described above in Figure 9, the second narrative, termed 'control driven', thus refers to a closed system with a focus on predefined partnerships and outcomes. According to this second narrative, the concept of service ecosystem relates strongly to the mechanical perceptions of value as something separate from the value cocreation process, i.e. to the controllable forms of substance-related networks and measurable outcomes. Therefore, in this second narrative, value cocreation refers to something where individuals, teams or organisations with similar interests and expertise join together for mutual benefit, actualised through dyadic knowledge share and transfer. To put it another way, value cocreation is only viewed as the method and means through which the execution of relatively fixed plans is efficiently carried out.

Finally, the following implications for management were made as the final conclusions of this study. Firstly, in order to foster network-specific innovation capabilities, the ecosystem actors need to become engaged in co-experiencing and co-defining the service ecosystem, i.e. to provide structures and functions that bring together a diverse group of actors. Secondly, open communication plays a crucial role in co-elevating stimulating innovation, and therefore the service platforms need

to be open so that the ecosystem actors can co-elevate their conflicting ideas and perceptions, as well as integrate their shared concepts and rules of conduct. This requires strong clear institutional rules and guidelines. Thirdly, whenever human networks are involved, it requires investments in facilitation. According to the layer-specific results, these narratives do not necessarily mirror the course of the individual interviews. Despite the self-organising and self-adjusting nature of the networks, trust and commitment are related significantly to the level of their functional abilities within the networks. Hence, in Publication V, emphasis was placed on the role of the service platform in creating new possibilities (i.e. resources and resource exchange) to accelerate collaboration (i.e. resource integration). It is suggested that the more the knowledge and understanding of methods and practices supporting institutional arrangements increase, the better the level of value cocreation.

5 DISCUSSION AND CONCLUSIONS

Whereas in the previous chapter each of the individual publications was given a new meaning as part of the whole, this final chapter presents the gradually developed knowledge and understanding about how social media enhances a) value cocreation and b) innovation in ecosystems. Hence, the focus is on answering the two research questions: 1) 'How does social media enhance the organisational practices of value cocreation in innovation?', and 2) 'How does social media enhance value cocreation and innovation in ecosystems?'

Firstly, five main propositions have been produced to summarise the various results described in the previous chapter and to present them more coherently. As a result of the proposition development, a three-level approach to social media is presented and evaluated. Secondly, the academic and management-related contributions of this dissertation are presented along with discussions about their further implications. Thirdly, an evaluation of this study is provided to conclude and discuss the research limitations and to give suggestions for further research.

5.1 Integrated results and answers

5.1.1 Five propositions

According to the results of this dissertation, social media has proven to play a key role in increasing a) the liquification and density of resources available for service exchange and b) the institutional complexity in resource integration. When referring to social media as applications that are either fully based on user-generated content or in which user-generated content and the actions of users have a significant role in increasing the value of the application or service, it is thus suggested that social media offers great potential in both enhancing the adoption of novel organisational practices for value cocreation and in increasing value cocreation and innovation in ecosystems. However, the impacts on ecosystem-level value cocreation and innovation in particular have remained relatively modest. More understanding is

needed about how to use social media to enhance value cocreation in real-life settings and why it is so important for innovation. Based on the knowledge and understanding gathered in this study, a total of five propositions have thus been created to respond to these questions. See the propositions below, in Table 17.

Table 17.   Propositions summarising the results presented in Publications I to V

	Propositions
I	The use of social media-enabled tools and methods may significantly increase both the number of value networks and the density of resources.
II	The use of social media may increase the density of resources and value networks, but it does not necessarily result in more intensity and quality in resource exchange and integration.
III	A more holistic view of innovation is needed to understand the role that social media can play in developing the practices of value cocreation.
IV	In order to develop a more holistic view of innovation, it needs to be built on the growing institutional complexity that lies within the ecosystems, and to thus adjust to the contextually changing nature of resource exchange and integration.
V	Ultimately, the development of innovation activities largely depends on the ecosystem actors' abilities to engage themselves in co-experiencing and co-defining their system-specific values, rules, and value cocreation practices.

According to the service-dominant logic view on value cocreation and innovation, the more the abilities to create new resources and to integrate them are accelerated (Vargo & Lusch, 2011), the more connectivity is increased and novel resources are made available for others to pick up and diffuse in their networks (Koskela-Huotari & Vargo, 2016). Once positive and reinforcing feedback cycles are created, novel and enhanced ways to cocreate value will emerge at a faster rate. Nevertheless, as the five propositions clearly indicate, more understanding is needed about the ways how social media can be used to increase value cocreation and innovation.

As shown in Table 17, social media plays a significant role in enhancing the implementation of propositions I to III. However, propositions IV and V are clearly focused on qualities that require changes in the ecosystem actors' mental actions and processes, and on the actor-related practices that guide the ecosystem activities in real-life settings. Hence, as stated in Publication V, the role of social media was regarded both as almost non-existent and unimportant to the refinements of value cocreation practices. Even though social media does not have a role to play in these last propositions, it does not mean that it could not affect them. That is to say, as highlighted throughout all five publications, the role of social media changes according to the nature and level of the value cocreation and innovation practices.

In addition, this raises an important question about the ways to approach value creation in relation to value destruction – a phenomenon not directly studied in this dissertation.

For example, as shown in Publications I and II, the case company representatives were so focused on the benefits of value creation that they completely neglected the downsides of their innovation process. In other words, due to the increased effectiveness in terms of time and costs, no thought was given to value co-destruction as something that may have resulted from the same process. Nevertheless, it is worth noting that only a small fraction (less than 10 %) of all business model innovations tend to represent new business models (Gassman et al, 2015). Most often, alleged business model innovations turn out to be combinations of existing concepts and patterns. Instead of concentrating on value creation, more attention should be directed towards understanding the many nuances of value. As stated by Samans and Davis, the overly positive conceptualisation of value is mostly due to a 'certain complacency about the human impact of the technological disruption' (Samans & Davis, 2017).

Proposition I:

The use of social media-enabled tools and methods may significantly increase both the number of value networks and the density of resources.

Hence, according to the first proposition, the use of social media can have significant impacts on increasing the number and diversity of the value cocreating actors. As shown in Publications I and II, crowdsourcing allowed the case company to invite thousands of mechanical engineers around the globe to join their internal innovation process. That is, with different knowledge and experiences, the crowds were invited to join the case company to participate in their innovation challenge. In doing so, any of the engineers on the social media-enabled crowdsourcing platform could get involved with the innovation challenge and to get in contact with the case company, regardless of their physical location or time zone. At the same time, the case company was provided with a huge potential for new innovations.

If the social media-enabled crowdsourcing platform had not existed, bringing all these engineering experts together would have been much more difficult and expensive. In addition, considering the social media as a feature that gave all the value cocreating actors (i.e. engineers, platform representatives and case company

representatives) access to the crowdsourcing platform and allowed them to communicate with one another whenever needed, it was also an important factor in increasing the density of resources to be diffused and to act upon. That is to say, social media had an important role in bringing together all the actors involved in the innovation challenge and in enabling them to easily connect and create extensive new value networks with one another. Largely supported by the results of all the publications, such networking and its expansion thus offered great potential for increasing both the quantitative and qualitative nature of the resource exchange.

Proposition II:

The use of social media may increase the density of resources and value networks, but it does not necessarily result in more intensity and quality in resource exchange and integration.

However, as was later observed in Publications II and III, increased resource density alone was simply not enough to ensure that the intensity and quality of the resource exchange and integration would actually increase. In fact, even though the case company was more than satisfied with the results of the innovation challenge, including its fast and effective execution, a lot of potential for resource exchange and integration was ignored. For example, the lack of communication between the case company representatives and the participating crowd did not really contribute to the exchange of knowledge and experiences. The notion of value was mostly connected with tangible assets such as the exchange of money and (concrete) solution designs.

As suggested in the second proposition, the use of social media may increase the density of resources and value networks, but it does not necessarily result in more intensity and quality in resource exchange and integration. Even though the case company estimated that the crowdsourcing challenge had been a successful experiment for them, they could have done better. With no direct communication between the crowd (i.e. the engineering experts present on the crowdsourcing platform) and the case company experts themselves, the interest and abilities to share their intellectual resources appeared negligible. This may also have reduced the development of the desired absorptive capacity within the case company.

Proposition III:

A more holistic view of innovation is needed to understand the role that social media can play in developing the practices of value cocreation.

In Publication II, little evidence was found regarding the use of operand resources. Consequently, in Publication III, the observed social media impacts on business models and value (co)creation were far less significant than anticipated. In particular, the lack of understanding of the contextually changing nature and variety of value networks and business models was highlighted. In other words, as demonstrated in Publications IV and V, the understanding of value cocreation as a process was only developing. All in all, as the third proposition suggests, the current understanding (and use) of social media in value cocreation and innovation is far too simplistic. Most importantly, more diversity and depth are needed in terms of research contexts and methods.

With regard to all five publications of this dissertation, it seems that, despite the arising systems view of innovation, more research is required on inter-personal and inter-company networks and interactions. This need was particularly well demonstrated in Publication V where the two-part model approach to value creation (Kijima et al., 2014; Galbrun & Kijima, 2009) was applied in order to observe and analyse the value cocreation practices in a real-life ecosystem. Leaning thus on the results of Publication III, further research is needed to develop and update the partially incomplete and fallacious research models and frameworks for value cocreation. In addition, more empirical insight is required to improve the current practices of resource exchange and integration.

Proposition IV:

In order to develop a more holistic view of innovation, it needs to be built on the growing institutional complexity that lies within the ecosystems, and to thus adjust to the contextually changing nature of resource exchange and integration.

With the fourth proposition, the focus shifts to the ecosystem actors' abilities to develop a more holistic view of innovation. That is to say, as the complexity of operational environments and various underlying institutional arrangements grows,

the more they accelerate encounters for individuals, teams and organisations from different interest groups and contexts to join for value cocreation. Therefore, as highlighted in Publications IV and V, in order to increase innovation, more attention should be paid to the ways to challenge the ecosystem actors' underlying assumptions and preconceived attitudes towards value (co)creation.

Given the results and discussions of Publication IV and V, and also with reference to the concept of autopoiesis (see Maturana & Varela, 1991; Maturana, 2005), the understanding of ecosystems should be based on seeing them as processes of continuous regeneration of interactions and transformations. As more organisations and actors join the ecosystem, the complexity of the ecosystem grows as well. So do the biases too, thus relating to all the prevailing institutional arrangements that guide the ecosystem actors. This inherent bias also relates to their abilities to adjust to the contextually changing nature of resource exchange and integration. As shown in Publication V, more in-depth knowledge is needed about the formation and development of complex value networks. According to the results of Publication V, two co-existing and consistent narratives were found to explain the level of value cocreation potential in the studied ecosystem: 1) an open system with a strong focus on disruption through the diversity of actors involved in it, and 2) a closed system, with a focus on predefined partnerships and outcomes. Therefore, in order to foster institutionalised, contextually changing innovation capabilities, ecosystem development becomes dependent on activities that bring together interest groups that would not easily come together otherwise.

Proposition V:

Ultimately, the development of innovation activities largely depends on the ecosystem actors' abilities to engage themselves in co-experiencing and co-defining their system- specific values, rules, and value cocreation practices.

Lastly, by bringing together all the insight gained from the previous propositions, the fifth proposition implies the emerging change from closed to open systems of interaction and collaboration. In doing so, it highlights the need for a) a better understanding of value cocreation as a process, and b) continuous interaction between a multiplicity of actors representing different views, experiences and competencies. When these principles are fulfilled, ecosystems have a strong focus on disruption through the diversity of actors involved in them. According to both the theoretical observations presented in Publication IV, and the empirical

observations presented in Publication V, this will eventually strengthen the disruptive nature of value cocreation practices and thus enhance innovation in the ecosystems. On the other hand, when these principles are not met, it is more likely for the ecosystem actors to apply a more 'control-driven' way of collaborating with some predefined partnerships and outcomes only. Whereas the open system inspires active participation and results in increased levels of value propositions and value exchange, the closed system relates to controllable forms of substance-related networks and measurable outcomes that are less disruptive and instructive by nature.

As demonstrated throughout these propositions, it seems that the biggest challenge relates to the so far rather theoretical discussions about value cocreation and innovation in ecosystems. With only limited empirical evidence about the impacts of the growing liquification of service provision in value networks and service systems (see e.g. Koskela-Huotari, 2018; Koskela-Huotari et al., 2016; Lusch & Nambisan, 2015), the understanding of value cocreation and innovation in ecosystems is not even close to realising the potential that clearly exists within the use of social media.

5.1.2   The three-level approach to social media

When starting this dissertation, crowdsourcing was considered as one of the most effective ways of getting new and fresh ideas into company-specific innovation processes. Besides its positive impacts on productivity, crowdsourcing had already been shown to have significant impacts on raising brand awareness and on leveraging the skills of (external) workforces (Allahbakhsh, Benatallah, Ignjatovic, Motahari-Nezhad, Bertino & Dustdar, 2013; Tickle, Adebanjo, & Michaelides, 2011). As already mentioned in chapter 4, summarising the results of this dissertation, value cocreation is still far too often understood as something that only brings the actors and resources together for increased actor engagement. Unfortunately, perceiving social media as a connector only easily leads to an inability to see social media as anything other than a simple tool to support actor-specific benefits such as the creation of absorptive capacity. In order to answer the questions of *how* (…to use social media to enhance value cocreation), and *why* (…it is so important for innovation), a three-level approach to social media is presented in Table 18 as a framework that enhances a more in-depth view on how to challenge the deeply rooted, preconceived attitudes and mindsets regarding the impacts of social media on value cocreation and innovation.

Table 18.   The three-level approach to social media

Level I: Social media as a connector – a tool to enhance resource exchange		
Main outcomes	**Main challenges**	**Main focus**
Serves as a platform for random encounters	Focus on actor-specific (companies, customers, stakeholders etc.) benefits, not on mutual value cocreation	Brings actors and resources together
Enables fast and cost-efficient resource exchange independent of time and place	Inability to differentiate the different roles of social media	Interest in dyadic interactions (actor-to-actor engagement)
Incorporates both offline and online resources (liquification)	Narrow focus on substance or context-dependent know-ledge sharing	Mostly used for organisational purposes (for example in innovation processes)
Supports the creation of new types of value networks (connects individuals and organisations)		

Level II: Social media as an enabler – a method to foster institutional complexity		
Main characteristics	**Main challenges**	**Main focus**
Supports dialogue through active participation	Limited understanding of value cocreation as a process that builds on experimentation	Generates new thinking and action within the participating organisations
Provokes interest in value cocreation practices	Focus on value networks and not on mutual resource exchange	Consists of a heterogeneous pool of actors, relationships and resources representing various different disciplines or industry sectors
Increases the resourceness of resources	Focus on methods, not on 'wisdom' creation	Increases intensity and quality in resource exchange and integration
Forms new social structures and actor-to-actor relationships based on shared interests, goals, attitudes and values	Management and facilitation practices are based on control, not on sharing	
Stays alert to the contextually changing nature of resource exchange and integration		

Level III: Social media as an actor – an agent that generates new value cocreation practices		
Main characteristics	**Main challenges**	**Main focus**
Develops the ecosystem actors' abilities to engage themselves in co-experiencing and co-defining their system specific values, rules, and value cocreation practices	Strong organisational focus	Supports disruptive thinking and action
Enhances advanced systems dynamics	Obsolete or incomplete perceptions about the concepts of platforms and ecosystems for innovation	Is mainly applied in ecosystem development
	The actors' inabilities to build on the growing institutional complexity that lies within the ecosystems (i.e. to innovate and adapt to unpredictable progress of things)	

However, as highlighted in the five propositions, representing the main results of this dissertation, the benefits of crowdsourcing or any other form of social media are not to be taken for granted. Without a more in-depth understanding of how to use social media to enhance value cocreation in real-life settings and why it is so important for innovation, the use of social media has much less impact than anticipated – or it may have impacts we do not become aware of. Major improvements are thus needed to support the more advanced utilisation of social media in resource exchange and integration.

As shown in Table 18, the role that social media can play in value cocreation and innovation is much more versatile and multi-dimensional than it actually appears in practice. Firstly, in Publications I and II, the studied case company was more than happy with the results from their crowdsourcing process. Yet, when examining the same process from the point of view of how well the case company exploited social media, the results were far less flattering. The interactions between the crowd and the case company representatives were almost non-existent and the exchange of resources was limited to the exchange of operand resources only. The process did not significantly differ from outsourcing, that is, from hiring a party outside the company to perform services and create goods that traditionally were performed in the company (Dolgui & Proth, 2013).

With the simple focus of bringing more people together and of obtaining more alternative solutions to choose from, at level I, social media is considered *as a connector – a tool to enhance the (re)distribution of resources*. In other words, social media serves as a narrow platform for random encounters, enabling the fast and effective distribution of resources independent of time and place. In addition, through the increased liquification of resources – referring to the incorporation of both offline and online resources – as well as through the coupling of both individuals and organisations to learn from each other, the connecting role of social media supports the creation of new types of value networks. In fact, the focus is not on value cocreation, but on achieving actor-specific benefits and interests.

It is not until the level II, introducing social media as *an enabler - a method or a tool that enhances institutional complexity* - that the use of social media reaches the level of mutual value cocreation. Hence, given the increased resource exchange and integration, the use of social media then supports dialogue through active participation. In addition, it forms new social structures and actor-to-actor relationships that are based on shared goals, attitudes and values. Although the understanding of value cocreation as a process remains rather limited, and management and facilitation practices are often based on control rather than on

sharing, the focus is a) on generating new thinking and action among the value cocreating actors in the participating organisations, b) on the heterogeneous nature of actors, relationships and resources, and c) on increasing both the intensity and quality of resource exchange and integration. Above all, when this leveraged understanding of the use of social media develops, many completely 'new', previously unrecognised functionalities of social media will emerge.

Finally, once understanding of how social media enhances value cocreation advances, it can create new opportunities at the third level, social media takes the role of *an actor - an agent that fosters resource exchange and integration*. Thus, at level III, the role of social media in supporting the self-directing nature of innovation is highlighted. Besides creating more dialogue through active participation, more diversity is needed in terms of value cocreating actors and resources. The focus then shifts to a) developing the ecosystem actors' abilities to engage themselves in co-experiencing and co-defining their system-specific values, rules and value cocreation practices, and b) enhancing advanced systems dynamics. At this level, the use of social media is faced with the challenge of a strong organisational focus. It may result in sometimes obsolete or incomplete perceptions about the concepts of platforms and ecosystems for innovation, and thus hinder the actors' inabilities to build on the growing institutional complexity that lies within the ecosystems. The main focus in using social media as an actor is to support the application of even more disruptive thinking and action in resource exchange and integration.

It is important to note that these levels are only suggestions and that the differences between them are at most parts relatively obscure. In addition, the ecosystem approach to value cocreation and innovation at level three does not necessarily represent any higher understanding of social media use in comparison to the organisational approach at level two. In fact, they may only refer to alternative approaches to the *how* and *why* of using social media. Nonetheless, as mentioned in earlier chapters, despite a number of studies focusing on service ecosystems as the 'coming together' of value cocreating actors, it seems that the understanding of value cocreation has remained at a rather theoretical level. With only a few exceptions (see e.g. McColl-Kennedy, Cheung & Ferrier, 2015; Kiron, 2017), the practical applications of the value cocreation process are practically non-existent. This insight is strongly supported by recent research by Ranjan and Read, raising the questions of both the core conceptual elements of value cocreation and the gaps between the empirical and theoretical understanding of value cocreation (Ranjan & Read, 2017). Especially, the level of understanding value cocreation as a process that extends the context of innovation beyond firm-specific activities is very low (Akaka et al., 2017).

Most importantly, as also referred to in Publications III and V, the importance of accelerating the resourceness of the resources or of speeding up resource integration has not been properly addressed.

One possible explanation for this low level of understanding of value cocreation as a process may be linked with the over positive attitude connected with the concept of value (co)creation. In other words, only a small number of studies have so far pointed out the importance of understanding value co-destruction as a companion to value cocreation (Echeverri & Skålen, 2011; Plé & Chumpitaz Caceres, 2010). However, as shown throughout this dissertation, and described in terms of main challenges in Table 17, it is important to remember that value creation is always connected with value destruction. For example, according to Publications I and II, the identified focus on actor-specific benefits based on substance or context-dependent knowledge sharing only (see level I) seemed to result in a significant failure to seek for a more in-depth understanding of value creation as a process for mutual value cocreation.

Again, several factors were found to limit the understanding of value cocreation and reduce the impacts of the value cocreation processes at levels II and III. These factors include, for example, the use of management and facilitation practices based on control rather than sharing (level II) and the actors' inability to build on the growing institutional complexity that lies within ecosystems (level III). Moreover, as clearly demonstrated in Publication V, the often contradictory or unclear definitions of platforms and ecosystems (de Vasconcelos Gomez, Figueiredo Facin, Salerno & Ikenami, 2015; Valkokari, 2015) do not make it any easier to create a clear view of how social media enhances value cocreation and innovation.

5.2   Final contributions

Service-dominant logic can be considered an important bellwether that has significantly accelerated the speed at which the systems view of services, platforms, ecosystems and value cocreation has been adopted (Barile et al., 2016; Maglio & Spohrer, 2008). It represents merely a continuum in a long history of debate about whether to see systems as models of the world or as intellectual constructs trying to explain the world (Checkland, 1985). This conclusion is strongly supported by the recent interest in systems thinking and service research, both of them supporting the cross-fertilisation of ideas and perspectives (Benoit, Schershel, Ates, Nasr & Kandampully, 2018; Capra & Jacobssen, 2017). Or, most importantly, by the

emerging need to both refine and clarify the existing ecosystem construct (Kijima, 2015; Tsujimoto et al., 2018). Hence, in this research, the service-dominant logic framework is applied to explore how social media enhances value cocreation and innovation in ecosystems.

In terms of academic contributions, two major challenges can be identified in the academic debate. Firstly, in order to support a more holistic understanding of value cocreation and innovation in service systems, more clarity is needed to discussions regarding the concepts of value cocreation and innovation. Secondly, more understanding is needed about the role of (social) technologies as actors that reshape the relationships and value constellations in innovation. Both theoretical and empirical insights are provided here.

From a managerial perspective, two major implications have been equally identified. Firstly, attention is given to the ways how companies should focus on developing their value cocreation practices. Secondly, important insight is provided regarding the ways how social media enhances the novel practices of value cocreation and innovation. Finally, as a result of combining these two managerial aspects, a process model for enhancing the use of social media in innovation is presented.

5.2.1   Contributions to academic research

Thus far, the existing, concrete models of service innovation (see Kijima & Arai, 2016; Lusch & Nambisan, 2015) have been largely ignored in practice. There is very little academic research on ways to renew the existing organisational understanding and practices of innovation (Skålen & Edvardsson, 2016), or on ways to manage the coexistence of many different logics within an organisation or a network of actors (Parkkinen & Lehtimäki, 2015; Stumpf, Doh & Clark, 2002). Instead, the debate on innovation has been primarily focused on demonstrating the differences between product and service innovation (Storey, Cankurtaran, Papasthathopoulou & Hultink, 2015). With a strong focus on market-driven product or service innovations, innovation activities have been mainly limited to streamlining the cost and time efficiency of the development processes (Storey et al., 2015).

By introducing a three-level approach to social media (see Table 18, page 93), this research calls attention to the vagueness and simplicity of the current mainstream understanding of value cocreation and innovation. For example, as referred to in Proposition II (page 89), despite the effective use of social media in increasing the density of resources, it does not necessarily result in more intensity and quality in

resource exchange and integration. In fact, the actual adoption of these resources has remained rather under-developed. However, as explained in Publication V, and also demonstrated at level one in the three-level approach to social media, this is not intentional. On the contrary, also with reference to the results of Publication V, this ignorance may simply result from too narrow a conceptual understanding of value cocreation.

The poor understanding of value cocreation is clearly connected with the often confusing and obscure concept of ecosystems. In other words, besides the two major competing theoretical approaches to value creation, i.e. goods-dominant logic and service-dominant logic (Vargo & Lusch, 2004; 2008), the number of competing research streams in ecosystem studies is exhausting (Valkokari, 2015; Järvi & Kortelainen, 2017; El-Darwich et al., 2018; Tsujimoto et al., 2018). As a result, both the theoretical and empirical debates on ecosystems seem to have focused more on creating the best possible definition of an ecosystem rather than elaborating and testing different models and patterns related to the processes of value cocreation and innovation in those ecosystems. As demonstrated throughout the results of this research and particularly through the five propositions presented in Table 17 (page 87), it seems that the ongoing debate has clearly reduced the ecosystem actors' interests and abilities to understand innovation as a process.

Besides highlighting the role of collaborative organisational structure and culture (Aarikka-Stenroos & Ritala, 2018; Smorodinskaya et al., 2017), the majority of research on network-specific innovation capabilities focuses on creating the firm-specific business ecosystems – or, as stated in a recent article by Fuller, Jacobides and Reeves (2019), it is only used as a buzzword and often overapplied. That is, despite the fact that the world's leading corporations have already built vast, dynamic multi-company systems through which they organise their economic activities, a lot of resources for value cocreation and innovation continue to remain unused (Fuller et al., 2019; Webb, 2019).

Ultimately, it seems that the more advanced use of social media is hindered by the ecosystem actors' conceptual ignorance of value cocreation and innovation. Or worse, due to the emerging 'dark side' of agency, the power of ecosystems seems to spill on the hands of actors who deliberately attempt to hinder other actors from providing their services through the value cocreation ecosystems (Mele, Nenonen, Pels, Storbacka, Nariswari & Kaartemo, 2018). Hence, as stated in Propositions III and IV, *more understanding is needed about the role that social media can play in developing the practices of value cocreation, and about why to adjust to the contextually changing nature of resource exchange and integration.* In fact, most importantly, with reference to Propositions IV

and V, the development of innovation activities largely depends on how the ecosystem actors are able to engage themselves in continuous interplay with the various value cocreating actors. Without an understanding of the ongoing systems change (Geels, 2005; Akaka & Vargo, 2014; Capra & Jacobsen, 2017), the likelihood of conflicts, ambiguity and opportunism will certainly grow (Mele et al., 2018; Fuller et al., 2019).

The emerging need to better explore and validate the still theoretical models and concepts of value cocreation has also been raised in recent research by Benoit et al. (2018), highlighting the importance of the cross-fertilisation of ideas and novel perspectives in terms of covering a variety of topics, theories, methods and contributions. In order to consider value cocreation as processes and relationships, and not as structures and properties, more research is needed about the interoperable and segregated phases through which value is generated. Confirmed by recent studies showing the inability to apply these guidelines in real-life business environments (West & Bogers, 2014; Alinaghian & Razmdoost, 2018), more effort is needed to enhance resource exchange that is mutually beneficial to all actors involved in the value cocreation process (Mazzucato, 2018b). In other words, as well as shedding more light into the underlying assumptions and expectations that impact value cocreation practices, either supporting the actual value cocreation or preventing it from taking place, more attention should be paid to creating a balanced view of both value cocreation and value destruction as a natural part of the innovation process.

As highlighted in the five propositions (see Table 17, page 87), more effort is needed to develop contextually suitable organisational structures and social environments that can support more advanced resource exchange and integration. For example, theoretically, crowdsourcing is considered as an ideal method for using social media to help organisations to increase productivity, raise positive brand awareness and leverage a skilled external workforce alongside the permanent workforce (Allahbakhsh et al., 2013; Tickle et al., 2011). In practice, as explored in Publications I and II, acquiring these benefits is not self-evident and, in particular, collaboration in the dynamics of innovation is often underestimated (Rajala et al., 2016). Given that, for a long time, technology was only perceived as an object, the majority of the ecosystem actors often tend to consider social media as a connector only. In doing so, they completely ignore the practices of value cocreation. Hence, the positive effects of value creation can remain surprisingly low, and even become devalued.

Interestingly, despite some earlier research attempts to raise awareness of value destruction (Echeverri & Skålen, 2011; Plé & Chumpitaz Caceres, 2010), overall

understanding of the concept has remained quite rare. With a limited number of studies covering anything other than the customer- or firm-centric approaches to value creation (Benoit et al., 2018), the understanding of value networks is so far mostly based on data collection. However, as stated by Echeverri & Skålen (2011), and as empirically shown in this research to be true, the pre-assumption that all cocreation experiences would be positive and unproblematic is somewhat unrealistic. For example, in Publications I and II, none of those interviewed seemed to have experienced value destruction in any way during the innovation process. Additionally, even though some of the ecosystem actors interviewed for Publication V mentioned value destruction indirectly, it was referred to as a failure. Interestingly, and most importantly, these ecosystem actors could not perceive their own role in weakening the results of the value cocreation activities. More understanding is thus needed about how to achieve a balance between value cocreation and value codestruction.

Nonetheless, the impacts of the complex interrelations between value cocreation and value destruction are often difficult, if not impossible, to estimate or confirm. It is therefore important to understand that whereas the term value destruction only refers to a natural yet often forgotten aspect of value formation (Echeverri & Skålen, 2011), the term value extraction should only be used when referring to the maximisation of stakeholder value at whatever cost for the value-creating actors (Mazzucato, 2018b). These two terms are not interchangeable. However, with reference to the two-part model approach to value creation (Galbrun & Kijima, 2009), presented in Figure 4 (see page 49) and used in Publication V, conflicting information and experiences should be examined as a notable opportunity not to be missed in value creation.

These observations are strongly related to the notion of institutional complexity as a trigger to support the creation of novel approaches to resource exchange and integration. Hence, there is a distinct need for both researchers and practitioners to elaborate the practices of value cocreation in more concrete ways. *Since understanding the concepts of value cocreation and innovation is of the utmost importance for developing collaborative innovation within ecosystems, significant changes are required to fill this gap in future research on value cocreation and innovation in ecosystems.*

5.2.2   Management contributions

The ability of both individuals and organisations to enhance value cocreation is closely related to their abilities to assimilate new knowledge and resources. In order to cocreate value, the ecosystem actors need to become engaged in continuous experimentation and development of the system itself. However, without investments in understanding the differences between the major theoretical approaches to and definitions of ecosystems, the currently blurred perceptions and conceptions of value cocreation and innovation are certain to continue growing. Whether the value cocreation process takes place in physical, social or virtual spaces (Frow et al., 2015) seems to be unimportant. As demonstrated throughout the results of this dissertation, *the significance of social media is not so much about understanding how to better use social media, but in understanding the power of social technologies to shape human behaviour.* This will certainly have its implications to, for example, the many possible applications of artificial intelligence.

As observed in Publication V, a paradigm change will not happen overnight. Once a holistic view has been formed of the various explicit and symbolic (inter)relationships between the different value cocreating actors, each of them will contribute to the success of a company's innovation practices and processes. As a result, the understanding of innovation tends to change in radical ways. This was clearly demonstrated in Publication V, where two alternative narratives were found to express the contradictions between the conscious and unconscious perceptions, attitudes and values related to value cocreation and innovation.

In other words, as stated by Wieland et al. (2016), attention must be directed towards more collaborative innovation processes in order to better assimilate the different roles and impacts of social media on value cocreation and innovation. To do so, a process model for enhancing the use of social media in innovation has been created. As shown below in Table 19, it urges companies to: 1) sense the possibilities of social media in innovation, 2) seize the opportunities to learn from other social media users, and 3) set goals for advanced social media use in innovation. Although the process model is very straightforward, the process itself rarely appears so in reality. *Strong emphasis is placed on the orchestration of value networks as a means to enhance the organisational innovation capabilities as a solid foundation for creating a more purposeful ecosystem for innovation.*

Table 19.   A process model for enhancing the use of social media in innovation

STEP 1: Sense the possibilities of social media in innovation	STEP 2: Seize the opportunities to learn from other social media users	STEP 3: Set goals for advanced social media use in innovation
Action Create organisational awareness for a basic understanding of social media use in innovation Follow companies who have already used social media in innovation (with success)	**Action** Map and experiment with different methods and tools for innovation Seek advanced understanding of the risks related to social media use (value destruction) Engage with and learn from others (new value networks)	**Action** Set specific development goals (not outputs) for social media use Analyse and elaborate the existing tools and methods for innovation
Focus Understanding the role of social media in increasing the density of resources	**Focus** Experimenting with the role of social media in enhancing the practices of value cocreation through improved resource exchange and integration	**Focus** Active participation in redefining the understanding of process innovation

As shown in the process model, in step 1, *the focus is on understanding how social media can help in increasing the density of resources.* Most importantly, it is about how organisations should first build up their understanding of the essential role of social media in increasing institutional complexity. For example, in Publications I and II, the case company was focused on trying out a new method for value cocreation, but in fact ended up never becoming part of the value cocreation process themselves. Hence, a lot of potential resource exchange, in terms of new knowledge, solutions and ideas, was left untapped.

In step 2, *the focus shifts to experimenting with the ways how social media enhances the practices of value cocreation through improved resource exchange and integration.* What this means in practice is that organisations should be active in mapping and trying out different methods and tools for innovation, preferably on a continuous basis. In addition, they should engage in creating new value networks and learn from others through dialogue and collaboration. At the same time, they should seek advanced understanding about the risks related to social media use.

When developing these new practices for resource exchange and integration, the view of value cocreation is often highly focused on the needs and benefits of individuals and organisations. Indeed, as explored in Publications I and II, the crowdsourcing process was successful from the case company's point-of-view, since

it was both cost-efficient and it helped in developing the absorptive capacity of their employees. However, the case company did not pay attention to the missed opportunities for resource integration: they did not have any real contact with the crowd, and they may have missed some great opportunities to learn from the crowd, which most probably would have led to value destruction. As discussed in Publications I, II and V, facilitation is a key element in accelerating processes where actors from different organisational settings first come together and create a common ground. On the other hand, if the value cocreating actors do not actively participate in this kind of experimentation, the understanding of innovation may remain rather mechanical and limited to certain key actors. Hence, this is also when the understanding of 'service' as the collaborative act of doing something (for the benefit of others) and 'innovation' as the manifestation that defines the attitudes, values and goals of these acts should start to grow.

Undeniably, new rules and norms are best adopted and integrated while exploring and testing value cocreation in everyday situations. As shown in Publication III, despite a number of published academic journals expressing a huge interest in the use of social media, hardly any changes at all were explored in terms of value creation and business models. Furthermore, in Publication V the role of social media was found to be completely unimportant to most of the participants in the innovation hub. Yet, as stated by a number of interviewees, more active facilitation of the value cocreation process would most likely have resulted in significant impacts on knowledge sharing within and outside the hub. Without a doubt, it is important to remember that both the quantity and quality of value cocreating activities are largely dependent on the construction of a shared narrative among the actors participating in the value cocreation. By engaging the actors through social media-enabled platforms and tools, this narrative can also become more widely shared and accepted.

In step 3, *the focus is on making the participating value cocreating actors more active in redefining the process of innovation*. At this point, emphasis is placed on understanding the importance of resource integration as the fuel for innovation. In other words, it becomes essential for the value cocreating actors to understand how social media can support value cocreation in non-authorised, self-organising and self-adjusting service ecosystems when multiple independent actors are involved in the process. At the same time, the understanding of service ecosystems is taken to a completely new level.

Given that the current understanding of the value cocreation process is still somewhat limited, the importance of facilitation cannot be highlighted too much. Generally speaking, in order to fully benefit from social media – or any of the new

social technologies – it needs to be approached with concrete, strategic and contextually defined goal setting. Whether in an organisational setting, or in ecosystems, both managers and employees should take time to really explore and understand the role of social technologies in enhancing the practices of value cocreation.

5.3   Evaluation of the study

In this dissertation, unique insights are provided regarding the ways how social media enhances value cocreation and innovation in ecosystems. Indeed, as far as the debate supporting a more strategic use of social media in innovation is concerned, this research has succeeded in making many new and interesting openings. Most importantly, by considering social media as both a trigger and a supportive element vis-à-vis the ongoing socio-technical transition, this dissertation brings forth the importance of developing a more systemic approach to innovation. That is, by presenting the five concluding propositions of this dissertation, along with the three-level approach to social media, it is to be noticed how undeveloped the understanding of value cocreation is and how this study demonstrates the emerging need to redefine the role of technology in value cocreation and innovation. Hence, with the three-step process model for enhancing the use of social media in innovation, this study aims to foresee the three most obvious approaches to social media: a connector, an enabler and an actor. In doing so, this research does not merely identify the different roles of social media in value cocreation and innovation, but calls for a change in terms of mind-sets, attitudes and operating models regarding the use of technology.

By combining the aspects of deduction (i.e. the process of first building and then testing a theoretical framework) and induction (i.e. the process of creating insight through proposition building), in this research, the aim was to identify, connect and make sense of the acquired knowledge and data - and to eventually produce the final results and conclusions of this dissertation. Given the qualitative nature of the research, the following three evaluation criteria were taken into account when evaluating the study: 1) selecting the appropriate theoretical framework, 2) validating the thoroughness of the methodological choices and 3) ensuring the reliability of the data collection and analysis. (Guba, 2012; Shenton, 2004).

5.3.1 Selecting the theoretical framework

The most challenging task was to set the focus of the research. That is, to begin with, the aim of the dissertation was to study the use of crowdsourcing in complex industrial business-to-business settings. Without having actually confirmed any specific theoretical framework or approach, the methodological choices of the first three publications were all based on the theoretical foundations of innovation management (Schumpeter, 2004; Burns & Stalker, 1961). The interpretivist nature of this dissertation was already perceptible. That is, the aim was to understand *what* is characteristic for the studied phenomena, and to find reasons for *why* they are as they are.

However, while conducting the interviews for Publication II that the researcher started to question whether the chosen topic was too narrow and limited as a viewpoint, thus leading in unrelated results from reality. Then, getting introduced to service-dominant logic while finalising Publication III that intuition was significantly strengthened and, finally, the researcher decided to change both the theoretical approach and focus of the research. As it was seen in Publication IV, a conceptual paper reflecting the emerging changes in organisational creativity and innovation, the change was not easy. Given that service-dominant logic was also significantly elaborated during that time (Koskela-Huotari & Vargo, 2016; Koskela-Huotari et al, 2016), some of the concepts and reflections in Publication IV did not respond to the latest discussions on service-dominant logic. In addition, some of the concepts introduced in Publication IV were still based on the goods-dominant logical views on value creation and networks.

Despite the challenges, adopting the service-dominant logical view on value cocreation and innovation turned out to be highly fruitful in terms of challenging the validity and reliability of this research. This was especially noticeable when summarising the results of this entire research. Even the data that had been collected and the methods that had been used in the early publications were all relevant for the new research design. In fact, looking back from here, being forced to rethink the research design over and over again did not only help in finding the focus of this research, but it also helped in validating the methodological choices of this research.

5.3.2 Validating the methodological choices

Due to the interpretivist and explorative nature of this study, his dissertation does not provide normative 'truths' about the ways how social media enhances value

cocreation and innovation. It only builds up the 'best possible explanation' resulting from the acquired data and knowledge. Thus, this research may seem to repeat the already widely examined 'facts' or assumptions about value cocreation and innovation, and therefore appear to be lacking a deeper focus and analysis. However, with the help of a strong research strategy, data collection methods and study subjects, the chosen qualitative multi-method approach allows each individual publication to be built on the results of the former. In doing so, this research represents an important phase in the empirical examination and validation of the continuously developing service-dominant logic framework and concepts. This need for more empirical research on a) the technology aspects (Christopher & Ryals, 2014; Kijima, 2015; Gadde, 2016; Koskela-Huotari et al., 2016) and b) the ecosystems view (Aal et al., 2016; Djellah & Gallouj, 2016; Rajala et al., 2016; Koskela-Huotari et al., 2016) of value cocreation and innovation has been confirmed in many recent studies.

In terms of research settings, this study included both international and local settings, both online and offline. This is much in line with the rather universal approach on value creation applied in this study. It is also supported by the fact that the two frameworks of reference (see Figure 4, page 49) that were used first in Publication V and then in summarising this entire research, have been developed by multicultural teams consisting of researchers from US, Asia and Europe (Lusch & Nambisan, 2015; Galbrun & Kijima, 2009; Kijima, Rintamäki & Mitronen, 2015). That being said, applying any framework is always dependent on the system-specific, institutional arrangements and therefore subject to different social, cultural and political impacts. More empirical research is thus needed to be able to generalise the impacts of social media on value cocreation and innovation.

As presented in chapter 4, the selection of the research methods, settings and samples were all based on the two research questions of this study, thus focusing on exploring either the organisational or the ecosystem's view on the ways how social media enhances value cocreation and innovation. Given the thorough descriptions of each research process, all of them peer-reviewed and presented in the individual publications, a lot of time and effort was invested in validating the methodological choices and the appropriateness of the research samples – thus referring to the intensity of data collection, the choices of interviewees and events to be observed. As such, this dissertation represents a concise and consistent summary of all five research publications.

5.3.3 Ensuring the reliability of the data collection and analysis

This dissertation consists of three case studies, one systematic literature review and one conceptual paper. Given the abductive nature of this dissertation, knowledge and understanding of the studied phenomena was acquired through continuous dialogue between empirical data and literature. The data collection was made through literature reviews, interviews and online observations and the analysis techniques included both content and conceptual analysis. However, the possibilities for any research bias as well as the unreliability of the results and conclusions were most obviously eliminated by the researcher's decision to use several overlapping methods during the overall study. In addition, the data was collected from several different and relevant sources and special attention was given to balancing the empirical and theoretical reflections resulting from the individual studies. (Guba, 2012; Shenton, 2004).

It is also worth noting that case studies always include a risk for bias, and that in order to ensure the quality of the results, it is important that the researcher is able to stimulate the interviewees' critical thinking and thus draw out any underlying presumptions and ideas. That being true, the use of case studies forms a reliable basis for data collection and analysis, i.e. to draw conclusions and construct explanations regarding the studied phenomena. (Guba, 2012; Shenton, 2004). However, in order to avoid favouring any information that would confirm the researcher's personal beliefs or ideas, special care was taken at all times to ensure the plausibility, contextual relevance, coherence and investigator-free nature of the interviews, as well as the prolonged engagement with the interviewees and the persistence and density of observations. For example, the structural coherence of the interviews was assured by comparing the answers with the overall data from transcriptions throughout the entire process of analysing the results of the interviews. In literature reviews, the keywords, search terms and selection of journals were thoroughly considered to ensure sufficient coverage. In doing so, the research publications included in this dissertation do not only support both research questions, but they are balanced and cover all the important areas of this dissertation. As a result, this research offers both holistic and versatile insight about the studied research problem.

In addition, the researcher greatly appreciated the guidance provided by distinguished reviewers to improve the clarity and quality of the publications. For example, the proper use of causal layered analysis in Publication V, along with the reliability of the findings, was significantly improved thanks to concrete and clear guidance from the reviewers. Altogether, the aspects of credibility, transferability,

dependability and confirmability of both the interviews and the literature reviews were considered very seriously (Guba, 2012).

5.3.4   Limitations of the study

Given the explorative and partly conceptual nature of this dissertation, the current results only represent one snapshot in time. That is, since this dissertation focused on exploring many different views regarding the studied phenomena, it did somewhat limit the depth of the research. To validate the currently presented ideas for succeeding in value cocreation and innovation, more longitudinal data might be recommended to eliminate any unnoticed pitfalls or bias in this study. As is the case in any scientific study that explores and interprets phenomena involving human senses and subjectivity, despite extensive cross-checking and the use of specific tools for data transcriptions and analysis, the possibilities of confirmation bias cannot be completely ignored. It is equally notable that the empirical data was limited, only representing a few cases.

Lastly, considering the researcher's former academic studies in French language and culture (Turku University) and in Tourism studies (University of Eastern Finland), there was no whatsoever prior knowledge of the chosen research topics and study fields applied in this dissertation. This did certainly affect the breadth and depth of general knowledge and understanding that steered this study process. (Strauss & Corbin, 1998; Shenton, 2004). It may also have resulted in dismissing some perspectives, conceptions and frameworks that could - or perhaps should - have been included in the analysis of the individual papers as well as this final analysis. (Benoit et al., 2018). This includes, for example, the recent insights from Actor Network Theory (ANT) – thus referring to the theoretical and methodological approach where everything in the social and natural worlds exists in constantly shifting networks of relationships (Latour, 2005) – and in relation to the research on social media as a technology – thus referring to their implications on the new forms of connectivity and data flows between the various human and machine actors (Gerlitz & Helmond, 2013; Matei, Russell & Bertino, 2015).

However, both the scope and the explorative nature of this dissertation strongly supported the researcher's intentions to create a bridge between the fields of innovation management and service-dominant logic. In fact, by adding the strong methodological contributions of Publication V, which combines the methods of service science and futures studies, this dissertation may be regarded as a serious

attempt to advance the thus far rather undeveloped transdisciplinary approach in innovation research.

5.4   Ideas for future research

In this research, many different issues were examined, and many more issues were excluded. In terms of future research, this dissertation opens up many new avenues for overcoming the limitations of this study and for advancing the ideas presented so far. All in all, the more complex business environments become, the more they generate the needs to understand the ecosystem-level interactions and their implications for value creation and innovation. As what comes to the results of this dissertation, more clarity and empirical guidance are required to implement cocreation and innovation in real-life situations. That is, *more research emphasis should be directed toward understanding the ecosystem view of service exchange, and to thus disrupt the current perceptions about value cocreation and innovation. In addition, the rising demand for a more balanced view of both value creation and value destruction should be further explored.*

   In fact, as writing this summary, the researcher is already working on several issues that support the further elaboration of the ideas presented in this dissertation. These topics include the research on innovation ecosystems as structures for value cocreation and co-destruction (see Ketonen-Oksi & Valkokari, 2019), the research on the use of value cocreation as a means to develop corporate futures orientation, and the research on understanding complexity as an important element in developing social media presence. What is common with these topics, is their focus on a) increasing the awareness of systems thinking, b) understanding the role of technology as an agency that is reshaping the current organisational structures and business models, and c) collecting empirical evidence on how to help organisations to adopt to the emerging systemic changes. In a world which can be described as a complex adaptive system, understanding the systems change is highly interlinked with the changing practices of value cocreation. Through increasing the understanding about value cocreation and innovation in the multi-actor networks, it becomes easier to address the many more questions related to technology as an agency. Most alarmingly, considering the present requirements to define humanity and better human conditions as the core value for the future development of artificial intelligence (Webb, 2019), there is an urgent need to study how our social behaviour as well as our value and data governance systems are being directed by the embedded use of artificial intelligence. After all, *understanding the interconnected nature of social media*

is a valuable method for increasing the understanding of the many emerging ethical, political and relational issues related to technology development.

Methodologically, empirical studies of the use of methods such as causal layered analysis and visual network analysis could be also interesting areas for further research. In fact, the method of causal layered analysis, borrowed from futures studies, could be useful in many case studies to shed more light on the underlying assumptions about and expectations of the value cocreation practices. Or, with the recent development of the data-driven approach to ecosystem-level sense making and orchestration, 'a plethora of new opportunities' (Huhtamäki, 2016, p. 3) have emerged for measuring, visualising and analysing socially constructed value networks. For example, with the help of visual analytics, it could make it more interesting for both private and public organisations to invest more resources on developing their understanding about institutional complexity. Who knows, *applying the three-level process model on social media might trigger more open approaches to dialogue, and thereby develop new forms of thinking and action.* Finally, it would be interesting to study the ways to use visual analytics and the construction of trust relationships in understanding the increasing role of technology as an agency - especially in terms of unfolding the many preconceptions and false assumptions related to human-machine collaboration.

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PUBLICATION
I

Social Media Based Value Creation in Innovation Community in Mechanical Engineering Industry

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Social Media Based Value Creation in Innovation Community in Mechanical Engineering Industry

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Abstract: Social media and crowdsourcing are becoming increasingly important not only for business-to-consumer (B2C) companies, in which context they have resulted in relatively large and fast-growing research body, but increasingly also to the development of business-to-business (B2B) products and innovations. However, academic research on the use of social media and crowdsourcing for the value creation of industrial companies and their new product development is almost non- existent. Compared to B2C companies, the B2Bs are e.g. challenged with far smaller number of customers and experts that could be utilised as crowdsourcing resources in innovation. B2Bs also face for instance various IPR and information security issues regarding product related knowledge. In addition, the development of complex industrial products often require large amounts of in-depth expertise and the crowdsourcing tasks may be very challenging in comparison to the usually simple tasks related to B2C and consumer crowdsourcing. The lack of understanding of social media in B2B context results in many restrictions and doubts related to B2B crowdsourcing. Novel systematic ways of value creation are needed in regard to the new product development (NPD) of B2B companies. In order to enable the crowdsourcing companies to efficiently make use of the crowdsourced ideas and concepts, it is essential to motivate the various different outside actors to share their needed in-depth expertise. In order to find out how social media and crowdsourcing can be used to create value for the development of complex B2B product in manufacturing industry, we selected a single case study research method. The selected single case represents a unique case regarding social media and crowdsourcing use in the development of complex B2B products. The data was collected in two stages - beginning with a netnographic participant observation in an online environment and followed by a semi-structured interview complementing and confirming the preliminary analysis. The interviews were based on the previously collected data. The analysis and collection of data occurred iteratively. In order to understand the overall patterns of value exchange and the value conversion between different actors, the case study data was analysed using Allee's Value Network Analysis method. The findings of the paper benefit manufacturing companies that are planning, designing, selecting and reviewing suitable social media based crowdsourcing communities to support their NPD. Manufacturing companies can learn from the case study and use it as a blueprint for their own crowdsourcing implementations, especially in the case of complex crowdsourcing tasks of industrial companies.

Keywords: social media, crowdsourcing, new product development, complex industrial B2B products, value creation, value network analysis

1. Introduction

Although social media and crowdsourcing are becoming increasingly important for business-to-business (B2B) innovation, very little research and understanding exists in how they could be used for value creation by industrial companies (Simula et al 2012; Simula and Ahola 2014). Compared to

business-to-customer (B2C) companies, the use of social media and crowdsourcing in B2Bs is challenged e.g. with far smaller number of customers (Tickle et al 2011) and experts that could be utilised as crowdsourcing resources in innovation. B2Bs also face for instance various IPR and information security issues (Marjanovic et al 2012; Simula and Vuori 2012), especially regarding the product related knowledge. In addition, the lack of understanding of social media in B2B context results in many restrictions and doubts related to B2B crowdsourcing (e.g. Simula and Vuori 2012, Kärkkäinen et al. 2012). Being demonstrated by a small number of forerunner companies, B2B crowdsourcing is however possible (Kärkkäinen et al 2012; Jussila et al 2013).

Novel systematic ways of value creation are needed in regard to the new product development (NPD) of B2B companies, in order to a) motivate and engage various different outside actors (customers and various stakeholders) to share their expertise, knowledge and other resources for the benefit of the crowdsourcing companies and b) to enable the crowdsourcing companies to efficiently make use of the crowdsourced ideas and concepts. Compared to traditional crowdsourcing of simple ideas or other simple tasks, the crowdsourcing of complex products requires various different types of in-depth specialized expertise.

Aiming at understanding how social media based online communities can help to create value for the development of new complex business-to-business products in manufacturing industrial companies, our research questions are:

1. What were the different actors involved in the crowdsourcing task of a complex industrial B2B product, and what were their roles in the crowdsourcing challenge?

2. How was the crowdsourcing task of the complex industrial B2B product carried out and managed? (E.g. how was the crowdsourcing call formulated and the rules for the crowdsourcing challenge created? How was the crowdsourcing challenge monitored and how were the complex solutions, received from the crowdsourcing task, evaluated and adopted?)

3. How did the crowdsourcing case company benefit from the crowdsourcing task as a whole? (E.g. what was the quality of solutions they received? According to the Case Company′s own experience, what were the overall benefits they achieved from the crowdsourcing task?)

2. Current literature

Empirical studies related to the use of social media in B2B relationships (Michaelidou et al 2011; Zaki et al 2013), and especially the development of new industrial B2B products, are rare (Jussila et al 2012; Kärkkäinen et al 2013). Further, empirical research concerning the use of crowdsourcing in B2B companies, and in particular in using crowdsourcing in the development of complex industrial products, is practically non-existing (Kärkkäinen et al 2012; Jussila et al 2013; Simula and Ahola 2014). In addition, explicit and concrete academic descriptions and analyses of how the above types of cases have been carried out, e.g. by means of value creation or value transaction analyses, were not found in the existing literature.

The concept of value has been debated for over 2000 years and there is no universally agreed consensus on the concept – the debate continues both in academic and in business domains.

Edvardsson et al. (2011) argue that value has a collective and intersubjective dimension and should be understood as value-in-social-context. While studying the NPD of a B2B manufacturing company co-creating value in an innovation community, the context can be viewed as a service system (Vargo 2009) or as a social system (Edvardsson et al 2011). In the social system the innovation community forms a social network between the parties involved, like represented in our case study: The Case Company′s Chain Wear Challenge at GrabCAD′s online community.

In a context of networks, it is especially fruitful to view value from the perspective of different kinds of exchanges. According to Allee (2009), the exchanges can provide a more dynamic and profound picture of the network than what could be achieved e.g. through a mere social network analysis. In fact, Allee′s (2008; 2009) value network analysis (VNA) is based on the identification of different exchanges and on the modelling of the complex value flows and human collaborations thereby discovered. Enabled by the visualisation of tangibles and intangibles, the VNA consists of both impact and value creation analysis.

The exchanges in the network are carried out between the different actors, and the value is being created through both monetary and non-monetary benefits and sacrifices (see e.g. Gummerus 2013). As being presented by Allee (2000), the exchanges in the value networks can be divided as follows: 1) material exchanges such as goods, services, and revenue, mostly easier to measure in monetary means, 2) knowledge, and 3) other intangible benefits, not directly beneficial in the financial sense. These exchange groupings are further utilised in the VNA process, where first the actors and their roles are being identified, and then the exchanges of tangibles and intangibles are analysed. In the VNA modelling, the nodes represent participants and the roles they play. Furthermore, in the VNA illustration the solid lines between the actors show tangible, formal or contractual deliverable exchanges between the actors, whereas the dashed lines show intangible or informal value being provided by the actors (see e.g. Allee 2009). Besides the identification of the actors, their roles and the tangible and/or intangible exchanges between them, an impact analysis is included in the VNA process. Through analysing the trade-offs of benefits and sacrifices, the impact analysis opens up the created value to each of the actors.

3. Methodology

In general, case studies are useful for investigating contemporary phenomena within their real-life context (see e.g. Yin 2003). As what comes to the selected case, it represents an interesting exploration on how social media and crowdsourcing can be used to support the internal NPD process of a B2B manufacturing company.

In our case, the unit of analysis is the crowdsourcing initiative (i.e. the Chain Wear Challenge) implemented on an online crowdsourcing platform (i.e. the GrabCAD Community) within the context of B2B manufacturing company's (i.e. the Case Company) internal NPD process. Considering the findings of our literature review, this research is to be considered pioneering in the field of social media based value creation in online communities.

The data was collected in two stages - beginning with netnographic (Kozinets 2010) participant observation in an online environment (i.e. online crowdsourcing platform and community), and followed by a semi-structured interview complementing and confirming the preliminary analysis

based on the previously collected data. Thus the analysis and collection of data occurred iteratively. The data collected with participant observation from the online environment included publicly available information only. It represented direct copies and screen captures from interactions between the users on the GrabCAD platform. All personal details were removed from the collected data to guarantee the anonymity of the users. All together, we took nearly 280 screen captures, downloaded all 44 entries (i.e. CAD designs) posted for the challenge, and analysed 980 separate lines of text. The semi-structured interview was held with Case Company's engineering director, based on a preliminary analysis that was generated from the netnographic data. The interview last about 80 minutes and it was documented making notes during the session.

The case study data was analysed using parts of Allee's (see e.g. Allee 2008) Value Network Analysis. In order to understand the overall patterns of value exchange and the value conversion between different actors (Allee 2008) in our case study, we first created a visualisation of the most important actors and value transactions occurring in the value network (i.e. exchange analysis). Second, we examined both the activities generated and impacts caused by the transactions in regards to the research questions of the study. During the analysis, we did not focus on conversing tangible and intangible assets, but we took a more general stance towards examining the value conversion from the Case Company's viewpoint.

4. Case study

In this section we discuss the selected case and the results and analysis of the case study. First, we outline the case context by introducing the case organization and explaining the crowdsourcing initiative. Second, we discuss our analysis based on the collected data and the selected analysis framework.

4.1 Case study context

The focus of this paper is on the Case Company, a globally leading overhead crane manufacturer and provider of lifting solutions and service network, and on how they used crowdsourcing in creating value for their new product development. The Chain Wear Challenge was held on GrabCAD´s online platform from 30th October 2012 to 15th of January 2013. Representing an online community of over one million engineers and 300,000 uploaded CAD designs, GrabCAD offers an open source CAD-library, a toolbox of industrial and mechanical design tools, a collaborative tool for editing and sharing as well as competitions, and is therefore an ideal platform for crowdsourcing for a mechanical engineering company.

The Case Company operates in 48 countries with over 12,000 employees. The case study focuses on the Case Company´s initiative to use crowdsourcing in innovating and developing an indicator for detecting chain wear in a chain hoist. The Chain Wear Challenge was a very concrete yet professionally demanding task, representing a functionality that has effects to the security of the Case Company´s lifting products. It was a task to be done in the long run, but the Case Company had only little resources to allocate for it.

As a concrete result of the Chain Wear Challenge, all together 44 solutions were created and 6 of

them were awarded with monetary or product prices. The jury consisted of both the Case Company´s and GrabCADs employees.

4.2 Results and analysis

In the Figure 1 we have described the major actors in regard to the crowdsourcing, evaluation and adoption of the crowdsourced complex solutions. The major actors influencing the above are described as nodes in the figure. The most important transactions from the perspective of our research questions are illustrated by arrows. Solid lines represent tangible transactions and dashed lines represent intangible transactions in the value network.
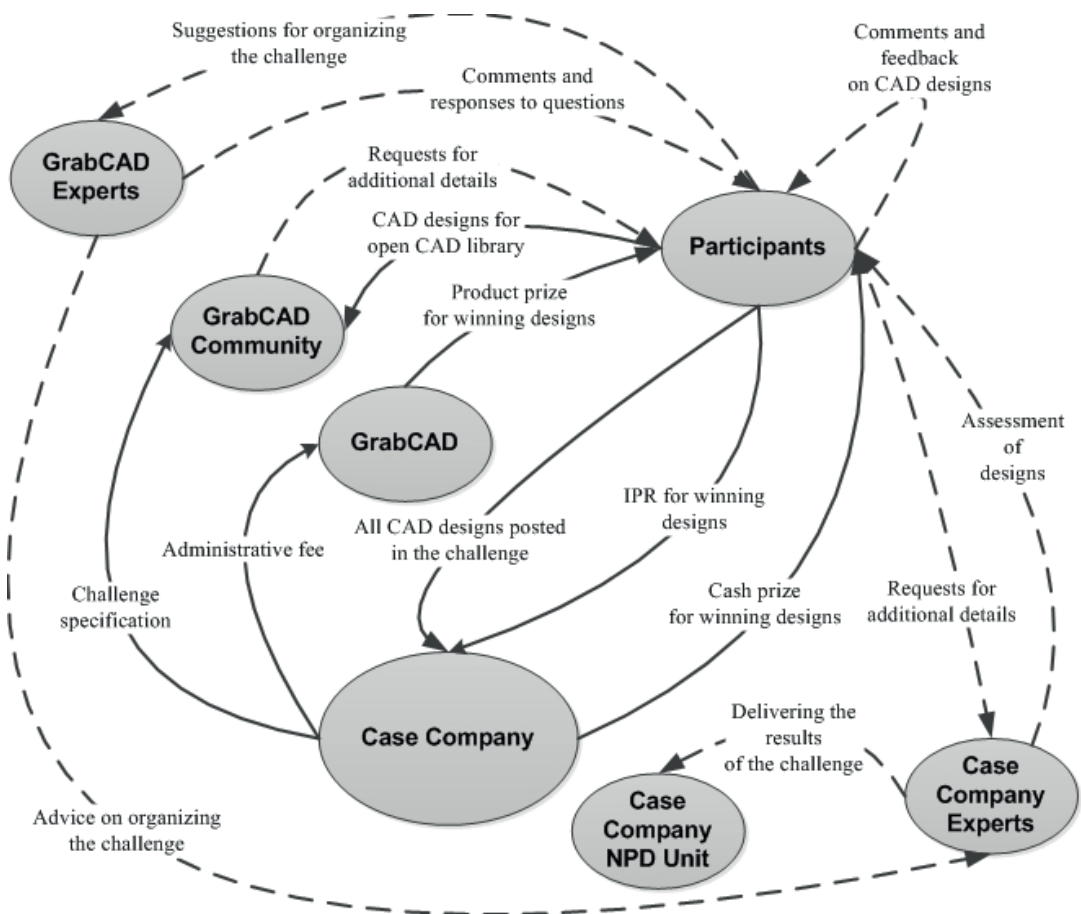

Figure 1: The value transactions identified in Case Company´s crowdsourcing task of a complex industrial B2B product.

We identified several different actors involved in the crowdsourcing challenge and in the evaluation and adoption of the complex crowdsourced solutions into Case Company's internal product development: GrabCAD Experts, GrabCAD (the company), Case Company Experts, Case Company, Participants and Community Members.

The Case Company had few direct contacts with the Participants during the challenge. Most of the transactions appear either between the Participants (i.e. the engineers in the online community) or between the Participants and Community Members or GrabCAD Experts.

The main interest lies in understanding the systemic nature of the transactions in the crowdsourcing of complex solutions. For instance, the GrabCAD Experts were monitoring the quality of the complex solutions (concepts) during the challenge, confirming that the concepts matched the goals set by the Case Company. As a result of monitoring the concepts, the challenge rules were modified during the contest to better steer the concepts towards the Case Company goals. This and other impacts of the transactions are next analysed in more detail in transaction and impact analysis (Table 1). As we can see from Table 1, the synergistic impact of tangible and intangible transactions leads us to a new level of understanding the interdependencies of the different actors in the crowdsourcing process: Themultilateral comments and discussions at the open community platform resulted in re-specification of the crowdsourcing challenge rules and in updates of the challenge related information – potentially increasing the quality of results. Due to the complexity of the crowdsourcing task, it was not possible to fully determine the challenge specifications and rules before publishing the crowdsourcing call, even despite the close cooperation between the GrabCAD experts and the Case Company experts. The role of GrabCAD is thus highlighted not only as technical platform owner, but as an important facilitator and a value adding link between the Case Company and the CAD engineers taking part in the Chain Wear Challenge. In terms of the Chain Wear Challenge the value creation was significantly systemic.

Table 1: The most essential transactions and their impact on the Case Company's new product development.

	Transaction analysis			Impact analysis
	Deliverables	**From**	**To**	**1) Activities generated** **2) Impacts caused by transactions**
Tangible	Administrative fee	Case Company	GrabCAD	1) Payment for hosting the challenge on GrabCAD platform (i.e. outsourcing the challenge related coordination and facilitation) 2) Financial expenses

	Challenge specification and rules	Case Company	GrabCAD Community	1) Publishing the challenge on GrabCAD platform 2) Enabling participants to produce relevant results for Case Company; Risk of revealing important NPD information publicly
	All entries	Participant	GrabCAD, Case Company	1) Reviewing and assessing of all entries (i.e. deciding the winners) 2) (Novel) ideas for product development
	Winning entries	Participant	Case Company	1) Developing and delivering the results of both internal and external challenges to product development sprints 2) Full IPR of winning designs and ideas for product development
	Cash prize	Case Company	Participant	1) Rewarding challenge winners (places 1-3) 2) Financial expenses worth $6,000 in total
	Product prize (GrabCAD T-shirt)	GrabCAD	Participant	1) Rewarding challenge winners (places 4-6) 2) -
Intangible	Advice on organizing the challenge	GrabCAD Expert	Case Company Expert	1) Designing the rules of the challenge and modifying them during the challenge 2) Increased probability that the results match better the needs of Case Company's NPD
	Comments and feedback on CAD designs	Participant	Participant	1) Discussions and collaboration between participants 2) Enhances the potential of collaboration between the participants and thus also the quality of CAD designs in the challenge

	Requests for additional details	GrabCAD Community	Participant	1) Responding to questions and modification of CAD designs 2) Enhanced quality of CAD designs in the challenge
	Comments and responses to questions	GrabCAD Expert	Participant	1) Coordinating the challenge 2) Improved challenge execution
	Suggestions for organizing the challenge (during and after the challenge)	Participant	GrabCAD Expert	1) Specifying the challenge rules 2) Increasing the probability of better results; Potential information for implementing a similar challenge in the future (lessons learned)
	Delivering the results of the external challenge to NPD	Case Company Expert	Case Company NPD Unit	1) Integrating external crowdsourcing challenge resources to internal product development 2) Speeding and improving the quality of internal NPD

Transaction and impact analysis were made by categorising the most essential transactions into tangibles and intangibles. If we take a look at the tangibles only, the impacts seem relatively obvious and predictable: As Case Company decided to pay for the use of GrabCAD´s online community platform and to reward the best idea propositions with cash prizes, it was able to outsource the coordination of the challenge and to save time- related resources of their experts. On the other hand, they took a risk of revealing some of their important NPD information publicly, also to their competitors, and in return, received (novel) ideas and concepts for their internal product development and the full IPRs of the winning entries.

As Case Company paid GrabCAD for the platform use and management, it was able to reach skillful designers and run the challenge instantly with relatively small monetary investments. For Case Company, the main value of the process was in getting new, fresh ideas and concepts for their product development, but they also gained brand awareness and visibility through the platform.

5. Discussion and Conclusions

Regarding the first research question, we were able to identify the different major actors involved in the crowdsourcing task of a complex industrial B2B product, as well as the roles they played in the crowdsourcing challenge. Through means of netnography we identified GrabCAD, GrabCAD Community, GrabCAD Experts, Participants, Case Company, and Case Company Experts as key roles in

the crowdsourcing challenge. GrabCAD Experts role was coordinating the challenge and facilitating discussions and collaboration between the Participants.

Together with netnogtraphic observation and the utilisation of value transaction analysis methods, we were able to make useful presumptions concerning the value creation in the crowdsourcing value system. By interviewing the Case Company representative we were able to confirm our preliminary findings, but were also able to identify additional actors and more detailed roles of the actors in the crowdsourcing challenge that were not possible to be determined by means of netnographic observation only. We discovered that the expertise and experience of GrabCAD Experts had an important role also in formulating the complex crowdsourcing task and in adapting the challenge rules to meet the Case Company´s goals. As an additional major actor, we identified that the Case Company's NPD Unit played a key role in integrating the external resources of the crowdsourcing challenge to the product development of the complex industrial end product of the company.

Regarding the second research question, we discovered several issues that were important for carrying out and managing the crowdsourcing task of the complex industrial B2B product. First, especially important when dealing with a complex industrial product, the Case Company used the expertise and experience of GrabCAD Experts in formulating the crowdsourcing call and challenge rules to improve the probability of quality of ideas from the Participants in the GrabCAD Community. Second, the quality of concepts, was monitored by GrabCAD Experts during the challenge to determine if the concepts matched the goals set by the Company. Based on the feedback, the challenge rules were modified during the contest to better steer the concepts toward the Case Company goals.

By organizing a simultaneous internal crowdsourcing challenge the Case Company was able to create absorptive capacity (see Cohen and Levinthal 1990) to quickly integrate the crowdsourced external resources and complex solutions from the crowdsourcing community into their own product development process and the end product. It made it easier to evaluate and assess the usefulness of the concepts created by the Participants, and to adopt the crowdsourced concepts into the further development of the ideas in their product development process more quickly. The Case Company would probably have not been able to properly evaluate and adopt the solutions without the increased absorptive capacity, due to their technical complexity and novelty.

Concerning the third research question, the Case Company´s perspective, the Chain Wear Challenge was experienced as successful. First, it demonstrated that crowdsourcing can be successfully utilised in the new product development of a complex and various in-depth expertise demanding industrial engineering challenge. Although the challenge did not provide the Case Company with fully ready-to-use concepts, the company was able to integrate the external resources quite usefully into their in-house product development. Financially, the Case Company estimated that the Chain Wear Challenge cost them about half of the cost compared to them developing it fully by themselves. Importantly, the Case Company expressed that it would probably have taken them around couple of more years to develop this specific component fully by merely in-house development resources. Other benefits included "fresh viewpoints from heterogeneous crowds" and positive brand awareness and publicity because of the openness of the challenge.

The studied crowdsourcing platform supported product development with several Enterprise 2.0 and

social media features, such as first, to reach and to properly allow the participation of experts in the crowdsourcing community of more than 900,000 professionals from different industries, and second, to support the provision of useful feedback from crowdsourced solutions by both other community members and the product development professionals of the crowdsourcing manufacturing company.

The findings of the paper benefit manufacturing companies that are planning, designing, selecting and reviewing suitable social media based crowdsourcing communities to support their NPD. Manufacturing companies can learn from the case study and use it as a blueprint for their own crowdsourcing implementations, especially in the case of complex crowdsourcing tasks of industrial companies.

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PUBLICATION
II

**How Can Crowds Be Used in Developing Complex Industrial Products?
An Analysis of Factors Impacting the Usefulness of Crowdsourcing
Outcomes Models**

Ketonen-Oksi, S., Kärkkäinen, H. & Jussila, J..

How can crowds be used in developing complex industrial products? An analysis of factors impacting the usefulness of crowdsourcing outcomes

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Abstract: Understanding how to plan and execute crowdsourcing challenges of complex industrial products is crucial for receiving useful information and knowledge from crowds. This qualitative single-case study was, thus, initiated to analyse the factors impacting the usefulness of crowdsourcing outcomes. The data were collected by means of semi-structured in-depth interviews with representatives of a crowdsourcing company and a crowdsourcing platform provider. From these data, a number of factors impacting the usefulness of information and knowledge acquired from crowdsourcing were identified, and their significances were evaluated, thereby increasing our understanding of value creation from crowdsourcing activities. The need for novel skills and competences was highlighted. Though more validation is needed to generalise these preliminary results, this study generates a new qualitative understanding of the use of crowdsourcing in the development of complex (new) product development.

Keywords: open innovation; crowdsourcing; complex products; product development; innovation process.

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1   Introduction

In modern free-market economies, innovation is considered a key element for organisational competitiveness and growth. Succeeding in generating and developing new ideas is, however, not easy. Companies can no longer rely only on their own knowledge; they must also take in knowledge and information from outside company boundaries (Franzoni and Sauermann, 2014). This requires active social interaction and visible practices to assist in capturing, assessing, rewarding and provoking the actions produced by these interactions (Burdon et al., 2013; Gassman et al., 2016).

The development of information and communication technologies has provided companies with a whole new range of possibilities to be socially connected. The availability of numerous interactive and inexpensive opportunities to foster, for example, idea generation, the identification of emerging new markets and the use of open innovation tools and methods (Chesbrough, 2003; Chesbrough and Growther, 2007) has significantly influenced how companies interact and collaborate.

Given their focus on knowledge sharing (Kuittinen et al., 2013), open innovation platforms are used by companies to generate successful innovative performance. In fact, crowdsourcing (Howe, 2006), which can be used in innovation and considered then as an open innovation activity, is estimated to be one of the most important trends fundamentally revolutionising the manner in which future business firms, governments and humanitarian organisations will work (Marjanovic et al., 2012; Schenk and Guittard, 2009; Sharma, 2010; Simula et al., 2012). At best, crowdsourcing can replace months or even years of development from a company's own product development unit, and it is considered one of the most effective ways of infusing new ideas into new product development. By providing better, easily differentiated and novel ideas to relevant problem-solving processes, crowdsourcing can help organisations increase productivity, raise positive brand awareness and leverage skilled external knowledge beyond their permanent workforce (Allahbakhsh et al., 2013; Kärkkäinen et al., 2012; Tickle et al., 2011).

Along with the recent maturing of crowdsourcing intermediaries and the subsequent fast growth of crowds, including crowds of industry-specific professionals, crowdsourcing has attracted particular interest among industrial business-to-business (B2B) companies. However, the research focus has typically been on outsourcing-type cases (e.g., marketing-related topics); thus far, the comprehensiveness of crowdsourcing potential and the modularity of product design have been neglected (Koskinen, 2014; Schenk and Guittard, 2011). Very little is known about the benefits of crowdsourcing when it is used for the development of complex tasks and products (Buettner, 2015; Franzoni and Sauermann, 2014; Kärkkäinen et al., 2012; Kittur et al., 2011).

The identification of the different actors involved in crowdsourcing processes and the synergistic impacts of their related tangible and intangible transactions (i.e., the systemic nature of the transactions) is, however, not sufficient. More in-depth studies are needed to gain a holistic understanding of how to acquire the most useful information and knowledge when using the specialised expertise of crowds for the development of complex products. Therefore, the objective of this study is to first define and then understand the significance of the major factors affecting how to obtain useful knowledge and information when crowdsourcing complex industrial B2B tasks and products.

2   Key concepts of the study

2.1   Open innovation

In general, open innovation can be used for many different purposes, including:

a   generating innovations to be internally commercialised (i.e., the proprietary model)

b   building absorptive capacity and using that capacity to identify external innovations

c   generating innovations that generate returns through external commercialisation (e.g., in the case of licensing patent portfolios)

d   generating intellectual property with indirect benefits (e.g., via returns through spillovers or the sale of related products).

In practice, the use of open innovation may relate to many different objectives, from product platforming (e.g., the development and introduction of partially completed products) and idea competition (e.g., the implementation of reward-based engagement systems) to customer inversion or co-creation. In addition, open innovation can be used for the creation of innovation networks (e.g., leveraging networks of contributors by rewarding incentives for already identified problems) (Cheng and Huizingh, 2014; Hutter et al., 2013).

In this study, we follow the definition of open innovation used by West and Gallagher (2006, p.3), who argued that open innovation is "systematically encouraging and exploring a wide range of internal and external sources for innovation opportunities, consciously integrating that exploration with firm capabilities and resources, and broadly exploiting those opportunities through multiple channels" (see Cohen and Levinthal, 1990). Our focus of attention is on using open innovation to support a company's internal research and development processes.

2.1.1   Characteristics of open innovation

Open innovation activities can be categorised into three different types:

1   outside-in activities

2   inside-out activities

3   coupled activities, which combine activity types 1 and 2.

First, outside-in activities are applied when open innovation is used for gaining and exploring knowledge from external partners (e.g., suppliers, customers, competitors, consultants, research institutes, universities, or governments). Second, inside-out activities are applied when internal ideas are being externally exploited (e.g., through licensing, the selling of knowledge or the spinning off of innovation projects into new firms). Third, coupled activities refer to situations in which different actors within the innovation system begin to collaborate, resulting in a combination of outside-in and inside-out activities (Faems et al., 2005; Gassman and Enkel, 2004). Through acquiring new knowledge and information, companies are able to; for example, create new offerings with new combinations of technologies and markets, leading to greater innovative performance (Cheng and Huizingh, 2014).

The benefits of open innovation apply to several different firm functions and aspects, such as profitability, R&D performance, customer satisfaction, product innovativeness, new product success, collaboration with customers and external technology commercialisation (Cheng and Huizingh, 2014). Hence, the use of open innovation often reduces R&D costs and time usage via potential improvements to products and services and the incorporation of both customers and professionals with relevant and high-demand skills. It also increases the accuracy and potential of synergies between internal and external innovations, as well as the potential for viral company marketing and branding (Chesbrough and Growther, 2007).

However, the use of open innovation rarely contributes to a firm's core competences. Rather, open innovation complements existing or new processes or product and service qualifications. Alternatively, external innovations could be used to extend the lifecycle of an internally developed product or service (Chesbrough, 2003). As a result of these benefits, a company engaged in outsourcing is able to minimise the challenges and risks of revealing strategic information unintentionally, of losing competitive advantage by revealing intellectual property and of being unable to identify or incorporate external innovations. Open innovation requires an outward focus; thus, it is most suitable for companies that are open to sharing their innovation processes with externals (Cheng and Huizingh, 2014). The more companies are able to loosen their control over their innovative activities and their intellectual property, the greater return on investment they will have.

2.2   Crowdsourcing

Finding a single, consistent and all-inclusive definition of crowdsourcing seems quite impossible in the current literature (see e.g., Estellés-Arolas and González-Ladrón-de'Guevara, 2012), and the taxonomy on crowdsourcing is virtually non-existent (Simula et al., 2013). Very often, crowdsourcing is studied as a process that involves several key actors and operations (see Zhao and Zhu, 2012; Stewart et al., 2009; Whitla, 2009) or as a

platform with specific functions and features, enabling the implementation of various paradigms and supporting corresponding processes (see Kittur et al., 2011; Schenk and Guittard, 2009; Vukovic, 2009; Zhao and Zhu, 2012). Alternatively, crowdsourcing has been labelled using antitheses, such as psychological experience vs. objective tasks, commercial vs. non-commercial activities, technology-mediated vs. technology-driven processes and individual vs. collaborative task designs (Campbell, 1988; Nakatsu et al., 2014; Zhao and Zhu, 2012). In this study, based on an extensive study of the extant crowdsourcing literature, we apply the definition proposed by Estellés-Arolas and González-Ladrón-de'Guevara (2012, p.197):

> Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organisation or company proposes to a group of individual of varying knowledge, heterogeneity and number, via a flexible open call, the voluntary undertaking of a task.

Crowdsourcing does not, *per se*, entrust crowds with any organisation-specific functions (e.g., research-or development-related functions). Like many other open innovation tools and methods, crowdsourcing is best used for individual processes or tasks (Stanko and Calantone, 2011). However, unlike outsourcing, which is based on juridical confirmed contracts of predefined tasks and expected outcomes, crowdsourcing is dependent on the skills and motivations of undefined and often anonymous crowds. Due to crowdsourcing's voluntary basis (Zhao and Zhu, 2012), its outcomes are less predictable and more varied than those of outsourcing, frequently resulting in outside-the-box types of solutions (Simula et al., 2013). Misunderstanding the conceptual differences between outsourcing and crowdsourcing, however, can result in wrong expectations and outcomes.

2.2.1 Use of crowdsourcing in new product development

Considering the short time frame it takes to carry out a crowdsourcing challenge, crowdsourcing is a very fast and effective way of getting results, often saving a company's new product development unit substantial time. Crowdsourcing can replace months or even years of internal development work, and it is also considered one of the most effective ways of getting new and fresh ideas into a new product development process. By providing better, easily differentiated and novel ideas to the problem-solving processes in question, crowdsourcing can help organisations increase productivity, raise positive brand awareness and leverage skilled external workforces besides their permanent workforces (Allahbakhsh et al., 2013; Kärkkäinen et al., 2012; Tickle et al., 2011). In addition, crowdsourcing is regarded as an effective tool for increasing a company's absorptive capacity (Afuah and Tucci, 2012).

2.2.2 Applying crowdsourcing to the design of complex B2B products

Companies operating in B2B environments are often challenged by far fewer customers, with experts used as crowdsourcing resources (Tickle et al., 2011). Companies are also faced with various Intellectual Property Rights (IPR) and information security issues (Marjanovic et al., 2012; Simula and Vuori, 2012), often requiring specialised and in-depth expertise. Very little prior knowledge is, however, available for understanding the key elements and mechanisms impacting the success of B2B crowdsourcing processes and tasks. Despite the existence of many frameworks and models for

evaluating the benefits of outsourcing (according to Sharma, 2010; see e.g., Carmel, 2003; Farrell, 2006; Heeks and Nicholson, 2004), only a few attempts (see e.g., Sharma, 2010) have been made to construct one for crowdsourcing itself.

When crowdsourcing is used in the context of industrial B2B companies, it is important to understand the differences between the simplicity and the complexity of the designed tasks and products. Although the process of B2B crowdsourcing rarely differs from that of a business-to-customer (B2C) context, B2B tasks and products often place high cognitive demands on the participating individuals. Instead of being characterised by a small number of predefined and non-evolving elements with little interaction, the majority of B2B products are fundamentally complex systems with many interrelated and conflicting components. Crowdsourcing challenges, thus, tend to involve:

a   multiple potential solutions

b   multiple desired outcomes

c   conflicting interdependencies among the paths to the multiple outcomes

d   uncertain or probable links among paths and outcomes (Campbell and Gingrich, 1986).

The greater the complexity of a crowdsourcing challenge, the more its participants hope to be treated as innovation partners (Afuah and Tucci, 2012). Thus, the notion of complexity is more or less connected to the management and decision making of a seemingly simple process with specific, complex tasks and products. The importance of formulating a crowdsourcing task and adapting the challenge rules to meet the host company's crowdsourcing goals may, thus, be more significant than presumed (Ketonen-Oksi et al., 2014). This also highlights the need to explore and understand the motivations of the participating crowds (Kosonen et al., 2014; Kosonen and Henttonen, 2015).

3   Research design

3.1   Research goals and theoretical framework

The extant literature has not yet discovered how best to acquire new and useful knowledge and information when using crowdsourcing to design complex industrial B2B products. To solve this problem, the following questions must be answered: why do some crowdsourcing processes yield more useful information and knowledge than the others? How can we improve the usefulness of acquired knowledge and information when crowdsourcing complex products?

Founded in a context of task and product complexity (see Schenk and Guittard, 2011), involving things either scientifically or technologically challenging by nature – and, thus, requiring high levels of individual or team professional skills and experiences – the crowdsourcing of complex, industrial B2B tasks and products typically yields very uncertain outcomes. With the aim of improving the internal innovation processes of industrial B2B companies through crowdsourcing, we study the following research questions:

1 What are the important factors impacting the success of crowdsourcing as a resource for external knowledge and information in the development of complex (industrial) products?

2 What is the significance of these identified factors in the crowdsourcing process of complex products?

The theoretical framework of this study adapts to the principles of open innovation, which is the ability of a company to open itself to more permeable working environments. As such, the theoretical framework is used as a guideline for understanding the basic requirements and characteristics of open innovation – and, more specifically, the requirements and characteristics of crowdsourcing in the studied context of industrial new product design. Any studies on the conceptual understanding of complexity have been excluded from this research.

3.2 Data collection and research methods

3.2.1 Data collection

The data collection and analysis of this study were conducted according to three main categories, applied in accordance with West and Gallagher's (2006) observations of three practical challenges of internal and external innovation:

1 motivating crowds to give their best efforts for creating useful knowledge and information

2 maximising the amount and quality of useful knowledge and information

3 incorporating the crowdsourced knowledge and information into a new product development processes

Since our focus of attention is on the process of crowdsourcing, rather than on the entire process of product or service development, we expected the data to fit mostly into categories 1 and 2.

3.2.2 Research methods

Sets of semi-structured, in-depth interviews were conducted in two phases between 2014 and 2015. To begin, a set of questions were asked based on earlier literature on crowdsourcing in industrial product development settings and on our previous data of netnographic observations of the same study case (see Ketonen-Oksi et al., 2014). The focus was on validating and expanding the preconceptions we had about the usability of crowds in highly complex industrial product development settings. Subsequently, the questions were formulated so as to facilitate a joint understanding of product complexity and the benefits of crowdsourcing complex product development tasks.

The first interview with the crowdsourcing company was carried out as a face-to-face discussion with the two case company experts who originally initiated the studied crowdsourcing challenge and two independent researchers (i.e., one of the authors of this paper and a colleague). The second interview was executed as a telephone conversation between a leading expert from the case company's innovation unit and a single researcher. Both interviews with the platform provider, represented by an expert with

long-term and versatile experience with the platform, were conducted through Skype video calls by a single independent researcher. All interviews were conducted as semi-structured interviews, allowing needed specifications during the discussions. The lengths of the interviews varied from 45 to 90 minutes.

Special attention was also given to the ways in which the samples were collected. The sample selection was designed to avoid influence by the researchers' own personal motivations, interests and point of view. All interviews were reported and documented, thus facilitating the replication and verification of the results. In addition, attention was given to the possibility of using the results in crowdsourcing cases not identical to this case study (see e.g., Guba, 2012).

Since our research was limited to the study of only one particular crowdsourcing case, the results may not be suitable for generalisations. The use of mixed methods could have strengthened the study's trustworthiness (Shenton, 2004). However, the study still offers an excellent lens through which to observe a novel concept that has thus far been only minimally studied and understood (Flyvbjerg, 2006).

3.3   Case description

The case study, hereinafter referred to as the chain wear challenge, was selected to illustrate the process of a specific, complex industrial new product development. The focal crowdsourcing company initiated the challenge in October 2012, and it ran until January 2013. The aim of the challenge was to use crowdsourcing to create value for a new product development process by innovating and developing an indicator for detecting chain wear in a chain hoist. The hosting crowdsourcing company is a globally leading overhead crane manufacturer and provider of lifting solutions and service networks, operating in 48 countries with over 12,000 employees. Following the completion of the challenge, this company sought to innovate and develop an indicator for detecting chain wear in a chain hoist.

The chain wear challenge was a very concrete yet professionally demanding task; involving complex functionality that could affect the security of the focal company's lifting products. It was the first product development-related crowdsourcing challenge initiated by the case company. The chain wear challenge was to be implemented in the long run, using few resources. As a result of the crowdsourcing challenge, a total of 44 solutions were created; of these, six were awarded monetary or product prices.

The crowdsourcing platform used consists of an online community of more than one million mechanical engineers and more than 500,000 uploaded CAD designs. The platform offers an open source CAD library, which is a toolbox of industrial and mechanical design tools for editing and sharing, as well as for competitions. It is one of the largest online platforms for complex industrial crowdsourcing in the mechanical engineering domain. This crowdsourcing platform has provided services to many global companies known for their front-end innovations, such as General Electrics, NASA and Koneranes, and it is considered the number one platform in the studied context of mechanical engineering, offering the most expertise and experience on the planning and execution of complex crowdsourcing challenges.

4   Findings

The interviews provided us with valuable knowledge on how the crowdsourcing process and the related benefits were seen from the viewpoint of the case company's new product development process. Once the in-depth interviews with the representatives of the crowdsourcing company and the platform provider were completed, we were able to identify several factors affecting how useful information was received during the crowdsourcing processes of complex industrial products.

Table 1   Factors impacting the usefulness of knowledge and information when crowdsourcing complex products. Why and how?

Motivating crowds to give their best efforts in creating useful knowledge and information	*Data sources*		*Why and how are these factors important?*
	CC*	*PP**	
Careful consideration of what can be feasibly crowdsourced	●	●	1 To limit the scope of the challenge according to the expected skills of the crowds. (CC)
			2 To reconcile the crowds' possible non-familiarity with the described technical solutions and company processes. (CC, PP)
Suitability of the challenge awards		●	1 To motivate sufficiently large crowds to participate. (PP)
			2 To show the crowds that they/their entries are valued. (PP)
Active communication among all actors involved		●	1 To allow feedback and questions from the crowds. (PP)
			2 To provide an active communication channel for the crowds, thus encouraging peer support. (PP)
Maximising the amount and quality of useful knowledge and information	*Data sources*		*Why and how are these factors important?*
	CC*	*PP**	
Careful design of the challenge specifications and instructions	●	●	1 To not substitute, but supplement the company's product development. (CC)
			2 To avoid excluding unforeseen, but useful solutions and approaches. (CC)
			3 To verify that the challenge fits the strategic goals and vision of the company. (CC)
			4 To encourage 'out-of-the-box-thinking'. (PP, CC)
			5 To avoid unclear or misleading challenge descriptions, resulting in solutions outside the scope of the original objectives. (CC, PP)
Explicit handling of intellectual property rights (IPR)		●	4 To address the legal risks of crowdsourcing. (PP)

Note: *CC stands for 'crowdsourcing company' and PP stands for 'platform provider'.

Table 1   Factors impacting the usefulness of knowledge and information when crowdsourcing complex products. Why and how? (continued)

Maximising the amount and quality of useful knowledge and information	Data sources		Why and how are these factors important?
	CC*	PP*	
Suitability of the challenge awards		•	1 To enhance the quality of results. (PP)
Diversity of the crowds		•	1 To bring together the skills and knowledge of different industry-specific sectors and different locations. (PP)
Close monitoring and administration of the challenge	•	•	1 To ensure that contact persons are not only technically competent and committed to the task, but also open to new ideas and concepts. (CC)
			2 To spare company resources by entrusting the monitoring to the service provider. (CC)
			3 To be able to quickly react to changing conditions (e.g., in order to redesign the challenge). (CC, PP)
			4 To ensure that the focus of crowd discussions stays on the most relevant technical issues. (CC, PP)
			5 To remove unsuitable discussions or entries (e.g., in cases in which the solutions are far from expected levels of know-how). (PP)
Active communication among all actors involved		•	1 To enable the sharing of more detailed information (e.g., about technical matters) among participating crowds. (PP)

Incorporating the crowdsourced knowledge and information into new product development processes	Data sources		Why and how are these factors important?
	CC*	PP*	
Careful consideration of what can be feasibly crowdsourced	•	•	1 To fit the company's strategic goals and vision. (CC)
			2 To support the company's core competences without revealing strategically important information to competitors. (CC)
			3 To balance the constraints with existing system specifications. (PP)
Explicit handling of intellectual property rights (IPR)		•	1 To ensure that solutions can be easily exploited later in the innovation process. (PP)

Note: *CC stands for 'crowdsourcing company' and PP stands for 'platform provider'.

Table 1 Factors impacting the usefulness of knowledge and information when crowdsourcing complex products. Why and how? (continued)

Incorporating the crowdsourced knowledge and information into new product development processes	*Data sources*		*Why and how are these factors important?*
	CC*	*PP**	
Development and use of absorptive capacity within the crowdsourcing company	•		1 To understand the need to conduct simultaneous internal processes (e.g., idea sprints) within the company. (CC)
			2 To strengthen the company's abilities to effectively evaluate and assess the technically complex and novel solutions produced during the challenge. (CC)
			3 To enhance company employees' ability to think 'outside the box'. (CC)
			4 To indirectly improve the skills of the company's own engineers, both during and after the challenge, resulting in new ideas and perspectives. (CC)
			5 To improve the company's capabilities to further develop the received ideas and solutions, (CC)

Note: *CC stands for 'crowdsourcing company' and PP stands for 'platform provider'.

A summary of the results is presented in chronological order in Table 1. When observations are made on the basis of our interviews with the crowdsourcing company, the source of the data is indicated with 'CC', and when observations are made on the basis of our interviews with the platform provider, the source of data is indicated with 'PP'. The results are presented according to the three main categories of analysis (i.e.;

a   motivating crowds to give their best efforts in creating useful knowledge and information

b   maximising the amount and quality of useful knowledge and information

c   incorporating the crowdsourced knowledge and information into new product development processes).

4.1   How can companies influencecrowds' motivation?

According to our study results, the following three factors will have the most impact on motivating the crowds to give their best efforts for creating useful knowledge and information:

1   careful consideration of what can be feasibly crowdsourced

2   suitability of challenge awards

3   active communication among all actors involved.

As noted by the crowdsourcing company, it was important for the scope of the challenge to be limited according to the expected skills and expertise of the crowds, as well as to

reconcile the crowds' possible non-familiarity with the described technical solutions and company processes. These activities were not so much about the number of challenge entries or about the size of the crowds, as they were about attracting and motivating a sufficiently large and skilled crowd to participate. By offering meaningful awards, the company showed appreciation for the crowd's work. The platform provider also highlighted the importance of active communication among all actors involved in the crowdsourcing process. First of all, this provider provided an active communication channel for the crowd, thus encouraging peer support. Second, it enabled the sharing of more detailed information (e.g., about technical matters) among crowd participants.

4.2   How can companies maximise the amount and quality of useful knowledge and information?

With regard to the factors impacting how to maximise the amount and quality of useful knowledge and information drawn from a crowdsourcing challenge, several factors were accentuated:

1   careful consideration of what can be feasibly crowdsourced

2   explicit handling of IPR

3   suitability of the challenge awards

4   diversity of the crowds

5   close monitoring and administration of the challenge

6   active communication among all actors involved.

4.2.1   Designing the challenge

Careful challenge design was seen as a key element for successfully acquiring useful knowledge and information when crowdsourcing complex industrial products. In fact, according to the platform provider, the value of the entire challenge strongly relied on the careful design of the challenge specifications and instructions: without precise, thoroughly considered descriptions of the task, task objectives might easily appear unclear or misleading, resulting in off-topic solutions. Designing a successful crowdsourcing challenge demands clarity and strategic perseverance on the part of the crowdsourcing company. Although the case company was flexible in clarifying or redesigning the task as needed, the number of crowd members taking part in the crowdsourcing challenge might have remained unexpectedly low if the description of the task had not been sufficiently informative.

As was pointed out by the crowdsourcing company, the crowdsourcing challenge design was a success because it did not exclude unforeseen, but useful solutions and approaches. Instead, the challenge followed the strategic goals and visions of the company and encouraged 'out-of-the-box-thinking'. The crowdsourcing challenge did not seek to substitute for any of the company's own product development activities; instead, it sought to supplement them. According to the crowdsourcing company, the careful design of the challenge specifications and instructions, together with careful consideration of what can be feasibly crowdsourced, are, thus, the most important factors impacting the usefulness of information gained during a crowdsourcing process.

Although both the platform provider and the case company recognised the importance of explicitly handling the IPR for any outsourced type of development process, only the platform provider considered this to be a factor impacting the usefulness of crowdsourced information. As pointed out in the interviews with the platform provider, there was a need to consider the legal risks of crowdsourcing at both the very early and the end phases of crowdsourcing. For example, the explicit handling of IPR could prevent entries from copying existing solutions. It was also essential to ensure that the solutions could be easily exploited later in the innovation process.

By providing transparent, detailed information on IPR-related issues for all actors involved in the process, the crowdsourcing company avoided a potential loss of resources and time from a juridical point of view. On the other hand, based on the wide experiences of the platform provider, the problems related to complex product development issues are typically unique, such that found results often cannot be applied to any competitors' products. Hence, since the case company did not consider crowdsourcing to be a tool for developing its core business activities, it did not consider IPR issues to be critical to the success of the crowdsourcing challenge.

4.2.2 Communication among the different actors involved

One of the greatest impacts of crowdsourcing comes from its ability to connect people with different working experiences and knowledge. As the platform provider saw it, crowdsourcing connects people in a new way. By supporting active communication among all actors involved, it brings together skills and knowledge from different industry-specific sectors and different locations. This being considered, the 'out-of-the-box-thinking' in the studied case was not so much dependent on the number of different fields of science involved, but on the diversity of skills and the work done in non-familiar teams and situations. Though some other crowdsourcing platforms might be based on more cross-disciplinary types of collaboration (see e.g., ArcBazar for architectural competitions), the studied platform provider did not consider this type of diversity at all necessary for the context of industrial mechanical engineering.

According to the platform provider, providing meaningful enough awards also had a considerable impact on the quality of the challenge entries and, thus, on the usefulness of the received information. The platform provider also highlighted the importance of the active communication among all actors involved in the crowdsourcing process. In addition to providing a channel for peer support and enabling the sharing of more detailed information among the participating crowds, the studied challenge also allowed crowd feedback and questions (e.g., for improving the challenge instructions and specifications).

4.2.3 Close monitoring and administration of the challenge

Both the platform provider and the crowdsourcing company considered the close monitoring of the challenge to be an important factor affecting the success of crowdsourcing for complex products. The platform provider suggested that close monitoring of a challenge emphasises active communication among all the actors involved in the crowdsourcing process, thus enabling quick reactions to changing conditions (e.g., in the event of needing to redesign the challenge instructions and specifications).

In general, close monitoring also enables the removal of unsuitable discussions or entries (e.g., in cases in which solutions are far from the expected level of know-how) and addressed the specific need to control the relevancy of discussions. As stated by both of the interviewees, active monitoring of a challenge will not only result in sharing more detailed information among participating crowds, but could also significantly improve the quality of a challenge. In addition, the studied platform provider's active role in monitoring and administrating the challenge spared the crowdsourcing company substantial resource expenditures.

4.3   How can the crowdsourced knowledge and information be incorporated for further use?

Though this study was limited to the acts of planning and executing a crowdsourcing challenge, we did find a few important factors influencing how to incorporate crowdsourced knowledge and information for further use:

1   careful consideration of what can be feasibly crowdsourced

2   explicit handling of IPR

3   the development and use of the crowdsourcing company's absorptive capacity.

As stated by the platform provider, there must be a balance between the constraints and the existing system specifications. The design of a challenge must fit the strategic goals and vision of the hosting company and, thus, support the development of the company's core competences. By managing the explicit handling of the IPR, the case company prevented new entries from copying existing solutions. It is also essential to ensure that found solutions could be easily exploited later in the innovation process.

By providing transparent, detailed information on IPR-related issues for all actors involved in the process, the crowdsourcing company avoided potential loses of resources and time from a juridical point of view. On the other hand, based on the wide experiences of the platform provider, problems related to complex product development issues are typically unique; thus, the found results cannot normally be applied to any competitors' products. Thus, although both the platform provider and the case company recognised the importance of explicit handling the IPR for any outsourced type of development process, only the platform provider considered this to be a factor impacting the usefulness of crowdsourced information. By contrast, since the case company did not consider crowdsourcing to be a tool for developing its core business activities, it did not consider the IPR issues to be critical for the success of the crowdsourcing challenge.

Last, but not least, the case company saw the development of absorptive capacity as being somewhat integrated into the concept of crowdsourcing. In particular, the execution of a simultaneous internal crowdsourcing challenge for the company's own employees significantly strengthened the absorptive capacity of the company's new product development unit. The results of both internal and external innovations became easily comparable and motivated company experts to compete for better ideas and solutions.

The crowdsourcing challenge substantially improved the crowdsourcing company's own experts' ability to quickly react to changing conditions (e.g., by motivating the use of new product development challenges, by introducing new and fresh ideas and by improving the experts' abilities to conduct needed organisational changes in the new product development-related activities). The crowdsourcing process could have, in no

circumstance, replaced the company's own new product development process; however, it was essential for generating new and fresh ideas and solutions for further development. In addition, the challenge-related atmosphere and the open-mindedness of thinking were strongly emphasised as important factors in the overall success of the crowdsourcing process.

4.4 Implications of the study results

To analyse the importance of each of the factors impacting the usefulness of the acquired knowledge and information, we categorised the factors according to the different stages of the crowdsourcing process. This analysis is based partly on the interviews and partly on the researcher's reading of the results.

Table 2   Factors impacting the usefulness of crowdsourcing and the resulting information and knowledge before, during and after the crowdsourcing challenge (see online version for colours)

Factors impacting the usefulness of crowdsourcing and the resulting information and knowledge	*In which stage of the crowdsourcing process is the factor significant?*		
	Before	*During*	*After*
1 The careful consideration of what can be feasibly crowdsourced	■		
2 The explicit handling of IPR issues			■
3 The careful design of the challenge specifications and instructions	■	■	■
4 The suitability of the challenge awards	■		
5 The diversity of the crowds	■		
6 The close monitoring and administration of the challenge		■	
7 The active communication among all actors involved		■	
8 The development and use of absorptive capacity for the crowdsourcing company	■	■	■

As we can see from Table 2, some of the factors must be considered either before (e.g., how to decide which complex products or components can really be crowdsourced in a feasible way) or during (e.g., the close monitoring and administration of the challenge) the crowdsourcing challenge. There are also factors that must be considered in several phases (e.g., the design of the challenge specifications and instructions and the development and use of absorptive capacity). Only a few of the identified factors should be carried out and considered after the challenge has ended, and none exist exclusively during this time frame.

Some of the factors were very comparable to factors affecting the crowdsourcing of relatively simple tasks or products. For example, the level of crowd diversity to seek depends on the level of creativity and novelty desired in the solution – a consideration that can also be associated with simple tasks. However, other factors appeared to have specific significance for the crowdsourcing of complex products: first, whether outsourced or crowdsourced, simpler solutions do not usually require any additional absorptive capacity in order to be properly understood, evaluated or adopted by the crowdsourcing company. However, in this case, the development of absorptive capacity was seen as a very important factor for the development of complex products. Second,

the careful design of challenge specifications and instructions, as well as the close monitoring and administration of the challenge, appeared to be far more important for the crowdsourcing of complex products.

5   Discussion and conclusions

Although a growing number of crowdsourcing projects have been carried out in recent years, in a wide range of different industries, very little is still known about how to use crowdsourcing for the development of complex tasks requiring expert skills in specific scientific domains (Franzoni and Sauermann, 2014). As the emphasis of the existing studies has been rather on analysingwhy and how to use crowdsourcing (ibid), this study provides new qualitative understanding on what mostly impacts on the usefulness of crowdsourcing, and on how to obtain that useful information and knowledge when crowdsourcing. In addition, new understanding on the differences between crowdsourcing and outsourcing of complex product development tasks has been generated.

In our study, we listed and analysed the significance of a number of factors to be considered when deciding whether to crowdsource or not and when planning and executing complex B2B product development tasks with an intermediary platform. By categorising our observations according to the already recognised challenges of internal and external innovation processes, i.e., to the motivation of the crowds, the maximisation of the amount and quality of useful knowledge and information, and the incorporation of the results into the new product development processes of the crowdsourcing company (see West and Gallagher, 2006), we have not only demonstrated that crowdsourcing can be used in cases of rather complex products and solutions, but we have also identified how the different factors should be applied before, during and after the execution of a crowdsourcing challenge.

Some of the identified factors are, at least on the general level, rather similar to factors significantly impacting on the success of crowdsourcing relatively simple tasks or products (see e.g., the careful consideration of the suitability of the challenge awards for the crowds). However, some factors seem to be specifically significant only when crowdsourcing is applied for the development of complex products: first, the more simple solutions, whether outsourced or crowdsourced, do not usually require investments on the absorptive capacity to be properly understood, evaluated and adopted to a company's entire product development process. However, the development of absorptive capacity was seen as very important for the development of complex products. Second, the careful design of the challenge specifications and instructions, as well as the close monitoring and administration of the challenge, were strongly emphasised as crowdsourcing was used for the development of complex products.

By highlighting the need for novel skills and competences in order to succeed in the crowdsourcing of complex product development initiatives among industrial B2B companies, this study contributes to the literature on crowdsourcing and to the empirical literature on new product development in particular. This study also serves as an example case for any manufacturing company interested in using crowdsourcing for the development of complex tasks and products.

5.1 Research limitations and future directions

Due to the exploratory nature of this study, more empirical research is needed to validate these results in the context of other complex products, different crowdsourcing platforms and crowds and different user industries. It must also be noted that, unlike in outsourcing, in which problem solvers and their backgrounds are often known in advance and companies may even have long histories of mutual collaboration, crowdsourcing companies cannot fully anticipate a crowd's solutions or expertise. Nevertheless, this study enables company managers to better understand the major factors impacting the success of crowdsourcing complex crowdsourced products and tasks.

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PUBLICATION
III

Social Media Based Value Creation and Business Models

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Industrial Management & Data Systems

Social Media Based Value Creation and Business Models
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Social Media-Based Value Creation and Business Models

Abstract

Purpose – The purpose of the study is to create an organized picture of the current understanding of social media-based value creation and business models.

Design/methodology/approach – Following the process model presented by Fink (2005), a systematic literature review of academic journal articles published between 2005 and 2014 was conducted. The research was grounded on the theoretical foundations of service-dominant logic.

Findings – This study offers detailed descriptions and analyses of the major social media mechanisms affecting how value is created in social media-based value networks and the kinds of impacts social media can have on present and future business models.

Research limitations/implications – The study is limited to academic research literature on business organizations, excluding all studies related to public and non-profit organizations.

Practical implications – Attention is given to developing an in-depth understanding of the functions and concrete value creation mechanisms of social media-based co-creation within the different organizational processes (e.g., in product and service development and customer services) and to updating the related practices and knowledge.

Originality/value – This study provides new insight into the challenges related to research models and frameworks commonly used for observing value creation, thus highlighting the need for further studies and updates.

Keywords Value creation, Value co-creation, Value capture, Social media, Business model, Service-dominant logic

Paper type Literature review

Introduction

The rapid growth of Web 2.0 technologies and the breakthrough of social media applications (Kaplan and Haenlein, 2010; Singaraju *et al*, 2016), in particular, have undoubtedly revolutionized the ways in which individuals share content and interact in various previously unreachable and globally distributed social communities and networks. Moreover, recently developed methods of collecting, monitoring, analyzing, and visualizing social media-related conversations and interactions have created a number of new research opportunities and challenges, resulting in huge possibilities for organizations interested in transforming their businesses or pursuing new innovations and services using social media data (Jussila, 2015; Mayer-Schönberger and Cukier, 2013; Mithas *et al*., 2013). For example, the use of advanced social media analytics tools and analysis techniques has enabled companies to access real-time data, which can then be used to extract useful patterns and intelligence on, for example, customer behavior (see Fan and Yan, 2015; He *et al*., 2015; Hussain and Vatrapu, 2014).

As a result of these advances, the boundary between the users and producers of value has grown increasingly blurred (Bechmann and Lomborg, 2013), and the roles and impacts of actors in value networks (see Frow *et al*, 2015; Palo and Tähtinen, 2013) have changed accordingly. Many past and present management concepts have been widely criticized, and the need for new kinds of

socio-technological business model concepts has been recognized (Kitchin, 2014; Singaraju *et* al, 2016; Vatrapu, 2013). At its simplest, human interaction is applied in social commerce, which refers to social networks that influence the making of shopping decisions (Wang and Zhang, 2012).

The challenge is getting even bigger as companies need to manage the growing shift from product-based to service-based business strategies (see e.g. Grönroos and Voima, 2012; Maglio and Spohrer, 2013; Nilsson and Ballantyne, 2014; Vargo *et al.*, 2008). Although promising results have been made in, for example, the automotive industry (see Godlevskaja *et al.*, 2011), industrial engineering (see Author *et al.*, 2016), and retail (He *et al.*, 2015), a lot of companies are still struggling in deploying and managing their social media interactions and networks (Frow *et al,* 2015; Singaraju *et al*, 2016). It seems that the uncertainties of investment returns on social media activities (Tørning *et al.*, 2015) hinder companies from realizing the fundamental changes of how the real-time flows of social media networks can (should) be used for nowcasting (Choi and Varian 2012; Lamboni and Christiani, 2012; An and Weber, 2015) and predicting customer and market behaviors and expectations Lazer *et al*, 2009; Tuarob and Tucker, 2013).

However, little is known about the processes, mechanisms and methods having an impact on social media enabled value co-creation in practice (Singaraju *et al.*, 2016). The research literature is still fragmented into case studies of various micro-level study contexts and, thus, fails to offer a generalizable, in-depth understanding of how companies with different business logics and alternative markets can create value through social media. A huge gap exists between potential and actual use of social media for real-time business and competitive analysis. (He *et al.*, 2015; Kietzmann *et al.*, 2011; Spaulding, 2010; Wang *et al.*, 2015).

In order to gain a comprehensive understanding of the major social media mechanisms affecting how value is created in social media-based value networks and the kinds of impacts social media can have on present and future business models, this paper addresses the research gap by providing a systematic literature review of social media-based value creation and business models. The research question was defined as follows:

> *What are the roles and impacts of social media in novel business-related value co-creation and business models, and in what ways does the current academic literature address these roles and impacts?*

Considering the growing interest in service-based business strategies and by thus adopting business models as an umbrella concept under which value is both created and consumed, this study grounds itself in the theoretical foundations of service-dominant logic. That is, the research was constructed based on the idea of perceiving value creation as a process in which companies, customers, and organizations are seen as interdependent actors that change their roles from one situation to another and in which the value of services is uniquely determined by the beneficiary (see Vargo and Lusch, 2004, p. 87; 2008; 2009). Due to the differences between the various social media-related approaches and potentials for value creation of business organizations and public organizations, the research was limited to business organizations only.

The structure of the paper is divided into five main sections. First, we introduce and define the theoretical grounds and central concepts of the study. Second, we describe research methodology, including the literature review approach we used to collect our review articles. Third, we introduce our study results and analysis of the current use of different methods and theories in generating knowledge about the use of social media in value creation and business modeling. Fourth, we present the major conclusions of the study and provide guidelines for future research, thus enhancing our understanding of the roles, impacts, and potential of social media use in business-related value creation and business model innovations.

Background and key concepts

The service-dominant logic perspective of value creation

Strongly based on the notion of companies as value creators and customers as value users, many past and present business models have been developed from the viewpoints of significantly product-oriented companies. The value creation activities have been developed accordingly to include several independent functions, such as articulating the contents of the value propositions, identifying proper market segments, specifying revenue generation mechanisms, defining the structures of the required value chains, and distributing the complementary assets needed to support the company's position in the value chain. The focus has been on estimating cost structures and potential profits, as well as on gaining and maintaining competitive advantage over rivals (Chesbrough, 2010; Chesbrough and Rosenbloom, 2002).

Instead of seeing companies solely as the producers of tangible goods, the service-dominant logic seeks to understand the logic and wellbeing of the entire service ecosystem. Based on ecosystem level actor-to-actor networks, the value is dynamically co-created through closely collaborating networks, which are filled with weak and often invisible ties (see Granovetter, 1983) among the different network members. Hence, the actual value co-creation takes place within the different resource integrating processes and activities, emphasizing the role of resource integrators as the creators of intangible resources that are beneficial for the entire value network. The resources can be either tangible or intangible and internally controlled or externally drawn on for support, thus never highlighting the role of any particular member of the value networks. (Lusch and Nambisan, 2015; Vargo, 2009; Vargo and Lusch, 2014; Vargo *et al*., 2008).

Although service-dominant logic, often referred to as a mindset rather than a model or a theory, could serve as a concrete tool for supporting both managers and employees in their search for new customer-based approaches to value creation, it is often discarded due to various organizational barriers (e.g., an inability to sufficiently or appropriately change management practices). However, as this new thinking and behavior emerge, companies should learn how to devote less effort to producing goods (products) and devote more effort to building value relationships. (Nuutinen and Lappalainen, 2012). In so doing, the service-dominant logic offers a great stepping-stone for creating a better understanding of the roles and impacts of social media tools and methods in value creation and business modeling. In fact, the service-dominant logic clearly reflects each of the three key concepts of our study: (1) value creation, (2) value capture, and (3) business models.

Value creation and value co-creation

In academic literature, value creation most often refers to the value created for either users or companies. Bechmann and Lomborg (2013), for instance, describe several ways that companies can benefit and create value from user participation in social media, including (a) through networking, updating, and content contribution; (b) by contributing to company development and innovation; and (c) by selling the data gained from users' digital information profiles.

The service-dominant logic type of value creation represents another stream of literature that emphasizes that value is always jointly and reciprocally co-created (see, e.g., Hirvonen and Helander, 2001; Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2004). Value co-creation is, thus, conceptualized to take place between service systems, such that service system 1 (company) and service system 2 (customer) are connected by value propositions (Spohrer *et al*., 2008; Vargo *et al*., 2008) and such that they both derive value (i.e., value-in-use) by integrating resources from their service systems.

Social media settings offer a fruitful basis for observing the changes emerging in value creation and value co-creation activities. Like the use of the service-dominant logic, the use of social media platforms and tools is based on an idea of continuously evolving and non-hierarchical collaboration among stakeholders, which may enhance new kinds of resource-integrating actions

among companies, their suppliers, and their customers (users). Hence, the major difference between value creation and value co-creation does not involve technology, but rather the strengthening of the interdependences among different actors so as to benefit them all. Unfortunately, value co-creation is often misleadingly used as a hypernym for all value creation activities.

Business models and value capture
Unlike value creation, which describes the overall aspects of a company´s value-creating processes and networks, the definition of value capture is restricted to the measured monetary benefits of a company's value creating actions. Business models play a key role in determining how a company performs. A business model encases the resources and the entire architecture of a value proposition, which is the actual value proposition for the client, the description of a company's position in the value network, and the company's revenue model (Chanal and Caron-Fasan, 2008; Zott *et al.*, 2011). Accordingly, a company cannot sustainably capture value unless it understands its entire value creation process.

Instead of explaining business models solely through individual activities (e.g., for marketing and R&D) or through mechanisms influencing business model outcomes (e.g., value chain, pricing, and networks), the recent research on business models highlights the development of holistic, multi-dimensional, system-level business model frameworks (Zott *et al.*, 2011). Indeed, the shift from product-based thinking towards services and company networks also applies to business models. Furthermore, in more recent literature, these business models are often related to such areas as company-related processes and strategies (Wirtz *et al.*, 2015). However, an urgent need for an in-depth understanding of the impacts of social media on business model development still exists (Klang *et al.*, 2014).

Adopting the new forms of social business modeling, which refers to the utilization of social media tools and social value networks in all business domains of a company, demands a completely new kind of consciousness and activeness in the use of social value networks both inside and outside company borders. The service-dominant logic is certainly one good way to approach the analysis of social media-based mechanisms for value capturing and business modeling recently highlighted by both researchers and practitioners (Kunz and Werning, 2013; Sigala *et al.*, 2012).

The methodology

Processing the literature review
Following Fink's (2005) process model for a systematic literature review, this literature review was accomplished in seven stages: 1) selecting research questions, 2) selecting the bibliographic or article database, 3) choosing search terms, 4) applying practical screening criteria, 5) applying methodological screening criteria, 6) doing the review, and 7) synthesizing the results.

First, we defined the research questions. Second, we selected the appropriate databases and chose the type of literature in which we were interested. To guarantee a comprehensive sample covering the most important data related to our research objectives, we used three large interdisciplinary databases: Scopus, EBSCO, and ABI-Inform. In our understanding, the combination of the chosen databases was diverse and multilayered, covering both business- and technology-related academic journals. As such, the review covered all of the different types of major journals affiliated with social media-related management issues, such as value creation and business models.

Third, we used three groups of search terms to find the most appropriate articles on social media-based business and/or value creation models: "social media" and "value creation;" "social media" and "value capture;" and "social media" and "business models." When translating these terms into search strings, we used several keywords to cover "social media," as perceived in earlier literature: "social media," "Web 2.0," and "enterprise 2.0." To capture spelling differences, we also

included the different ways of spelling these terms: namely, "Web 2.0" and "Web2.0" and "enterprise 2.0" and "enterprise2.0." Similarly, to cover various ways of spelling "value creation," we used the following search strings: "value*" and "creat*" or "creat*" and "value*." Likewise, we used the following search strings for "value capture:" 'value*" and "capt*" or "capt*' and "value*." For "business model," we used one search string: "business model."

Fourth, we applied the practical screening criteria outlined in Table I, including only those studies that matched the inclusion criteria. We thus excluded a total of 92 articles that referred to social media and the other inclusion criteria but did not show evidence of studying and addressing these criteria as a central goal. We excluded studies that focused on public or non-profit organizations (e.g., public services ranging from higher education and e-learning to e-health, e-libraries and politics). Of the 92 excluded articles, 87 were identified as meeting the selection criteria during the practical screening, and the last 5 were identified when the articles from Scopus, EBSCO, and ABI-Inform were combined. The most common research settings that were excluded were related to e-learning and higher education or to e-libraries (including, in particular, studies published from 2007 to 2009).

Table I. Practical screening criteria

Inclusion criteria	Type
Include only studies written in English	Publication language
Include studies focused on social media, web 2.0, or enterprise 2.0	Content
Include studies focused on value creation, value capture, or business models	Content
Include studies conducted from January 2005 through the end of 2014	Duration of data collection

Exclusion criteria	Type
Exclude studies focused on public or non-profit organizations	Setting
Exclude duplicates	Content

Fifth, we applied the methodological screening criteria as follows: All possible research designs (i.e., empirical, conceptual, and theoretical academic research papers) were included, thus ensuring a plausible and holistic view of the different aspects of the existing studies contributing to our research questions. Only conference proceedings, expert interviews, and non-academic research papers were excluded from this study. In total, 13 papers, including conference proceedings (3), papers based solely on expert interviews (2), and papers with non-scientific approaches to our research targets (8), were excluded during the practical screening of articles.

Sixth, due to differences between the search engines' functional characteristics, the Scopus search strings were effectuated in two sections and the EBSCO and ABI-Inform search strings were effectuated in four sections. As a result, we collected 125 articles from Scopus, 230 articles from EBSCO, and 194 articles from ABI-Inform, for a total of 549 articles. These articles were then screened, and the number of papers decreased to 276: 125 from Scopus, 101 from EBSCO, and 50 from ABI-Inform. However, when the articles from the different search engines were combined through a number of separate search sections, it became clear that our data included several duplicates. Removing these duplicates resulted in 117 papers.

The in-depth examination of the remaining articles was based on titles, abstracts, and keywords. During this more intensive examination, some articles were determined to not fit our research focus (e.g., some focused on public or non-profit organizations). As a result, the number of articles again decreased, this time to 26 research papers. After thoroughly reading these 26 papers in full, we further excluded 4 papers, which did not match the inclusion criteria when examined in

more detail. The final number of articles for our review was thus reduced to 23 research papers. Most of the selected papers were published between 2010 and 2014.

The synthesis of the results was developed to 1) describe current knowledge about a topic or body of research, 2) support the need for and significance of new research, 3) explain research findings, and 4) describe the quality of a body of research. The methods and data sources used in the studies are described in Table III, and the research findings are explained in Tables IV and V. Table IV compares the various ways researchers studied the mechanisms behind social media-based value creation. Table V compares the papers' investigations of the business models. The need for and significance of new research are discussed in the final chapter, which presents the discussions and further research directions.

The 5C framework model

In order to find ways to organize the reviewed literature and to enable the drawing of conclusions about our current understanding of value creation, several options were considered for: according to the type of business organization, in terms of possible revenue models (see Lee, 2011), or according to the various mechanisms for creating, capturing, and sharing value.

A framework adapting the 5C model (see Table II) by Vuori (2011) was developed, thus allowing us to observe whether or not an organisation has adopted service-based thinking or not. The 5C model facilitated the identification of five different social media functions within the studied organizations. Separate columns for value creation and value co-creation were added to Vuori's (2011) model to serve as analysis dimensions to position existing studies based on their emphasis on product-oriented and/or service-oriented thinking (see Table IV).

It can be assumed that some of the functions of social media, such as communicating, collaborating, and completing, are better aligned with value co-creation, whereas other social media functions, such as connecting and combining, are more typical of value creation. However, there are differences in how companies make use of these social media functions. For instance, some companies may only use social media for one-way communications with customers (e.g., through broadcasting marketing material), whereas others may, for example, become engaged in dialogue with their customers in order to solve customer problems.

Table II. Examples of social media applications based on a 5C categorization (adapted from Vuori, 2011).

5C function	Typical social media applications providing functionality	Purpose	
Collaborating: collectively creating content	Wikis, shared workspaces	Create content together, collaborate, produsage	Web 2.0
Communicating: publishing and sharing content	Blogs, media sharing systems, discussion forums, micro blogs, instant messaging	Publish, discuss, express oneself, show opinions, share, influence, store	
Completing: adding, describing, and filtering	Tagging, social bookmarking, syndications, add-ons	Add metadata, describe content, subscribe to updates, combine, experience serendipity	⬆⬆⬆
Connecting: networking	Social networks, communities, virtual worlds	Socialize, network, connect (sometimes also play, entertain)	Web 1.0
Combining: mixing and matching	Mash-ups, platforms	Combine other tools and technologies according to situations and needs	

Results

General remarks
A wide variety of theoretical approaches and models were found among the reviewed studies. The emphasis was on empirical knowledge and approaches, with snapshot-like analyses of experienced value(s) in certain moments of time. Most of the studies analyzed areas offering easy access to empirical data, such as social media platform providers (e.g., LinkedIn, WordPress), content intermediaries and selling companies, and individually important business model parts, particularly the revenue models of related business models. Interestingly, the business model analyses were based solely on models that existed before the reign of social media, or even before the Internet.

About half of the studied articles (12 out of 23) focused on social media–based value creation, while the other half focused on social media business models (11 our of 23). Most focused on business-to-consumer markets, and many did not focus on any specific market. Only one study focused on a business-to-business market: namely, Baghdadi's (2013) study of social commerce–oriented businesses.

Most of the articles were either theoretical or conceptual papers that lacked empirical data. The theories and models used in the studies varied greatly, ranging from task-technology fit and the long-tail concept to the resource-based view and the theory of planned behavior. No single theory was emphasized in the results; however, slight differences were observed in the methods and data used (see Table III). Whereas the majority (9 out of 11) of the empirical studies were grounded on qualitative research data, the majority (8 out of 12) of theoretical studies focused on the qualitative aspects of their research targets: that is, on identifying and describing the tools, theories, and assumptions related to social media use in organizational settings.

The most common methods used were literature reviews, interviews, and case studies, which complemented data from online communities, websites, company reports, and the news. The case study samples varied from 1 to 4 case companies (Ramdani and Rajwani, 2010; Wikström and Ellonen, 2012) to 15 to 20 websites or platforms (Bjørn-Andersen *et al.*, 2009; Enders *et al.*, 2008). Both single and multiple case studies were represented. Only two studies (Cortimiglia *et al.*, 2011a; Horng, 2012) applied quantitative methods. Research methods specifically designed for studying social media and online communities, such as netnography and online observations, were rarely used (Cortimiglia *et al.*, 2011; Pihl and Sandström, 2013; Wikström and Ellonen, 2012). The lack of consensus in terms of theories and models indicates the novelty of the studies' research themes.

Table III. Methods and data sources used in the studies

Methods	(N)	Authors
Literature-based model or concept development	12	Agnihotri *et al.*, 2012; Baghdadi, 2013; Bechmann and Lomborg, 2013; Chen 2009; vanDijk and Nieborg, 2009; Hajli, 2013; Kaplan and Haenlein, 2011; Lee, 2011; Merigó *et al.*, 2013; Nath *et al.*, 2010; Roblek *et al.*, 2013; Yuan *et al.*, 2014
Statistical survey	2	Cortimiglia *et al.*, 2011; Horng, 2012
Qualitative survey	1	Bjørn-Andersen *et al.*, 2009
Netnography	1	Pihl and Sandström, 2013
Multiple case study	7	Bjørn-Andersen *et al.*, 2009; Cortimiglia *et al.*, 2011; Enders *et al.*, 2008; Pihl and Sandström, 2013; Wikström and Ellonen, 2012; Wirtz *et*

_al._, 2010; Yuan _et al._, 2014

Single case study	3	Lehmkuhl, 2013; Ramdani and Rajwani, 2010; Shih _et al._, 2014
Data sources		Authors
Interview	6	Cortimiglia _et al._, 2011; Enders _et al._, 2008; Lehmkuhl, 2013; Ramdani and Rajwani, 2010; Wikström and Ellonen, 2012; Wirtz _et al._, 2010
Online communities and platforms, blogs	6	Enders _et al._, 2008; Kaplan and Haenlein, 2011; Lee, 2011; Lehmkuhl, 2013; Pihl and Sandström, 2013; Yuan _et al._ 2014
Websites (incl. YouTube)	5	Bjørn-Andersen _et al._, 2009; Cortimiglia _et al._, 2011; Lehmkuhl, 2013; Wielki, 2010; Wirtz _et al._, 2010; Wikström and Ellonen, 2012
Reports, statistics	4	Enders _et al._, 2008; Lehmkuhl, 2013; Ramdani and Rajwani, 2010; Wikström and Ellonen, 2012;
News, press articles, public documents	4	Bjørn-Andersen _et al._, 2009; Cortimiglia _et al._, 2011; Enders _et al._, 2008; Ramdani and Rajwani, 2010
Databases	1	Ramdani and Rajwani, 2010

Altogether, 13 of the 23 articles focused either significantly or in essential areas on business models. The research interests varied from business and revenue model-related frameworks (Cortimiglia _et al._, 2011; Enders _et al._, 2008; Horng, 2012; Wirtz _et al._, 2010) and the creation of social commerce-oriented business model frameworks (Baghdadi, 2013) to existing business model frameworks, such as Osterwalder's (2004, 2008) business model ontology or Wirtz's 4C business model (see Wirtz, 2010).

Various types of business models, either facilitated or enabled by social media, were recognized and analyzed in the studies. Most of the observed business models had existed before the reign of Web 2.0 technologies or even before the rise of the Internet. Only Lee (2011) and Wielki (2010) identified business models that were either significantly social media-specific or that could not have existed without social media. Significantly, both of these authors also identified the existence of business-to-business-related business models, providing examples such as Dell's and PSP Audioware's business models.

The emergence of value creation and value co-creation through social media activities
As shown in Table IV, the value creation and value co-creation aspects of the articles were analyzed in two different ways: First, they were based on (a) the degree to which the articles described the social media mechanisms of value creation and value co-creation and (b) the extent to which the articles recognized the different roles of social media. Second, the 5C framework (see Vuori, 2011) was adapted to analyze the social media functions in more detail and to determine whether they showed any evidence of a company's level of service orientation.

The symbol "●" was used to indicate those studies that described the various social media roles and mechanisms of value creation or value co-creation in detail. The symbol "○" was used to indicate studies in which the mechanisms of value co-creation or the roles of social media were mentioned, but not specifically described. The symbol "?" was used to indicate studies in which the social media-related value co-creation mechanisms and their corresponding social media roles were either ambiguously stated or open to various interpretations. Finally, the symbol "-" was used to indicate studies in which social media-based value creation or value co-creation mechanisms and their corresponding social media roles were not explicitly described.

Table IV. The mechanisms behind social media-based value creation

	Analysis of social media mechanisms impacting value creation and co-creation		Detailed analysis of the 5C social media functions of value creation (adapted from Vuori, 2011)				
	Value creation	Value co-creation	Communication	Collaborating	Connecting	Completing	Combining
Agnihotri *et al.,* 2013	●	○	●	-	●	-	-
Baghdadi, 2013	○	○	○	-	-	-	-
Bechmann and Lomborg, 2013	○	-	-	-	-	-	-
Bjørn-Andersen *et al.,* 2009	○	-	○	-	-	-	-
Chen, 2009	○	-	?	-	-	-	-
Cortimiglia *et al.,* 2011	○	-	○	-	○	-	-
vanDijk and Nieborg, 2009	-	-	-	-	-	-	-
Enders *et al.,* 2008	●	-	●	-	●	●	-
Hajli and Hajli, 2013	○	○	○	-	-	-	-
Horng, 2012	-	-	○	-	-	-	-
Kaplan and Haenlein, 2011	●	-	●	-	●	-	-
Lee, 2011	●	○	●	○	●	●	●
Lehmkuhl and Jung, 2013	●	○	○	-	○	○	○
Merigó *et al.,* 2013	●	-	●	-	●	-	-
Nath *et al*., 2010	○	○	○	-	○	-	-
Pihl and Sandström, 2013	●	-	●	-	○	-	-
Ramdani and Rajwani, 2010	○	-	○	-	○	-	-
Roblek *et al.,* 2013	○	-	○	-	-	-	-
Shih *et al.,* 2014	○	-	○	-	○	-	-

Wielki, 2010	-	-	○	-	○	-	-
Wikström and Ellonen, 2012	○	-	○	-	-	-	-
Wirtz *et al.,* 2010	○	○	●	-	●	-	-
Yuan *et al.,* 2014	●	●	●	-	●	○	-

Although value creation was extensively discussed in many of the articles, we noticed that the roles of value-related social media use were often analyzed in relation to communication (publishing and sharing content) and connection (networking with people). Only one study (Lee, 2011) was related to collaborative content creation (collaborating), with reference to a case in which Second Life was used for company-customer co-creation. Further, only a few studies analyzed the roles of social media in completion (connecting people and content) and combination (combining different types of content) (Enders *et al.*, 2008; Lee, 2011; Lehmkuhl and Jung, 2013).

The studied themes related to research areas like value creation characteristics (2013) (e.g., in terms of efficiency, novelty, and complementarity), the phenomenon of social media-mediated lock-in effects (Lehmkuhl and Jung, 2013), the conceptualization of customer-perceived value (Agnihotri *et al.*, 2012), social media's relationship-related benefits (Möller and Törrönen, 2003; Walter *et al.*, 2001), social media's value creation potential for small- to medium-sized enterprises (Lehmkuhl and Jung, 2013), the effects of social media on business model components in traditional business organizations (Lee, 2011), and the business values associated with Web 2.0 technologies (Nath *et al.*, 2009). In addition, a preliminary framework for understanding the impacts of social media use in customer support services (Agnihotri *et al.*, 2012), an enterprise architecture for supporting social commerce through the actions of value co-creation (Baghdadi, 2013), and a 4C typology of Internet business models involving examples of how to co-create value when providing services (Wirtz *et al.*, 2010) were presented. Finally, the importance of theoretical foundations and opportunities when co-creating value with customers in online communities was emphasized (Hajli and Hajli, 2013).

Overall, the value creation mechanisms of social media use were rarely analyzed, or, at least, these analyses were generic and superficial. The only exception was Yuan *et al.*'s (2014) introduction of a new resource mapping framework. This framework followed the principles of the service-dominant logic of Vargo *et al.* (2008) and included descriptions of company, customer, and encounter processes. It defined user-generated content as the primary resource of value co-creation and introduced a four-step pattern of value co-creation, demonstrating how the model reacted to negative word-of-mouth in customer service situations.

The appearance of social media-based, value-creating business models
As shown in Table V, we also reviewed how and to what extent social media supported and facilitated the business models represented in the articles. Whereas only 4 of the 13 business model papers (Baghdadi, 2013; Enders *et al.*, 2008; Ramdani and Rajwani, 2010; Wikström and Ellonen, 2012) executed in-depth analyses of actual social media mechanisms, most of the studies involved generic analyses from the specific standpoints of social media service provider companies. The descriptions of found revenue and business models included analyses of social media's roles in supporting the major building blocks of business models (Ramdani and Rajwani, 2010; Wikström and Ellonen, 2012), analyses of the social media mechanisms specifically supporting the revenue models of social networking sites (Enders *et al.*, 2008) and concepts and frameworks for social commerce enabled by social media (Baghdadi, 2013). Only Lee (2011) incorporated the perspectives of both service providers and users.

Lee's (2011) categorization of six business model categories (i.e., the broad online community, the focused online community, social shopping, content intermediaries, the virtual world, and shared Web 2.0) emphasized the use of social media as the primary driver of revenue and, thus, corporate existence. According to Lee (2011), revenues are generated from different types of sources, such as subscriptions from premium services, banners, other advertisements, sponsors selling their products on the forum, sales commissions, and sales of virtual products. Altogether, Lee (2011) focused strongly on such service providers as Facebook, LinkedIn, Storenvy, eBay, Second Life, and Google Apps.

Wielki (2010) also recognized six business models that were at least partly based on and facilitated by social media. The first was characterized as a variation of the "long-tail" concept (see Anderson, 2006) allowing for the feasible delivery of products (e.g., Amazon or eBay) or software (e.g., Apple's iTunes or AppStore) to small customer segments or even individual customers. The second was more clearly based on the essential features of social media and engaging users through the freemium model (i.e., getting a basic product or service for free, but paying for extended or enriched versions). As a result of these studies, Wirtz *et al.* (2010) proposed a framework of four broad factors (the 4Cs) fundamental to social media and the impacts of value creation: namely, social networking, interaction orientation, customization, and user-added value. This framework was illustrated with cases from MySpace and Wikipedia.

In studying the various parts of the business model, Cortimiglia *et al.* (2011) concluded that there is a clear link between the technological delivery channel and the preferable revenue channel; that is, the web channel is more appropriate for advertisement-based revenue models, while mobile technology opens up new and relevant opportunities for value appropriation. In accordance with the results of Cortigmilia *et al.* (2011), Kaplan and Haenlein (2011) explored how applications like Twitter can generate value for companies during the three stages of the marketing process (i.e., pre-purchase, purchase, and post-purchase) and provided detailed analyses of their five case companies (i.e., Google, Dell, Whole Foods Market, Zappos.com, JetBlue Airways). For example, Twitter was used to generate value by collecting feedback from customers (e.g., Dell), promoting products (e.g., Google, Whole Foods Market, JetBlue Airways), improving customer service and complaint management processes (e.g., Whole Foods Market, Dell, and JetBlue Airways), and enhancing internal communication (e.g., Zappos.com).

In the most recent papers, value creation was first analyzed in the context of fashion blogging (Pihl and Sandström, 2013), in which the focus was on the value relationships between fashion bloggers and end consumers. Second, it was analyzed in the context of microblogging and pharmaceutical services (see Yuan *et al´s* [2014] resource mapping framework for value co-creation in social media).

Table V. Business models and business model parts or frameworks related to social media

Author(s)	Levels of analysis: Whole business model(s) ● Business model parts (which) ○ Other: what	Name(s) of social media based business model(s)	Analysis of social media mechanisms impacting business models
Baghdadi, 2013	Other: factors that need to be taken into consideration when building business models	-	●
Bjørn-Andersen *et al.*, 2009	Other: theoretical, implicating a need for new business model frameworks in the social media context	-	○

Chen, 2009	●	-	-
Cortimiglia *et al.*, 2011	○ (revenue models)	-	○
Enders *et al.,* 2008	○ (special focus on revenue models)	Not named	●
Horng, 2012	○ (subscription models)	-	○
Lee, 2011	● (focus on revenue models)	1) Broad online community, 2) focused online community, 3) social shopping, 4) content intermediary, 5) virtual world, 6) shared web 2.0	○
Lehmkuhl, 2013	●	-	○
Ramdani and Rajwani, 2010	●	-	●
Shih *et al.,* 2014	Other: Causalities behind increased cash flows and revenues from fan base and loyalty	Fan-centric social media business model based on Berthon *et al.* (2012)	○
Wielki, 2010	●	Not named	○
Wikström *et al.,* 2012	●	Not named	●
Wirtz *et al.,* 2010	● (special focus on value propositions and revenue models)	-	○

Discussion and conclusions

Various types of business models and revenue models were recognized and analyzed throughout the papers forming this literature review. Only two research papers (Lee, 2011; Wielki, 2010) identified significantly social media-specific business models, and the actual co-creation of value, as well as the potential roles and impacts of social media in new business model creation, were also largely unexamined. This strongly supports the findings of Gassman *et al.* (2015), who, after reviewing several hundreds of business model innovations, found that only about 10% of the innovations represented genuinely novel concepts.

Empirical findings and framework analysis
The most concrete and valuable finding of our study was the developed understanding that the commonly used research models and frameworks for observing the value creation mechanisms of Web 2.0 and social media applications are partially incomplete and fallacious. Indeed, we found that the 5C and 4C frameworks (see Vuori, 2011; Wirtz *et al*, 2010), for example, were unable to either distinguish or provide any in-depth analysis of the differences between the Web 1.0 and Web 2.0 elements of actual value co-creation activities. Given this observation, it seems necessary to reframe existing research models and frameworks and to add more descriptive elements to broaden their scope of analysis in order to better understand all of the various Web 2.0 and social media implications to the collaborative value networks that connect companies, customers, and their stakeholders.

Updating the research models and frameworks for value (co-)creation will certainly shed new light on the research into the different bonds between revenue models and business model-

related value networks. Furthermore, it is essential to understand that the social media approaches used in business-to-consumer contexts are largely different from those used in business-to-business industries (Gillin and Schwartzman, 2010).

Only one study applying the service-dominant logic of thinking and acting was found (see Yuan *et al* 2014). The understanding of the self-contained, self-adjusting service ecosystems (see Lusch and Nambisan, 2015) seems thus almost non-existing in the current value creation and business model literature. Considering the common understanding of social media as a tool for community-based many-to-many collaborations, the scarcity of service-based thinking and the use of service-dominant logic even in the more recent studies was somewhat surprising. In particular, more research studying social media-based value creation and business model impacts on industrial companies and business-to-business manufacturers, in particular, is needed.

Scientific implications and limitations of the study

The lack of large-scale empirical studies limits our understanding of the differences and challenges related to inter-personal and inter-company networks and interactions, leading to a superficial view of the roles and impacts of social media on value co-creation and future business models. Including conference papers in our data search might have generated a more up-to-date understanding of current research topics, however it can be argued that the literature review does provide a comprehensive picture of the state-of-the-art.

The roles of various technologies in social media-based value creation should be further studied. For example, the combined roles of social media and mobile technologies, service-oriented architectures, and cloud computing in value creation should be investigated. Mobility can offer significant opportunities related to social media-related value creation, with an emphasis on the characteristics of non-traditional interactions among the members of value networks affected by social media.

The use of novel research approaches, such as agent-based or system dynamics simulations (see, for example, Okada and Yamamoto, 2011), as well as the use of longitudinal data and mixed methods, should also be encouraged. The use of research approaches directly designed to study social media and related communities, such as netnographic methods (see Kozinets, 2010) and social network analyses (e.g., Hansen *et al.*, 2012; Wasserman, 1994), together with managerial interviews, should be encouraged, especially when studying the data-driven viewpoints of social media-based value creation. When combined with real-world empirical data, the use of novel approaches might provide more in-depth understanding of the major social media-related cause-and-effect relationships, ultimately leading to increased business value, revenue, or cost savings in the long run.

In addition, more research should be conducted within different types of companies and industries. In particular, the development of more and more complex digital business ecosystems and their related value co-creation processes might benefit from the study of the effects of the service-dominant logic type of thinking on the adoption of new mindsets and concepts. Above all, the existing models and frameworks studying the impacts of Web 2.0 and social media (see, for example, 5C and 4C) should be revised in order to reflect the service-dominant logic type of thinking.

Implications for managers

More attention should be given to developing an in-depth understanding of the functions and concrete value creation mechanisms of social media-based co-creation within the different organizational processes (e.g., in product and service development and customer services). Giving more attention to emergent, but evolving theoretical approaches, such as the service-dominant logic, might offer a good starting point to companies interested in adopting new, innovative, social media-based value (co)-creation tools and operation models.

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Social Media-Based Value Creation and Business Models

Table I. Practical screening criteria

Inclusion criteria	Type
Include only studies written in English	Publication language
Include studies focused on social media, web 2.0, or enterprise 2.0	Content
Include studies focused on value creation, value capture, or business models	Content
Include studies conducted from January 2005 through the end of 2014	Duration of data collection

Exclusion criteria	Type
Exclude studies focused on public or non-profit organizations	Setting
Exclude duplicates	Content

Table II. Examples of social media applications based on a 5C categorization (adapted from Vuori, 2011).

5C function	Typical social media applications providing functionality	Purpose	
Collaborating: collectively creating content	Wikis, shared workspaces	Create content together, collaborate, produsage	Web 2.0
Communicating: publishing and sharing content	Blogs, media sharing systems, discussion forums, micro blogs, instant messaging	Publish, discuss, express oneself, show opinions, share, influence, store	
Completing: adding, describing, and filtering	Tagging, social bookmarking, syndications, add-ons	Add metadata, describe content, subscribe to updates, combine, experience serendipity	↑↑ ↑↑ ↑
Connecting: networking	Social networks, communities, virtual worlds	Socialize, network, connect (sometimes also play, entertain)	Web 1.0
Combining: mixing and matching	Mash-ups, platforms	Combine other tools and technologies according to situations and needs	

Table III. Methods and data sources used in the studies

Methods	(N)	Authors
Literature-based model or concept development	12	Agnihotri *et al.*, 2012; Baghdadi, 2013; Bechmann and Lomborg, 2013; Chen 2009; vanDijk and Nieborg, 2009; Hajli, 2013; Kaplan and Haenlein, 2011; Lee, 2011; Merigó *et al.*, 2013; Nath *et al.*, 2010; Roblek *et al.*, 2013; Yuan *et al.*, 2014
Statistical survey	2	Cortimiglia *et al.*, 2011; Horng, 2012
Qualitative survey	1	Bjørn-Andersen *et al.*, 2009
Netnography	1	Pihl and Sandström, 2013

Multiple case study	7	Bjørn-Andersen *et al.*, 2009; Cortimiglia *et al.*, 2011; Enders *et al.*, 2008; Pihl and Sandström, 2013; Wikström and Ellonen, 2012; Wirtz *et al.*, 2010; Yuan *et al.*, 2014
Single case study	3	Lehmkuhl, 2013; Ramdani and Rajwani, 2010; Shih *et al.*, 2014
Data sources		Authors
Interview	6	Cortimiglia *et al.*, 2011; Enders *et al.*, 2008; Lehmkuhl, 2013; Ramdani and Rajwani, 2010; Wikström and Ellonen, 2012; Wirtz *et al.*, 2010
Online communities and platforms, blogs	6	Enders *et al.*, 2008; Kaplan and Haenlein, 2011; Lee, 2011; Lehmkuhl, 2013; Pihl and Sandström, 2013; Yuan *et al.* 2014
Websites (incl. YouTube)	5	Bjørn-Andersen *et al.*, 2009; Cortimiglia *et al.*, 2011; Lehmkuhl, 2013; Wielki, 2010; Wirtz *et al.*, 2010; Wikström and Ellonen, 2012
Reports, statistics	4	Enders *et al.*, 2008; Lehmkuhl, 2013; Ramdani and Rajwani, 2010; Wikström and Ellonen, 2012;
News, press articles, public documents	4	Bjørn-Andersen *et al.*, 2009; Cortimiglia *et al.*, 2011; Enders *et al.*, 2008; Ramdani and Rajwani, 2010
Databases	1	Ramdani and Rajwani, 2010

Table IV. The mechanisms behind social media-based value creation

	Analysis of social media mechanisms impacting value creation and co-creation		Detailed analysis of the 5C social media functions of value creation (adapted from Vuori, 2011)				
	Value creation	Value co-creation	Communication	Collaborating	Connecting	Completing	Combining
Agnihotri *et al.,* 2013	●	○	●	-	●	-	-
Baghdadi, 2013	○	○	○	-	-	-	-
Bechmann and Lomborg, 2013	○	-	-	-	-	-	-
Bjørn-Andersen *et al.,* 2009	○	-	○	-	-	-	-
Chen, 2009	○	-	?	-	-	-	-
Cortimiglia *et al.,* 2011	○	-	○	-	○	-	-
vanDijk and Nieborg, 2009	-	-	-	-	-	-	-

Author(s)							
Enders *et al.,* 2008	●	-	●	-	●	●	-
Hajli and Hajli, 2013	○	○	○	-	-	-	-
Horng, 2012	-	-	○	-	-	-	-
Kaplan and Haenlein, 2011	●	-	●	-	●	-	-
Lee, 2011	●	○	●	○	●	●	●
Lehmkuhl and Jung, 2013	●	○	○	-	○	○	○
Merigó *et al.,* 2013	●	-	●	-	●	-	-
Nath *et al.,* 2010	○	○	○	-	○	-	-
Pihl and Sandström, 2013	●	-	●	-	○	-	-
Ramdani and Rajwani, 2010	○	-	○	-	○	-	-
Roblek *et al.,* 2013	○	-	○	-	-	-	-
Shih *et al.,* 2014	○	-	○	-	○	-	-
Wielki, 2010	-	-	○	-	○	-	-
Wikström and Ellonen, 2012	○	-	○	-	-	-	-
Wirtz *et al.,* 2010	○	○	●	-	●	-	-
Yuan *et al.,* 2014	●	●	●	-	●	○	-

Table V. Business models and business model parts or frameworks related to social media

Author(s)	Levels of analysis: Whole business model(s) ● Business model parts (which) ○ Other: what	Name(s) of social media based business model(s)	Analysis of social media mechanisms impacting business models
Baghdadi, 2013	Other: factors that need to be taken into consideration when building business models	-	●
Bjørn-Andersen *et al.*, 2009	Other: theoretical, implicating a need for new business model frameworks in the social media context	-	○
Chen, 2009	●	-	-
Cortimiglia *et al.*, 2011	○ (revenue models)	-	○

Reference			
Enders *et al.*, 2008	○	(special focus on revenue models)	Not named	●
Horng, 2012	○	(subscription models)	-	○
Lee, 2011	●	(focus on revenue models)	1) Broad online community, 2) focused online community, 3) social shopping, 4) content intermediary, 5) virtual world, 6) shared web 2.0	○
Lehmkuhl, 2013	●		-	○
Ramdani and Rajwani, 2010	●		-	●
Shih *et al.*, 2014		Other: Causalities behind increased cash flows and revenues from fan base and loyalty	Fan-centric social media business model based on Berthon *et al.* (2012)	○
Wielki, 2010	●		Not named	○
Wikström *et al.*, 2012	●		Not named	●
Wirtz *et al.*, 2010	●	(special focus on value propositions and revenue models)	-	○

PUBLICATION
IV

Reinventing organisational creativity and innovation through adapting a service-based working culture

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A volume in the Advances in Business Strategy and Competitive Advantage (ABSCA) Book Series

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Chapter 1

Re-Inventing Organizational Creativity and Innovation through Adopting a Service-Based Working Culture

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ABSTRACT

By considering creativity to be a necessity for organisational competitiveness in today's rigorously changing working environments, this study seeks to examine whether adopting a service-based working culture could significantly improve organisational creativity and innovation. Grounded on the concepts of the Service-Dominant Logic and Complex Adaptive Systems, this research develops on understanding of the complexity of the emerging socially and digitally connected networks of individuals, teams and institutions. By introducing a novel framework for facilitating and improving the adaptability of a service-based working culture, this study offers both deliberation and practical advice for business organisations seeking valuable insight into how to develop and manage organisational creativity and innovation in increasingly digitalised service ecosystems. Specifically, the proposed framework encourages organisations to invest in the learning capacities and motivations of their employees.

INTRODUCTION

In recent years, researchers have increasingly focused on the socio-cognitive aspects of creativity and innovation management. In addition to the many observations related to organisational learning (see e.g. Cirella, Canterino, Guerci, & Shani, 2016; Lozano, 2014; Senge, 2006) and employee motivation (see e.g. Lozano, 2014) in various socially connected internal and external networks (Bergman, Jantunen, & Tarkiainen, 2015), considerable contributions have been made to the development of open communication, non-hierarchical working cultures and decentralised decision-making (Angle, 1989). Yet, more information and knowledge are needed to understand how these multiple cognitive, structural and procedural mechanisms will affect organisational creativity and innovation (Burdon, Al-Kilidar, & Monney, 2013). While the need and possibilities for learning have increased, so also have the challenges of building such capabilities (Senge, 2006).

Considering the emerging digital transformation, as well as the uncontrolled nature of information creation and sharing in globalised social networks, the influence and power of acquired information and knowledge have been substantially decentralised (see e.g. Hanna, Rohm, & Crittenden, 2011). Against the backdrop of the changing dynamism of social environments, the levels and frequencies of creative behaviours are varying accordingly (Amabile, Conti, Coon, Lazenby, & Herron, 1996a; McLean, 2005). That is, the liquefaction of many previously tangible products and services has resulted in a growing need to adapt a new, virtually connected worldview, both initiated and supported by social media (2016). Uncertain about the emerging new working environments, companies are urged to re-evaluate their organisational cultures, management practices, patterns of behaviour and structures (Anderson, Potocnik, & Zhou, 2014; Bilton, 2014).

Indeed, given the criticality of creativity for organisational competitiveness (Amabile & Kramer, 2011), more in-depth knowledge and information are needed on

1. Why and to what extent organisational culture affects creativity and innovation, and
2. How to develop creativity and innovation in the various socially connected networks of individuals, teams and institutions (Koskela-Huotari, Edvardsson, Jonas, Sörhammar, & Witell, 2016; Vargo, Wieland, & Akaka, 2015).

By manifesting increasingly informal collaborative and decision-making practices and leaderships and by taking turns or coexisting within teams and networks that render services to one another, modern (business) organisations are growing increasingly connected to the notions of value creation and service-based thinking.

In order to offer theoretical, yet practice-oriented guidance on making the required fundamental shift in thinking about cooperation, connectivity and innovation in rigorously changing working environments, this study builds on the theoretical grounds of the Service-Dominant Logic and Complex Adaptive Systems theory, both of which represent novel ways of understanding complex, digitally enabled service ecosystems (Barros & Dumas, 2006). In particular, this study examines whether adopting a service-based working culture can significantly improve organisational creativity and innovation. A framework for re-inventing organisational creativity and innovation through adopting a service-based working culture is initiated, and the potential of its practical implications is discussed.

MOTIVATION OF THE STUDY

Defining Creativity and Innovation

Beginning with Schumpeter's (Reinert & Reinert, 2006) notion of "creative destruction", which refers to the process of creating something new to replace something old, a number of definitions for creativity and innovation have been posited (Anderson et al., 2014; Angle, 1989; Koskela-Huotari et al., 2016). Whereas creativity often refers to the formation of something original, unexpected and contextually useful (Sternberg, 2006), innovation is most commonly defined as a new idea, device or method or as the application of new value-creating products, processes, services or technologies (Vargo et al., 2015; West & Farr, 1990). More specifically, creativity is primarily considered to be the first phase of innovation (Amabile & Kramer, 2011), where innovation is seen as the entire process from problem solving to using newly created solutions and products (Sternberg, 2006). Moreover, many researchers consider creativity as something that can be attained in almost any domain, whereas innovation typically refers to the successful implementation of creative ideas within an organisation (McLean, 2005).

Given the growing research focus on empathy, adaptability and creativity (Saarikivi, 2015), the notion of creativity is strongly connected to the individual characteristics of employees, whereas innovation refers primarily to team- or organisation-related behaviours (McLean, 2005). However, organisational creativity and innovation are both closely related to means of developing employees' independent and logical processes of thinking and acting (Burdon et al., 2013; Pink, 2009), and both involve the same organisational norms (Martins & Terblanche, 2003). At present, understanding creativity and innovation demands the awareness and abilities to understand both

1. The characteristics of specific individuals, and
2. The different networks of individuals within, between and outside organisations (Bilton, 2014).

Changing Worldviews

As the many past examples of such companies as Xerox, Nokia, Yahoo, and Polaroid have already shown, modern organisations are facing increasingly profound challenges related to societal and organisational learning. In addition to confronting the fast growth of Web 2.0 technologies and of social media in particular (Kaplan & Haenlein, 2010; Singaraju, Nguyen, Niininen, & Sullivan-Mort, 2016), which has radically affected the ways in which individuals create and share content in their various previously unreachable and globally expanding social networks and communities (Ketonen-Oksi, Kärkkäinen, & Jussila, 2016), companies are being gradually forced to adapt to a new worldview of living systems: a systems view based on the interconnections and interdependences among the various actors in their business ecosystems (Akaka & Vargo, 2014; Senge, 2006).

With hundreds of different social media platform with multiple different functionalities, from photo sharing and discussion forums to specified professional usages such as e.g. crowdsourcing and crowdfunding, the emerging social media ecosystems strongly center on the consumer experience (Hanna et al., 2011). Besides the decentralisation of information creation and sharing (Hanna, Rohm, & Crittenden, 2011), and the growing trend towards providing intangible services rather than physical products (Teece, 1998), social media has significantly influenced on the ways in which individual and companies are now being interconnected through the many different platforms and networks representing both traditional and social media (Allee, 2009; Hanna et al., 2011).

However, modern organisations are still far too excessive in their need to fragment, compete on and react to the cultural grounds surrounding them. Instead of seeing organisations as microcosms of their larger societies, the common understanding of organisations is largely built on ways to control physical and social environments. That is, complex situations are first broken into components, then examined in isolation and, only in the end, synthesised into a whole (Kofman & Senge, 1993; Senge, 2006). This approach emphasises reductionism and mechanical thinking, weakening organisational abilities to learn and create completely new things (Kofman & Senge, 1993; Senge, 2006). Furthermore, as companies try to manage the growing shift from product-based to service-based businesses, the related challenges are only growing bigger (Grönroos & Voima, 2012; Nilsson & Ballantyne, 2014; Vargo & Lusch, 2016).

Since the prevailing focus on reacting to emerging problems does not support organisational creativity (Kotter, 2012), more aggregate knowledge and a better understanding of the impacts of the various cognitive, structural and procedural characteristics affecting working conditions and environments are needed (Cirella et al., 2016; Kotter, 2012; Walker, Holling, Carpenter, & Kinzig, 2004). The management of creativity and innovation calls for an advanced understanding of the emerging individual and institutional variables and their interdependences. In order to avoid the creation of mental disabilities that may negatively affect organisational learning (Senge, 2006), special attention should be paid to the development of social environments (Amabile, Conti, Coon, Lazenby, & Herron, 1996) and to enhanced employee collaboration and engagement (van Osch & Coursaris, 2013).

Focus on Individuals

Simplified, the adaption of systems thinking forces organisations to systemise the ways in which they are able to bring people together and how they can help people develop the best possible practices and mental models for facing unpredicted challenges (Senge, 2006). Through this systematisation, both managers and employees become more aware of their individual mental models, which are formed gradually beginning in early childhood (Senge, 2006) and are affected by a number of different cultural beliefs (Greif, 1994) and society-dependent rewards (e.g. social acceptance, study credits, money) that supersede our natural instincts, behavioural patterns and attitudes (e.g. curiosity, self-realisation and the inner drive for continuous development) (Senge, 2006). Hence, levels and frequencies of creative behaviour (Amabile et al., 1996) strongly affect the balance among different individual- and team-related intrinsic and extrinsic motivations (Walker et al., 2004; Welschen, 2014). Changing mental models, however, is not an easy task.

According to decades of studies by Kahneman and Tversky (Kahneman, 2011; Kahneman & Tversky, 1984; Tversky & Kahneman, 1981), the emerging dichotomy between two different systems of thought yields one axiomatic explanation, which applies to all humankind:

1. "System 1" refers to a fast, indistinctive and emotionally stuffed way of thinking, while
2. "System 2" refers to a slower, considerably more deliberate and logical way of thinking.

Since human tendency prefers avoiding losses to acquiring gains (i.e. avoiding failures and uncertainties), shaping employees' system 1 thinking abilities seems to be the most important key for managing successful change in the long run (Kah-

neman, 2011; Senge, 2006). If managing the fears and doubts fails, it may lead to significant resistance to change and, thus, fatal results related to organisational capabilities to create and innovate novel products and services (Kahneman, 2011).

Besides companies needing to better understand the systemic structures and patterns of behaviour affecting their organisational learning and business actions (Senge, 2006), it is also important for employees to take leadership of their own actions in their increasingly self-organised working environments (Burdon et al., 2013; Saarikivi, 2015). As employees are faced with more and more complexity in their daily working environments, it becomes vital to understand how each individual can and should master both the creative and the emotional tensions (see Senge, 2006) that affect his or her performance. Instead of defining creativity as a state of mind full of anxiety (referring to the emotional tensions hindering success), creative tension refers only to the ways in which an individual can clarify the gap between his or her vision and the current reality—and, thus, acts as a great source of energy (Senge, 2006).

THEORETICAL APPROACH

Given all the changes affecting on current working environments, from technological changes, such as digitalisation and the growth of social media (Hanna et al., 2011), to the different characteristics of socio-cognitive traits related to both individuals and organisations, including the development of service-based business thinking (Grönroos & Voima, 2012; Vargo, Maglio, & Akaka, 2008), the purpose of this study is to examine whether adopting a service-based working culture could significantly improve organisational creativity and innovation. That is, in this study, creativity and innovation are conceptualised by building on the theoretical grounds of the Service-Dominant Logic and Complex Adaptive Systems thinking to create a theoretical, yet practice-oriented framework for making the required fundamental shifts in thinking about cooperation, connectivity and innovation in today's rigorously changing working environments.

By emphasizing strategic, non-authoritarian leadership—that is, the construction and development of relationships among an organisation's various individuals, teams and units (i.e. its internal relationships) and between inter-organisational or customer-related networks (i.e. the external relationships) (Schneider & Somers, 2006) —this study offers a modern, boundless and flexible alternative for the re-examination of leadership and employees' learning experiences.

Complex Adaptive Systems

According to Complex Adaptive Systems thinking, the effectiveness and productivity of organisations are strongly dependent on:

1. The emergence of the variables that make these systems complex,
2. The different contexts in which these variables can occur, and
3. The relationships among the various independent actors involved in the systems (Akgun, Keskin, & Byrne, 2014).

Represented as self-organising systems in which the role of leadership may be initiated either consciously or unconsciously, then performed either in rotation or in tandem, and finally shifted from one person to another depending on the situation, the changes in Complex Adaptive Systems are impossible to comprehend or predict. As such, Complex Adaptive Systems thinking encourages social interactions and a certain sense of community among the employees within studied systems. Thus, it offers a boundless and flexible alternative for the re-examination of an organisation´s management practices and its employees' learning experiences (Schneider & Somers, 2006).

The most typical paradigms of complex adaptive systems refer to organisations whose semi-autonomous members tend to interact at many different levels of cognition and action and who are, thus, affected by a variety of operational functions and mechanisms (Schneider & Somers, 2006). The level of consensus on the objectives and methods used depends on the relationships constructed and developed among the various individuals, teams and other units within an organisation (i.e. the internal relationships), as well as between the inter-organisational or customer-related networks (i.e. the external relationships). Hence, the achievement of the desired outcomes, either directly or indirectly, depends on the behaviours of socially complex human systems (Mitleton-Kelly, 2006).

Through access to both single loop learning (i.e. learning supported by existing mental models) and double loop learning (i.e. learning occurring through the re-framing of mental models), Complex Adaptive Systems theory emphasises strategic, non-authoritarian leadership (Dooley, 1997; Schneider & Somers, 2006). Studying creativity and innovation through the lenses of Complex Adaptive Systems can, thus, offer great insight into both the principles of emergence and the self-organisation of networks formed by creative individuals. Even more, perceiving organisations as complex co-evolving systems may emphasise the importance of stimulating innovation, thus preventing the unintentional blocking of control (Amabile & Kramer, 2011; Angle, 1989; Mitleton-Kelly, 2006). By considering wholes, this approach

facilitates an understanding of not only the complexity around us, but also the structures behind complex situations (Senge, 2006).

Service-Dominant Logic

Given the focus on the wellbeing of entire service ecosystems (Akaka & Vargo, 2014), rather than on particular members of value networks, the Service-Dominant Logic refers to a value that is dynamically co-created through a set of closely collaborating internal and external actor-to-actor networks. The created service ecosystems are seen as self-contained and self-adjusting systems, in which the various different actors are connected by shared institutional arrangements and mutual value-creating service exchange (Vargo & Lusch, 2014; Vargo et al., 2008).

Although often criticised as unable to sufficiently or appropriately change the management practices in use, the Service-Dominant Logic serves as a concrete tool for supporting both managers and employees in their search for new customer-based approaches to value creation (Nuutinen & Lappalainen, 2012). Furthermore, the Service-Dominant Logic, which is most commonly referred to as a mind-set, offers a great stepping-stone for adopting the new, digitally enabled business environments with the numerous emerging requirements for individual skills and competences.

Despite its presentation in current product-based research literature, the Service-Dominant Logic refers to value creation through joint and reciprocal processes only (Hirvonen & Helander, 2001; Vargo & Lusch, 2014). That is, according to the Service-Dominant Logic, value is always co-created between distinct service systems, which are connected to one another by value propositions. Hence, value is used only once the value propositions are integrated into the service systems in question. Whether tangible or intangible, the value-creating resources can be either internally controlled or externally drawn upon for support (Spohrer & Maglio, 2008; Vargo et al., 2008).

While the most recent Service-Dominant Logic-related discussions are largely dedicated to seeing innovation through a variety of institutionalised norms and rules, the focus of attention has been on gaining new insight into how the maintenance, disruption and transformation of such institutional arrangements will eventually affect organisations' innovation capabilities. The institutions play an important, but not central role in value creation: They both influence and are influenced by the various social interactions among the multiple actors of the service ecosystems (Vargo et al., 2015). Given this consideration, the Service-Dominant Logic offers a valuable tool for examining both the emergence and the potential impacts of creativity and innovation in the non-hierarchical collaboration of novel, service-based business ecosystems.

NEW MINDSETS, NEW WORKING CULTURES

Shift in Perspective

When summarising both past and present knowledge and information about creativity (see e.g. Amabile et al., 1996; Anderson et al., 2014; Angle, 1989; Bilton, 2014; Cirella et al., 2016; Ford & Gioia, 2000; Sternberg, 2006), it becomes clear that it is not only individual characteristics or team-wise skills and abilities that determine the creative potential of work places. Instead, companies' ability to renew organisational and institutional settings to be in line with their employees' existing (although often quiescent) skills and competences seems to be equally important. Then, according to the systems thinking perspective, success comes only when all the actors involved are playing their part (Senge, 2006).

That being considered, the advancements in information technology and digitalisation, including the currently emerging liquefaction of information resources (Ketonen-Oksi & Koskela-Huotari, 2016) and the lowering of efforts and costs of collaboration have enabled completely novel ways to connect with and integrate resources. These advancements have significantly impacted how information and knowledge are being shared:

1. Within the innovation processes and
2. When managing social interactions.

As such, digitalisation represents a major driver for changing current organisational cultures. Significant changes are to be observed in the power relations between companies and their customers as well as with the companies´ various stakeholders. It demands both organisations and their employees to adopt completely new mental models and practices about networking and connectivity.

Social Interconnections and Interdependences

In order to create the new mental models enhancing positively collective working cultures (Börjesson & Elmquist, 2011; Parkkinen & Lehtimäki, 2015), companies must better understand the complexities that arise from the inter-relationships, interactions and inter-connectivities of the multiple components that exist both within organisations and between organisations and their environments (Mitleton-Kelly, 2006). Although influencing the employee´s individual behaviour patterns and attitudes, i.e. the employee´s intrinsic motivational factors, may seem quite impossible from a company perspective, organisational management does play an important role in supporting and motivating both individual- and team-related motivation

and in maintaining organisations' everyday trust-creating practices (Parkkinen & Lehtimäki, 2015). In doing so, organisations should change their focus from how to develop creativity to how to maintain and promote the creativity that already exists within individuals, teams, organisations or even within the entire ecosystems. This applies especially to mind settings and operations models.

Most importantly, it will be advisable to extrapolate from past experiences; instead, organisations must create completely new patterns of behaviour and structures (Burdon et al., 2013). The roles and methods of leadership must change accordingly, emphasising trust, diversity, active participation and communication skills. In particular, managers' abilities to motivate their employees will be highlighted (Börjesson & Elmquist, 2011). In fact, organisations involved in the development of new services have been shown to be more willing to cannibalise organisational routines and prioritise employee-based investments (Nijssen, Hillebrand, Vermeulen, & Kemp, 2006). Indeed, resources allocated to social networking are of outmost importance to any individual or team hoping to succeed in their efforts to build a sustainably creative and innovative working place. Strong individual commitment and courage will be needed in order to continuously adapt to new circumstances that will enhance organisations' abilities to learn about surrounding systems (Senge 2006).

Hence, the many similarities and shared ideas behind systems thinking, Complex Adaptive Systems and Service-Dominant Logic, as well as between Senge's (2006) conceptions of the skills of reflection and inquiry and Kahneman's (2011) studies of fast and slow thinking, illustrate the importance of diversity in thinking and acting. That is, engaging with and adopting new and fresh ideas is the only way for companies to stay innovative and competitive in the long run. This emphasises the growing demands for the managers to encourage open and supportive interactions both among its employees and with any external party interested in communicating and sharing ideas.

Introducing the Framework

As an outcome of the emerging need for new mindsets and new working cultures, the framework presented in Figure 1 is introduced in order to facilitate and improve organisational creativity and innovation while adopting the digitally enabled, service-based working culture. The framework, which consists of three key dimensions, namely of:
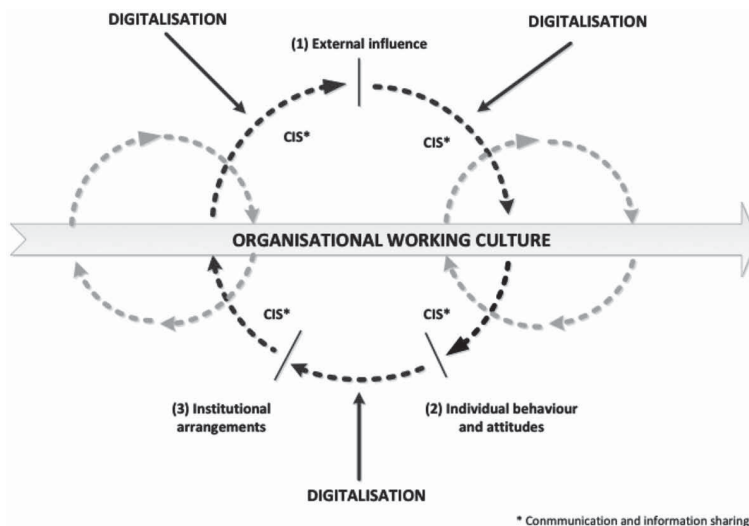
1. External influence,
2. Individual behaviours and attitudes, and
3. Institutional arrangements, and presented in a never-ending circle, strongly highlights the importance of seeing organisational working cultures as continu-

ously evolving systems in which many characteristics influence one another. It also describes the process of organisational change as part of the on-going process of organisational learning (see the dimmed circles on the left and right sides of the main circle). As such, the framework draws on and supports the ideas and concepts of several different mindsets and theoretical models, such as Complex Adaptive Systems and the Service-Dominant Logic.

Considering the revolutionary impact of Web 2.0 technologies and social media in particular, also playing an important role in the framework, it is being described as arrows affecting on all sides of the circle. In addition, the role of communication and information sharing (CIS) is being highlighted as having an important impact on how the ideas, information and knowledge is being shared in the complex working environments, continuously affected by both the traditional and social media. That is, the framework discloses the ways in which organisational creativity and innovation are to be developed by increasing organisations´ awareness of the various interconnections and interdependences of the multiple actors involved in their business (service) ecosystems. Yet, in spite of the apparent significance of social media impacts, many more external variables are simultaneously affecting the organisational working cultures. That being considered, the framework sees digitalisation only as one of many external stimuli having an impact on the organisational working culture.

Figure 1. Conceptualising creativity and innovation in a digitalised, service-based working culture

As in practice, major organisational changes are usually enacted from places external to their focal organisations, the first key dimension is described as "External influence". It thus refers to the process of extrinsic motivation originating from both surrounding societies and competing business ecosystems. Once these external variables begin to affect the organisational culture, for example, through the implementation of social media-based working tools or through the offering of new digital services to customers, this culture will gradually affect more and more employees. Yet, from an organisational point of view, it is important to understand how these external influences will impact not only the organisation as a whole, but also each of its employees individually through a plethora of hidden and unconscious information and emotions that may affect employees' mental models. Hereby defined as "Individual behaviours and attitudes", succeeding in developing the second key dimension is extremely difficult. Controversary to external motivations and influences such as rewards, money and collegialism which are easy to observe, defining a person's intrinsic motivations is difficult if not almost impossible. Defining a person´s abilities and mental models specifically related to creativity and innovation are thus even harder to define.

However, individual attitudes and behaviours play a crucial role in giving input that leads to changes in the third key dimension defined as "Institutional arrangements": that is, to an organisation's internal rules and structures. Given all the previous dimensions, institutional arrangements contribute a purely organisational view of how to manage creativity and innovation. They confront the organisational complexity of visions, strategies, organisational habits and management practices and highlights their importance in creating a working culture that encourages employees of various kinds and with many different personal characteristics to give their best efforts for the benefit of organisational creativity and innovation. In doing so, it seeks to convince employees to serve one another in order to maintain a socially attractive and motivational working culture. That beind said, the institutional arrangements do not only relate to the ways in which organisations are managed, but also to the ways how individual employees can significantly contribute to the organisational working culture through their own mental models and attitudes.

Ultimately, the framework focuses in particular on the differences between the characteristics of intrinsic and extrinsic motivation, conceptualising them as both organisational and individual dimensions. Instead of defining a specific final stage, in which the creative output is configured as a contribution, the framework is described as an on-going process reshaped by various acts of communication and information sharing, both inside and outside the company borders.

Yet, most importantly, the framework does not refer to creativity as something the employees either do or do not have. Rather, it sees creativity as something we all possess, which is strongly influenced by employees' individual behaviours and

attitudes in relation to changing circumstances. It encourages organisations to not pre-define individuals' potential for creativity as a static quality; instead, it emphasises the importance of creating continuous opportunities to change and improve individuals' attitudes and behaviours.

DISCUSSION

Re-Inventing Creativity and Innovation

As a result of this study, a novel framework for conceptualising creativity and innovation in a digitalised, service-based working culture was created. Consisting of three key dimensions, that is of:

1. External influence,
2. Individual behaviours and attitudes, and
3. Institutional arrangements, the framework is strongly impacted by digitalisation and of social media in particular.

In addition, it supports the ideas and concepts of systems thinking and of Complex Adaptive Systems and Service-Sominant Logic in particular.

The framework encourages organisational efforts to integrate diversity and discomfort, both of which can strengthen active learning and contribute to the change management activities needed for creativity and innovation to flourish. These efforts are strongly supported by the implementation of service-based thinking, which can increase employees' trust and commitment to the wellbeing of entire workplaces. Consequently, the framework emphasises the importance of personal mastery as a tool to develop individual behaviours and attitudes, regarded as the major single variable supporting the development of more creative and innovative performance.

Above all, the framework encourages managers to reinvent creativity and innovation by developing their employees' existing creativity. Instead of defining employees' creative capacities by their obviously distinguishable characteristics, the framework comprehends creativity as a resource we all inherently possess and which takes its shape according to the various internal and external variables that affect it. In other words, the framework conceptualises creativity as something that builds on both

1. The employee´s personal mastery of their mental attitudes and behavioural patterns towards their own skills and abilities towards creativity and innovation, and

2.   The organisations´ abilities to support their employees to develop their individual and team –related capabilities for creativity and innovation.

That is, in order to succeed in creativity and innovation, companies are urged to invest on positively encouraging organisational working cultures that enhance trust and commitment to an organisation´s shared visions. Re-inventing organisational creativity and innovation through adapting a service-based working culture is thus highly recommended.

Implementing the Framework in Practice

As the framework clearly confirms, an organisation's capability to create a culture of positively collective commitment (Börjesson & Elmquist, 2011; Parkkinen & Lehtimäki, 2015) depends largely on its willingness and ability to understand the complexities that arise from the inter-relationships, interactions and inter-connectivities of the multiple components both within organisations and between organisations and their environments (Mitleton-Kelly, 2006). Here, the emphasis must be on organisations' everyday practices, with a particular focus on the small things that can steer the change process towards increased positive interactions, trust and strengths (Parkkinen & Lehtimäki, 2015). The framework also highlights the need to understand reciprocal changes and the ways that they affect the totality, i.e. the importance of investing in the creation of shared visions and cultural diversity.

Instead of seeing creativity as the result of individual abilities and actions, the framework introduces creativity and innovation through a novel multi-level approach, calling for shared visions and consistency of actions. By developing employees' social connectedness and trust, it builds a certain kind of absorptive capacity within companies' internal networks. In order to succeed in creating positive and dynamic organisational working cultures the manager´s abilities to engage their employees to actively participate in making improvements can not be highlighted enough. Adopting a service-based working culture, strongly initiated by the emerging decentralisation of modern, social media driven communications culture, will certainly be beneficial in this endeavour.

Hence, the framework offers concrete tools for current and future business organisations interested in managing creativity and innovation by first understanding the complexities that are emerging at all organisational levels, both inside and outside companies (e.g. among stakeholders and customers), and by then understanding the importance of developing an organisational culture to support employees' creativity. Whether existing only only as potential, as already emerging or as strongly distinguishable and productive, the framework highlights the importance enhancing creativity and innovation through a social connectedness constructed by open

knowledge sharing and multi-level communication. In doing so, investments on networking strategies should be regarded as simple and effective tools to enhance companies' abilities and skills related to creativity and innovation.

FUTURE RESEARCH DIRECTIONS

Although trust plays a significant role in any organisational change process, issues of trust were beyond the scope of this study. Hence, the trust relationships among different organisational actors and their related impacts on creativity and innovation were left for further studies. In addition, the proposed framework and its implications remain to be tested by means of an empirical case study. Yet, the preliminary reflections presented herein strongly emphasise the emerging interconnectedness and interdependencies of creativity and innovation. Hence, more studies are needed in order to better understand and support the development of complex, digitally enabled working environments influenced by the emerging nestedness of networks and structures.

CONCLUSION

By developing a service-based organisational culture and, thus, forming a solid basis for the formation of new routines and working cultures, the hereby created framework urges managers to update their current strategic approaches and operations models to better respond to future needs related to supporting organisational creativity. Instead of leading stable and standardised tasks in a mechanical way, the framework stresses managers to adopt the emergingly dynamic structures involving constant uncertainties, thus making rapid communications and wide information sharing critical for the success of organisations´ creativity and innovation performance. Creating a balance in these rapidly changing working conditions will notably affect the employees' commitment to their workplaces while developing their potential creativity.

All things considered, moving away from established norms and adopting to on-going experimentation and exploration as integral parts of organisational working culture allow companies to achieve a certain "bounded instability" (see Stacey, 1995). The pervasive adaptation of Service-Dominant Logic thinking may lead to significant increases in organisational creativity and innovation.

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PUBLICATION
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Creating a shared narrative: The use of causal layered analysis to explore value co-creation in a novel service ecosystem

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Creating a shared narrative: the use of causal layered analysis to explore value co-creation in a novel service ecosystem

Sanna Ketonen-Oksi

Abstract

Purpose: The current business environments are increasingly dominated by the networked and systemic conceptualisation of value creation. However, surprisingly, little is known about the explicit and symbolic (inter) relationships between the different actors involved in the value co-creation processes—or about how they impact on the network-specific innovation capabilities. More research is needed to explore and validate the yet theoretical models and concepts of value co-creation in practice.

Design/methodology/approach: Theoretically, this study is built on the ideas and concepts of Service-Dominant (S-D) logic. Empirically, the research is based on a set of thematic interviews conducted in a real-life service ecosystem, in the context of university-industry collaboration. The method of causal layered analysis (CLA) is used to both identify and develop constitutive narratives that support the service ecosystem's long-term strategic planning and value co-creation practices.

Originality/value: The use of CLA in exploring the S-D logical view on value co-creation is a unique combination. By studying a highly social, dynamic and interactive process during which different service ecosystem actors first come together to share their values and mental models, and then act upon, significant new knowledge and understanding is offered for all those interested in applying a more systemic approach on service ecosystem development.

Practical implications: Given that the use of CLA not only increases the awareness of alternative narratives, but of the abilities to facilitate the desired future(s), new insight and practical advice will be provided for both managers and participants taking part in a service ecosystem.

Keywords: Service systems, Service ecosystems, Service-dominant logic, Value co-creation, Causal layered analysis, Futures literacy

Introduction

The rapid growth of Web 2.0 technologies, particularly social media [1, 2], has fundamentally changed the ways that people interact and communicate with one another [3–5]. While the influence and power of the acquired information and knowledge has considerably decentralised [6], companies have been forced to adopt new, systemic ways to work, socialise and create value [7, 8]. With a focus on the multi-actor practices, processes and symbols through which various social, economic and technological aspects of change are connected [9–12], it has become

unquestionable to recognise, appreciate, and participate in value co-creation [11].

Besides the more theoretical discussion of value, increasingly dominated by the networked [13–15] and systemic conceptualisation of value creation [16–18], *more empirical research is needed to validate the so far developed models and concepts of multi-actor value co-creation in real-life business environments* [19, 20]. Except studies focused on organisational learning [21–23] and employee motivation [23] in a variety of socially connected, both internal and external networks [24], little is known about the ways to develop and manage multidimensional networks of actors when loosely coupled in both formalised and non-formalised interactions [25]. Most importantly, more

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knowledge and understanding is needed about the explicit and symbolic (inter)relationships between the different value co-creating actors, often connected to various service systems at the same time [26, 27].

The urgent need to support value creation in practice [28] gradually shifts the emphasis on everyday interactions. As companies eventually recognise the strength they have in both individuals and organisations [29, 30], and thus become more aware of their innovation capabilities [11, 31, 32], they will see themselves as the microcosms of society at large. Eventually, the still dominant firm-centric operations models [11] will be replaced with highly social, dynamic and interactive processes during which different actors come together to share their values and mental models [33]. Considering how difficult it is to break old habits, *significant changes are needed to replace the mechanical patterns of thinking with system dynamic*s [34]. More research is needed to validate the yet theoretical models and concepts of value co-creation practices. Hence, to better understand, how to foster value co-creation in the emerging service ecosystems, *the aim of this study was set to explore the explicit and symbolic (inter)relationships between the different actors involved in the value co-creation processes and the ways how they contribute to the network-specific innovation capabilities.*

Theoretically, this study is built on the ideas and concepts of Service-Dominant (S-D) logic. In doing so, the term 'service ecosystem' referred to a relatively self-contained, self-adjusting system of resource-integrating actors or entities which are connected by shared institutional logics and mutual value creation through service exchange [35]. Empirically, this study consists of a set of thematic interviews carried out in the context of university-industry collaboration, that is, in a real-life service ecosystem under construction. Inspired by recent studies indicating that there is a positive consistency between companies' abilities to foster long-term strategic planning and their value co-creation activities [36], and that companies systematically applying corporate foresight outperform their competitors [37], the interviews were analysed with causal layered analysis (CLA), a technique developed for opening up the constitutive discussions among the actors involved in the value co-creation process [38]. *While adapting a more systemic and in-depth view on value co-creation, new insight and advice will be provided for those interested in a practice-oriented view on value co-creation in the emerging service ecosystems.* By acknowledging the role of knowledge as a key resource for companies to maintain their competitiveness, this study will equally highlight the increased importance of strategic collaboration among education, research and industry [39].

Motivations and theoretical background

The recent technological breakthroughs have enabled many new patterns and levels of value creation, thus playing a crucial role in transforming how value is being co-created [4, 16]. Yet, the understanding of the current, technology-driven changes in value creation [40–42] is still rather ambiguous [43]. Considering that 'we live in an anticipatory universe, which is chock-a-block with anticipatory systems and processes' ([29], p. 520), *too much attention is still being paid to the ways how to plan, analyse and control the value co-creating processes* [36]. In order to systematically relate and combine activities and resources with one another—and thus embrace different forms of collaboration—more focus should be placed on both the individual's and the organisation's abilities to reorient and reframe their thinking around systems, networks and ecosystems [27, 45]. However, when analysing recent literature reviews on the theory of value co-creation, it seems that the current knowledge and understanding about co-creation is surprisingly incoherent and mainly consists of studies on customer experience [19, 20].

Besides understanding the system-level coexistence of structural changes and stability, it is extremely important to recognise the huge differences in how the functioning and the evolution of service ecosystems are being conceptualised, especially depending on the logic being applied. For example, when an organisation succeeds in combining a flexible mind set with a networked and team-based organisational structure, it also supports the abilities of the organisation to implement strategies that embrace foresight and futures literacy [44]. That is, the ability to transform the ways in which value is being created in modern business environments is increasingly connected to the system's ability to engage in cyclic self-renewal and structural coupling where each process of interaction results in the transformation of the system [45].

The S-D logic view of value co-creation and service ecosystems

In the many firm-centric views on value co-creation, the emphasis lies on the optimisation of monetary wealth for a single actor who takes part in the value exchange [46, 47]. By contrast, the S-D logic view on value creation builds on a socially constructed multi-actor process that occurs at the intersection of activities among providers, consumers or any other possible actors, all of whom are participating in the value co-creation process [18, 19, 32]. In doing so, S-D logic conceptualises value co-creation as something that encompasses many disciplines and perspectives [48–50] and refers to service as the fundamental basis for value co-creation, i.e. as the application of resources (e.g. knowledge and skills) for the benefit of

others [47, 50, 51]. According to S-D logic, the effective-ness and productivity of an organisation are strongly dependent on both (a) the emergence of variables that make the system more complex and the different contexts where these variables can occur and (b) the relationships among the various independent actors involved in the sys-tem [52]. As such, *a great majority of the value creation potential is now related to the ways to reconstruct social patterns,* i.e. *to improve communications and collaboration within and across the different players of the service ecosys-tems* [53].

While the development of service ecosystems is increasingly dependent on the attitudes, skills and prac-tices that embrace collaboration, risk taking and experi-mentation, i.e. the rules, norms, symbols and other institutional arrangements [4, 41, 54] that direct the collaborative networks [55], it is particularly important to identify how the different sub-systems each exert on the larger ecosystem. In S-D logical terms, these behav-iour and dynamics are explained with the concept of 'service innovation' [56]. While seeing service platforms as a tool to connect the various different actors together and to become interested in value co-creation in the first place, the actual act of value co-creation then happens in a multi-layered process consisting of four major phases of interaction.

First, with *co-experience* the focus is on reducing the gap between the needs and expectations of the value co-creating actors and in co-defining what individual person or organisations actually mean by service. Second, at *co-definition*, the actors become aware of each other's capabilities and expectations related to value co-creation. Third, *co-elevation* is about strengthening the collabor-ation through high-quality value propositions. Fourth, *co-development* refers to the phase where the co-creation finally becomes true and is being evaluated [56, 57]. By referring to service ecosystems as the structures that support engagement to the process of interaction through knowledge creation and exchange [56, 58], *the adoption of the S-D logical view on service ecosystem thus helps the ecosystem actors to move away from too much planning and control.* It helps organisations to better sense the emerging changes in their operational environments and to systematically relate and combine activities and resources with one another [27].

Case study
Although notable benefits have already resulted from the already-existing knowledge transfer between universities and their industry partners [58], the number of failed attempts to collaborate is also significant [59]. While most of the existing research on university-industry collabora-tions has been conducted in the USA [60], more research and understanding is needed about how to successfully

bridge the cultural, social and political divide between aca-demia and industry [39]. Yet, the current networks tend to focus on data collection rather than on the ways to in-fluence on the strategies and decision-making in more sensitive and fundamental ways [61]. Given the growing interest on both value co-creation and the importance of strategic collaboration among education, research and in-dustry [38, 39], more depth and diversity are needed to in-tensify universities' role in the service economy.

To thus explore and validate the yet theoretical models and concepts of S-D logical value co-creation in practice, an empirical case study was conducted in Tampere, Finland. Besides Finland's consistent position as one of the best education systems in the world [62], the Tampere University of Technology has been ranked as one of the world's leading universities with a large volume of success-ful industry collaborations [63]. That being the case, this case study offers plenty of opportunities for observing the strategic, operational and transactional relationships within the context of university-industry collaborations [64]: When intertwined and associated with each other, individual institutions may form strong assemblages of institutional arrangements [17] where managing change is not easy. In addition to understanding the context-specific variables that make the system complex [51], it is equally important to succeed in introducing novel concepts and forms that support the multi-actor collaboration. In this particular study, the focus will be on examining the ways to establish sustainable, user-driven and collaborative networks that enhance innovations [65].

Kampusareena—the setting up of a 'real-life' service ecosystem
Located at the heart of the Tampere University of Technol-ogy's campus in Tampere, the Kampusareena building and concept was purposefully designed to encourage and sup-port productive collaborations between the university and a number of its stakeholder organisations. Officially launched in September 2015, the planning and construction work was managed by the University Properties of Finland, a limited company with its core business in producing, main-taining and developing premises for universities, colleges and their partners. Centred in an international community of over 8000 undergraduate or postgraduate students in technology and architecture and home to 1700 employees, Kampusareena offers working spaces for about 100 private companies and public organisations, as well as for about 200 university students and staff members. About half of Kampusareena's premises are occupied by the Tampere University of Technology, and another half is owned by the University Properties of Finland. While the university premises include a scientific library, technical test laborator-ies, a cafeteria and various student services and services for further education, the University Properties of Finland

rents its premises to companies and street-level service providers (including a restaurant and a barber).

The Kampusareena premises offer a broad range of services and multipurpose facilities for learning and innovation for both the scientific and business communities. With the slogan 'a hub of science, research and technology' [64], its ambitious objective is to become the centre of a real-life service ecosystem that fosters productive university-industry collaboration. In fact, there are several hubs within the hub itself, including the Kampusklubi co-creation hub run by the University Properties of Finland and the Smart Machines and Manufacturing Competence Centre (SMACC) run together by the Tampere University of Technology and the VTT Technical Research Centre of Finland, as well as the Design for Value (DIMECC D4V) run by DIMECC, Finland's leading industrial co-creation ecosystem. The DIMECC network alone consists of over 2000 research, development and innovation professionals and of more than 400 organisations. The many networking opportunities and concrete forms of cooperation being acknowledged, *Kampusareena refers to its role as a platform of engagement that is intentionally designed for the co-creation of shared value* [11].

Methods and data

A set of thematic interviews were carried out within Kampusareena. Instead of studying different context-specific variables that make a system complex [51], or examining the value networks between the various actors taking part in the ecosystem [65], *the focus of this study was to explore and critique the various stories the ecosystem actors* present about the evolution of their value co-creation aims and activities. In doing so, the method of CLA was used to shed light on the multiplicity of institutional arrangements [17, 66] that drive change and innovation in the studied service ecosystem.

CLA—a method for creating a shared narrative

Originally developed in the 1990s by a futures researcher, Sohail Inayatullah, the causal layered analysis (CLA) represents a modern approach to examine the in-depth aspects of social and strategic change [67, 68]. According to CLA, just as language does not only describe reality constitutes it, metaphors do not only describe, but they also shape and create organisational strategies [69]. By unveiling the different ideological, value-based mind sets of the studied individuals, teams and/or organisations, CLA emphasises the importance of understanding reality through different layers of knowing and observing things. These layers are (1) *litany*, which refers to issues that are often collectively shared as 'facts' yet rarely questioned or confirmed with real data; (2) *social causes*, which focus on the system's perspective on economic, social, political and

cultural factors and thus explains the behavioural rules behind the litany; (3) *discourse*, which reveals the significant impact that our historical, social and spatial settings have on our common sense and thinking, including how we build structures and discourses around our values and worldviews; and (4) *metaphors and myths*, which expose us to narratives and false information that we use to justify ourselves to our inner selves [67–69].

From a theoretical point of view, CLA combines and integrates empirical, interpretative and critical research traditions with practical tools, such as emerging issues analysis, scenarios and back casting. It opens up both past and present value-creating practices and thus unveils any conscious and subconscious preconceptions and perceptions related to the issues being studied. That is, it exposes any tensions, contradictions and vagueness between the collective discourses being represented and internalised [67, 70]. By mapping the narratives, CLA by no means predicts the future, but it helps in creating 'transformative spaces' for alternative futures [68, 70]. In other words, CLA does not take a stand on whether the stories are true or false; rather, it challenges underlying assumptions about reality and thus facilitates the creation of desired futures [69].

While helping to link empirical findings within the studied sociocultural contexts, CLA provides a concrete tool for constructing and reconstructing powerful stories that (a) make us conscious about the deeper layers of reality and (b) make use of them in more explicit ways. Hence, the systemic use of CLA helps to understand the impact of present actions on the desired systemic changes in social systems and structures. Then, considering that the core narrative can be changed only through adopting new worldviews and values, it highlights the need for constructing narratives that engage people in shared objectives and goals [38, 67]. This consistency between the four layers is rather uniform with the concept of 'institutional arrangements' used in S-D logic [71]. Hence, given the objective of this study, *CLA represents an excellent method for obtaining an in-depth understanding of the interviewees' different social, cultural and behavioural attitudes towards co-creation in the service ecosystem under investigation.* In doing so, it also helps to create alternative views for value co-creation between the various actors and actor networks [70, 72]. Moreover, the multilayer analysis will provide explanations about the constitutive discourses at different types and levels of service ecosystems.

Data collection

The actual data consists of 21 thematic interviews, carried out with 22 individuals. At the time of the interviews, Kampusareena was celebrating its first year of existence. As we can see from Table 1, half (11) of the interviewees were employed by a public organisation, including

Table 1 Interviewee characteristics

	Public organisations	TUT only	Companies	UPF only
Number of interviewees altogether	11	7	11	5
Position in top/middle management	3	4	6	2
Position as an expert/researcher	4	2	5	3
Active participation in the concept development	3	1	6	4
Expertise in innovation research and development	8	4	6	4
Office (mainly) at Kampusareena	2	1	9	5
Active in co-creation at Kampusklubi	7	5	5	3

representatives from the Tampere University of Technology (7). The other half (11) of the interviewees represented companies, including University Properties of Finland (5). Or, half of the interviewees represented the two organisations that co-manage the ecosystem, and the other half represented their various stakeholders, including both companies (6) and public, non-profit organisations (4). Importantly, almost half of the interviewees (9) were top- or middle-level managers, with more than half (14) of them being experts in the field of innovation research and development. Again, half of the interviewees had substantially participated in the Kampusareena concept development.

The length of the interviews was about 50 to 60 min on average. The majority of them (i.e., 18 interviews with 19 individuals) were conducted face to face, whereas 2 of them were made by telephone and 1 over Skype. A set of rather pragmatic questions was prepared to support the quality and conformity of the interviews. Yet, some variations occurred between the individual interviews, mostly due to different levels of expertise or the familiarity with the actual co-creation activities within Kampusareena. Once the data were transcribed, they were stored and organised using NVivo, an Internet-based qualitative data analysis software.

As we can see from Table 2, each of the four layers of CLA were first amalgamated with the four phases of the value co-creation process and then applied according to the research questions specifically designed for each layer: Whereas the first layer (i.e. litany) was built around the interviewees' current perceptions about the platform functionalities, and the second layer (i.e. social

causes) described the system-level behaviour and rules that direct the ecosystem development, the third layer (i. e. discourse) collected the worldviews and values with (hidden) impacts on the interviewees' attitudes and behaviour towards value co-creation. Finally, the fourth layer (i.e., metaphors and myths) unveiled the mind sets and concepts that direct the service ecosystem development in reality. Altogether, these four layers of CLA were used to acknowledge possible changes in planning, implementing and creating change within the service ecosystem.

Results

In general, *all the interviewees had very positive attitudes towards Kampusareena and its development.* However, as we can see from Tables 3, 4 and 5, some significant differences of opinions and experiences did also occur between the different interviewees. To demonstrate the differences, a variety of direct citations from the interviews will be provided in the tables. Each citation is individually numbered, and for example, 'I-1' refers to 'Interviewee number 1'.

Layer 1: Current perceptions about how the platform supports value co-creation

For most of the interviewees, Kampusareena represented the most recent development of the high level of university-industry collaboration between the Finnish universities and companies. As we can see from Table 3, the most positive responses were related to the award-winning architecture and attractiveness of the Kampusareena building, thus emphasising its high brand value for Kampusareena as a

Table 2 Research questions

	CLA, the four layers	The four phases of the value co-creation process	Research questions
1.	Litany	Co-experience	How do the platform functionalities and location support value co-creation?
2.	Social causes	Co-definition	What are the system-level behaviours and rules that direct the service ecosystem development?
3.	Discourse	Co-elevation	What are the values and worldviews that drive forward the service ecosystem level collaboration?
4.	Metaphors and myths	Co-development	What are the underlying mind sets and concepts that direct the service ecosystem development in reality?

Table 3 Results, Layer 1

Current perceptions about how the platform supports value co-creation

Brand value

'Finland has some of the best universities in the world as per the their activeness in university-industry collaboration.' (I-7)

'The image connected with the platform supports value co-creating activities.' (I-3)

'The idea was to create a landmark, a building that would strengthen the university's brand image.' (I-5)

'This concept is interesting. More importantly, the constant competition between the two foundation-based Finnish universities guarantees that the progress will not end here.' (I-1)

Positive feedback confronts scepticism

'The physical space is attractive, with an emphasis on the experience [of collaboration].' (I-20)

'The location is good. The place has good vibes, and it's crowded there.' (I-11)

'There's too little bustle, and the lobby is nothing but a transit zone.' (I-12)

'Co-creation is a common topic of discussions, but [it is] not realised in practice. (I-13)

'The resistance for this platform is harsh.' (I-4/16)

'Too much attention is given to how things work from the companies' perspectives.' (I-15)

Open versus a closed system

'This place represents a no man's land that is easily accessible to all kinds of actors.' (I-19)

'Ultimately, this place is rather closed. People do not come this far from downtown.' (I-12)

'Even the smallest things can make big barriers for collaboration. The need for a pass [for entering company premises] challenges the concept for open collaboration.' (I-14)

'It is not easy for companies and students to come together. Besides the lobby, there are no places for social encounters.' (I-15)

'All the action happens at the 2nd floor. I barely ever go to any other floor.' (I-4)

'There are challenges in information sharing.' (I-14)

Awareness of the platform

'I guess there are quite many people from the university who have never been to Kampusareena.' (I-15)

'It takes time before people get familiar with new concepts.' (I-21/22)

'More effort is needed to encourage dialogue between the different organisations. I don't actually even know the actors there.' (I-20)

'I have not seen changes in the work cultures. At least not yet.' (I-2)

Table 4 Results, Layer 2

Co-defining the system-level behaviours and rules that direct the ecosystem development

Attitudes towards collaboration and engagement

'We will create a new concept where a low threshold results in increased networking and a sense of community.' (I-1)

'Well, this place is good for those who are looking for multidisciplinary collaborations.' (I-5).

'It would be more effective and interesting to have events for dedicated fields of study.' (I-14)

'This platform represents the ongoing change in work cultures.' (I-17)

'This platform works for proactive people.' (I-16)

'We believe this platform will be beneficial for us in the long run. Measuring the benefits, however, is difficult.' (I-21/22)

'Those who work here in research and teaching – they should be more active.' (I-3)

'The aim was to attract companies to join the campus, and to then encourage them to renew their thinking in close collaboration with the university.' (I-5)

'I hope that the platform creates things that companies cannot solve by themselves.' (I-8)

Lack of experimentation

'No big investments are needed. This place could serve as a great platform for testing new tools and methods.' (I-13)

'This platform has a lot of potential as a place for demos.' (I-7)

'I wish this platform would encourage taking time for creating something new instead of being effective all the time.' (I-1)

'Allocating more time for the platform activities would certainly be beneficial.' (I-11)

Facilitation requested

'If the aim is to really mix people and ideas, more support is needed to activate the co-creation processes.' (I-20)

'The platform owners should take more responsibility for facilitation. They know their own world, but as everything is new to us, we do not know how to navigate there. Channel management [for new platform actors] is needed.' (I-12)

'It is not something that can be automated, I mean, enhancing value co-creation needs coaching and looking after.' (I-8)

'Guidance from a person to a person is a prerequisite for this platform.' (I-13)

(Mis)interpreting the concept

'There's a lot of talk about innovation ecosystems and networking, but I haven't figured out what it could mean for us.' (I-11)

'The vision is not clear to all of us. There are many simultaneous processes going on.' (I-16)

'The co-creation practices are fragmented, and their interrelations are not obvious.' (I-8)

'[It seems to me that] either the organisations have not understood the concept [of Kampusareena], or then they have difficulties in creating contents that support the concept.' (I-8)

platform for value co-creation. In addition, the central location and the proximity to many other industry partners in the area, as well as the generally positive stance for working at and visiting Kampusareena, were equally appreciated. Yet, the positive overall assessment was also more or less confronted with scepticism and dissatisfaction.

Two particular challenges were brought up: First, even if Kampusareena was considered as an agreeable place to work, the value co-creating effects of the platform were regarded as rather limited. While the cafeteria was considered as too crowded and noisy, there were not enough spaces for random social encounters. More importantly, most of the activities, including in the different actor- or

Table 5 Results, Layer 3

Co-elevation of the worldviews and values with (hidden) impacts on attitudes and behaviour

Pioneers in university-industry collaboration

'This is a laboratory where scientific knowledge about learning and innovation is being applied in practice.' (I-7)

'Given the resources we have in Finland, with not much money and with challenging weather conditions and all, it is important that the Finnish universities stay strong in university-industry collaboration.' (I-1)

'This is a pilot. We kind of open up this campus through integrating it with the city around it.' (I-5)

'Compared to the USA or UK, this is a world-class project.' (I-9)

A showroom versus shared processes

'We now have a space where our team can meet, which also serves as a showcase toward the outer world.' (I-6)

'We aim to develop operations models that are based on co-creation. This place has an image that supports the aim.' (I-3)

'The real things will not be shared. They are kept in secret to make financial profit. That is my view on how things work.' (I-2)

'Openness is important. There is no point to compete.' (I-10)

'Kampusareena is a platform, and it is the people who co-create.' (I-4)

Ecosystem development takes time

'It is interesting to see how this platform develops and what keeps us here in the long run.' (I-11)

'The infrastructure suits co-creation well, but developing the concept takes at least a few years.' (I-10)

'A year is far too short of a time period to estimate the results and success of this platform. Ten years is a minimum.' (I-9)

'It is rather short-sighted to talk so much about financial challenges when this place is meant for creating solutions.' (I-2)

Old habits die hard

'Building up new operations models will take years.' (I-8)

'In ICT and electronics, the tradition and culture for co-creation is surprisingly weak.' (I-1)

'The university could be more active in bringing forth their knowledge and supplies.' (I-11)

'Well, we have people here who only work together with the universities or with the companies.' (I-10)

'There is bustle, but no dialogue.' (I-4)

'This is a place where university staff is not making science or teaching. For the university, it represents lost resources.' (I-7)

'More information is needed about how to integrate co-creation in the university's scientific research.' (I-3)

'Besides being challenged by the university's ability for quick responses, companies find it difficult to get information about the possibilities for collaboration.' (I-10)

'The goals should be set higher.' (I-2)

Platform-specific facilitation and marketing

'It is strategically important that the campus welcomes different actors to work in the same premises. However, this platform is just one of the facilities where that collaboration takes place.' (I-21/22)

'What is needed is events and continuous activities; that is, facilitation.' (I-5)

Table 5 Results, Layer 3 *(Continued)*

Co-elevation of the worldviews and values with (hidden) impacts on attitudes and behaviour

'It is important that the platform becomes more self-organising in a few years' time.' (I-16)

'There are some tensions between the two managing organisations.' (I-16)

'The role of the university's partnerships unit is not clear to me.' (I-6)

'As I see it, the concept idea is being lost or set aside on purpose. The focus seems to be on short-term monetary profits.' (I-4)

'There is an urgent need for a marketing plan including all the main actors of the platform.' (I-12)

'It is not the customers' role to find their way to the services.' (1-10)

'The success stories should be highlighted more, serving as examples.' (I-2)

theme-specific hubs located at the Kampusareena premises, were not freely accessible and thus prevented many potential initiatives for resource exchange. The interviewees felt that it was difficult to exchange ideas without prescheduled meetings, thus referring to a rather company-focused and controlled approach to collaboration. Second, most of the interviewees reported challenges in creating or confirming value networks and partnerships with the actors already present at the platform, or with the university staff and students overall. According to the interviewees, the common awareness of Kampusareena was surprisingly weak or out of date, resulting in low levels of participation in the events and other activities taking place at the platform. In short, the interviewees were pleased with the overall atmosphere at Kampusareena, but fairly critical about its success in initiating new resource-integrating connections. Or, the value propositions offered by Kampusareena were not expressed clearly enough.

A certain disequilibrium was noted between the high expectations and the realisation to date of the value co-creation activities (and benefits). On the one hand, Kampusareena was seen as an important landmark and a flagship for both the university and the entire economic region. On the other hand, significant frustrations were brewing underneath the seemingly positive attitude towards co-experiencing the platform and its further development.

Layer 2: Co-defining the system-level behaviours and rules that direct the ecosystem development

At layer 2 (see Table 4), the benefits of a multidimensional service ecosystem were not well acknowledged. According to several interviewees, there was too much diversity among actors in the ecosystem, thus resulting in fewer noteworthy opportunities for collaboration. As they saw it, the best opportunities for collaboration were based on networks with substance-related interests.

Surprisingly, many of the interviewees were seemingly satisfied if they met their old friends, colleagues and co-workers at Kampusareena—but they dismissed the value of spending time at events connecting people from different fields of expertise. With some inconsistency in their opinions, most of the interviewees believed that the platform-level success was relying on its ability to foster change in work cultures and to solve complex, multidisciplinary problems. Yet, despite highlighting the platform's potential for serving as a stepping stone for testing various kinds of new ideas, concepts and methods, the collaboration was still focused on rather conventional and simple forms of student assignments or on well-trodden networks of expertise.

Altogether, the concept of value co-creation seemed to be rather narrowly understood. As stated in one of the interviews, too much focus was given to easily measurable projects with short-term benefits. For example, in some cases, the interviewees were genuinely wondering how they could benefit from the value networks and new innovation practices in their own organisations. In overall, with many overlapping, simultaneous development processes going on at the platform, the vision of the platform objectives and benefits was seen as unarticulated. Either way, the interviewees' perceptions about value co-creation varied largely depending on their degree of activity in the ecosystem. According to most of the interviewees, more attention should be given to processes where something new is being created and experimented. In this context, the role of professionally and socially experienced facilitators was emphasised— and requested—in every other interview.

Layer 3: Co-elevation of the worldviews and values with (hidden) impacts on attitudes and behaviour
The more experienced the interviewees were at managing innovation hubs or the more they had been involved in co-creation in multidisciplinary settings according to their own descriptions of experience, the more they were sensible to predicting whether this service ecosystem would succeed in its objectives or not. That is, *the expectations and levels of satisfaction regarding the value co-creating activities were rather different depending on their level of understanding the concept of value co-creation.* For some of the interviewees, the Kampusareena platform represented a showroom for their already existing networks. To others, the noble objective of Kampusareena to become a world-class pioneer in university-industry collaboration and in applying the latest scientific knowledge in practice was considered as an accelerator to improve the understanding and practices of co-creation within their own organisations.

As some of the interviewees did point out, the investments on the value co-creating infrastructure had been

huge. However, whether it had been worth it or not, was not so much up to the facilities provided by Kampusareena, but to the worldviews and values that direct the development of the value co-creation practices. Patience and long-term engagement is thus needed from all the actors participating in the service ecosystem. As we can though see from the results of layer 3 (see Table 5), when reflecting on the interviewees' worldviews and values in relation with their attitudes and behaviours towards the value co-creating practices, old habits stick hard and strong strategic guidance is needed to change them. More platform-specific facilitation and marketing are needed to support the service ecosystem development in more concrete ways. As the interviewees expressed, establishing new ways for working will not happen without facilitation and engagement. As such, the interviewees clearly indicated that more dialogue was needed to create a shared understanding of both the desired outcomes and the means through which those objectives could be obtained.

On the basis of the interviews, the biggest challenge at layer 3 was the missing interface between the two owners of the platform. The roles and responsibilities of these two main actors were more or less unclear for the interviewees, resulting in conflicting and confusing views about the objectives and means through which the platform activities should be developed. That includes the challenge of double-management, referred to as management by 'walking in two pairs of shoes'. As such, it strongly referred to the lack of shared strategic insight into what Kampusareena actually could and should represent to the university and its various stakeholders in the long run.

Layer 4: Co-developing the underlying mind sets and concepts directing the service ecosystem development
In order to identify the current mind sets and concepts as well as their impacts on how to direct the service ecosystem development in the long run, the results of layer 4 were largely mirrored against the results of the previous layers. In doing so, the data was interpreted according to the interviewees' levels of understanding and practicing (a) the ideas and concepts of systems dynamics and (b) the willingness for learning and renewal (see Table 6). That is, it was important to keep in mind that the autopoietic nature of service ecosystems refers to *a learning process, where balance and continuity between the four phases of value co-creation (co-experience, co-definition, co-elevation, co-development) is needed to genuinely build up a shared narrative for value co-creation.*

In this study, the level of strategic visioning and planning did vary highly among the interviewees. As highlighted throughout the interviews, the self-organising and self-adjusting nature of value co-creation always comes back to people and the ways how the different structures and functionalities of the platform support the change. Still,

Table 6 Results, Layer 4

Co-developing the underlying mind sets and concepts directing the service ecosystem development

Systems dynamics

'It's not all about money. An intensive community is more important.' (I-9)

'The particular aim in here is to enhance different forms of cross- and transdisciplinary collaboration; to create systems dynamics from a societal perspective.' (I-4)

'I have only been there to meet my existing partners and stakeholders.' (I-3)

Renewal

'What is needed there is the unique concept of co-creation, something that does not exist in many places.' (I-8)

'Before anything, we want to work here as a team regardless of organisational boundaries.' (I-4)

'This is a learning process. The platform should be flexible but durable. Co-creation – that creates the change.' (I-7)

'We are aiming for changes in the organisational culture.' (I-1)

'Literally, there is no such thing as an open environment – not as long as we talk about money in this world.' (I-3)

Power of mind sets

'The platform builds on people and their random encounters, together with the modes of operations, and the environment.' (I-5)

'There is nothing more important than motivation – motivation to work hard and to adopt to changing conditions.' (I-1)

'In the end, it all depends on people.' (I-19)

although skilled and motivated to adopt the more systemic, S-D logical view on value co-creation, less than half of the interviewees proved to have no consistency in their responses. Although the found metaphors showed a very positive stand towards value co-creation, when examining the entire data in relation to all responses by individual interviewees, the non-systemic and suspicious attitudes towards collaboration and change were also present. For example, there were several individuals who expressed scepticism and conflicts related to value co-creation at layers 1 and 2 (see Tables 3 and 4) and did not provide any valuable data to be analysed at layers 3 and 4. For them, value co-creation simply presented a new method to share and transfer knowledge.

Conclusions

Even if more attention is paid to both the individual's and the organisation's abilities to adapt to continuous change [36], many companies still lack behind on strategies that embrace the importance of understanding the socially constructed narratives that direct the complex multi-actor networks. At the same time, the notions and concepts related to value co-creation are also evolving, with significant impacts on how we perceive and respond to collaboration [33]. More holistic and in-depth

understanding is needed about the formation and development of complex value networks.

In this study, the aim was to identify and analyse the explicit and symbolic (inter)relationships between the different actors involved in the value co-creation processes—and to understand their impacts on the network-specific innovation capabilities. In overall, the interviewees' responses included many positive attributes connected with value co-creation, such as interesting, modern, pioneering and experimental. However, the actual level of the value co-creation practices still remained rather non-existent, and the interviewees' perceptions and understanding of value co-creation varied significantly. On the basis of the layer-specific results (see Tables 3 to 6), *two co-existing and consistent narratives were found to explain the level of the value co-creation potential in the studied service ecosystem.*

Two alternative futures

As we can see in Fig. 1, the first narrative 'breaks barriers' in terms of representing an open system with a strong focus on disruption through the diversity of actors involved in it. That is, it describes co-creation as a process where active participation in the discussions and events results in increased levels of value propositions and value exchange, thus referring to the autopoeitic nature [72] of the service ecosystem. With a holistic view on innovativeness, the first narrative is built on the ideas of resilience [73] and continuous renewal [74]. The second narrative then describes the view on a 'control driven' closed system, with a focus on predefined partnerships and outcomes. The value propositions in that service ecosystem are more related to the controllable forms of substance-related networks and measurable outcomes than in the disruptive learning process. So, in this second narrative, value co-creation refers to something where individuals, teams or organisations with rather similar interests and expertise join together for mutual benefit, actualised through knowledge share and transfer.

Although the found narratives do not necessarily mirror the course of all individual interviews, this twofolded nature of the results is significantly supported by the layer-specific results. Indeed, the mind sets in these two narratives are very different. In S-D logic terms, the first narrative focuses on co-creation as a method and a process, whereas the second narrative is more interested in the outcomes. As such, the second narrative could be seen as a representation of the Goods-Dominant (G-D) logic view on things, thus referring to some of the interviewees' clearly mechanical perceptions of value as something separate from the value co-creation process. In doing so, value co-creation is only viewed as the method and means through which the execution of relatively fixed plans will be efficiently carried out, either through resource exchange within the already

Fig. 1 Competing narratives
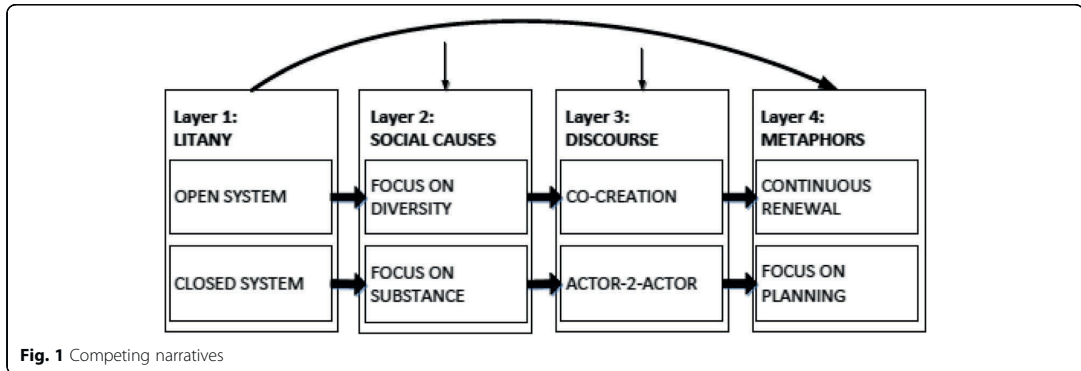
existing networks or through the integration of new resources by introducing new partnerships.

Managerial implications

The co-existence of the two narratives certainly reflects the initial phase of the studied service ecosystem. However, in order to avoid the further differentiation of the apparently divergent worldviews, more purposeful orchestration of the value networks is needed to incorporate these two narratives into a shared understanding of the service ecosystem's future directions. In fact, regardless the contextually changing nature and qualities of the self-adjusting service ecosystems, the following advice would most likely be useful for any service ecosystem under construction:

First, in order to foster the network-specific innovation capabilities, the ecosystem actors need to become engaged in co-experiencing and co-defining the service ecosystem. It is highly important that the ecosystem provides its members structures and functions that enhance casual meetings and interactions without a predefined agenda. Moreover, it is important to support any activities that bring together interest groups that would not easily come together otherwise—in this case, students, researchers and company representatives. It supports open communication and results in an increased level of willingness to share ideas and concepts among the ecosystem actors [75].

Second, open communication plays a crucial role in co-elevating stimulating innovation. Therefore, the different visions and expectations considering the service ecosystem development should be thoroughly discussed (a) in an open environment where all the ecosystem actors are encouraged to take part and (b) in a way that helps the ecosystem actors to co-elevate their conflicting ideas and perceptions, and to integrate them with shared concepts and rules of conduct. Once all the visions, institutional rules and guidelines are openly and continuously shared, disrupted and coordinated, the benefits of the service ecosystem are more likely to emerge [75]. In

other words, this study encourages managers to become active in ensuring that a common understanding of the visions and rules of the ecosystem are being developed. This requires supporting the institutional rules and guidelines. In this case study, the potential of interdisciplinary collaboration had not been fully realised, and many of the ecosystem actors had continued to follow their former routines and continued to work with their trusted partners from previous projects.

Third, whenever human networks are involved, it requires investments in facilitation. Although the service ecosystems view highlights the self-organising and self-adjusting nature of the networks, it still makes sense to allocate resources for the facilitation services. Trust and commitment develop slowly, yet they relate significantly to the functional abilities of the networks [75]. Instead, the question is more about understanding how to adopt the process of value co-creation in novel working environments. As indicated by the results of this case study, when the ecosystem actors had accessed to facilitation services, they were significantly more satisfied with the service ecosystem's functions in overall.

Evaluation of the study

Since the empirical data was collected only a year after the launch of the service ecosystem under evaluation, estimating its future success was neither the aim nor the result of this study. In addition, given the limited number of interviews in this study, it can be argued that the results are merely directional and might be partially intensified by many of the interviewees' pronounced expertise in innovation management. In addition, the high level of ambiguity in analysing the interviews, and the use of CLA proved to be somewhat susceptible for alternative interpretations. Yet, the intensified discussions enabled by the in-depth interviews and the fact that using CLA took the analysis to a completely new level compared to discourse analysis, most conventionally used for analysing the role of knowledge sharing and

creation in qualitative research, approved to be especially useful in mapping the various dimensions of both the past and the present mind sets, attitudes and impressions towards value co-creation. In doing so, it was well in line with the S-D logical, i.e. the systemic approach of this study, and enabled creating an exceptionally in-depth view on the current state and future prospects of the novel service ecosystem.

Given the growing interest on understanding the explicit and symbolic relationships and interrelations between the different value co-creating actors in the increasingly complex service systems, the results of this study offer significant new knowledge and understanding for all those interested in the service ecosystem development. In addition, it is highly recommended to further elaborate this unique combination where CLA is used to explore value co-creation in a real-life service ecosystem. Considering that there are many companies still lacking behind on strategies that embrace foresight and futures literacy [44], more attention should be paid to both the individual's and the organisation's abilities to adapt to continuous change [36].

Author's contributions
The author read and approved the final manuscript.

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