Seppo Kuula

CONTINUOUS CO-CREATION OF KNOWLEDGE-INTENSIVE BUSINESS SERVICES
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Abstract

The internet is connecting suppliers, customers, and other stakeholders together as ecosystems for sharing and integrating resources in value creation. In this transformation customers have shifted from passive sales targets to active players in the ecosystems, and all the actors in the ecosystem are equally seen as resource integrators. This phenomenon is often called digitalization. Digitalization is service centric, which is further accelerating the transition towards service economy and service-dominant logic (SDL). Based on SDL value is co-created with the customer. This is changing the value stream beginning from the customer, and therefore the whole business logic from push to pull. In SDL also all actors are seen as equal resource integrators, so supplier organization has to align its value-creating resources with the customer’s and other resource integrators’ resources. The prerequisites for success in this transformation are continuous value co-creation, iterative market testing, and an agile and lean response to opportunities.

The content of this dissertation has been produced and tested in a real business environment as an action-design research, answering the question: How does a knowledge-intensive business service provider maintain its relevance in constantly changing market conditions? This study demonstrates that agile responsiveness to the transforming market requires SDL, co-creational business model development, lean operations with a modular solution structure, and the continuous review of value creation (design thinking).

The study provides four kinds of new knowledge. Firstly, it clarifies the practicality of the SDL approach in professional services, explaining the organizational encountering requests. Secondly, the study provides a framework for continuous business model transformation in the constantly changing market environment. Thirdly, the study modularizes a solution to a co-creational commercial service portfolio and repetitive technical structures in seeking delivery efficiency. Lastly, the study demonstrates how design thinking can be used to connect service portfolio management to the customers’ business needs, maintaining the co-creational and iterative value creation.

Keywords: action-design research, business model, co-creation, design thinking, lean thinking, service-dominant logic
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Tiivistelmä

Internet yhdistää toimittajat ja asiakkaat yhteen arvontuottoon integroituneissa ekosysteemiissä, muuttaen asiakkaat passiivisista myynnin kohteista aktiiviksi toimijoiksi. Tämä edellyttää tuoteorientoituineen liiketoimintalogiikan muuttamista imuohjattuun jatkuvan yhteiskehittämiseen ja sitä vastaavan palvelutuotannon optimoimiseen. Menestyksen kannalta avainasemassa on yritysten kyky jatkuvan asiakasarvon luomiseen ja palveluiden kehittämiseen, markkinaa kokeillessa ja muutokseen vastaten.

Tämä tutkimus osoittaa, että kyky vastata digiajan ajamaan jatkuvan muutoksen edellyttää palvelutuotanto- ja palveluorientoituunuttta (service-dominant logic) ja iteratiivista (LEAN) toimintamallia, jossa arvo tuotetaan yhdessä asiakkaan kanssa, arvovirta ohjataan asiakkaan suunnasta vetäen ja liiketoimintamallin elementtejä jatkuvasti testaten, ja missä ekosysteemin kaikki toimijat ovat tasa-arvoisia resurssi-integraattoreita. Jatkuvan kehittämisen ohjauksessa hyödynnetään luovan työn keinoja muotoiluajattelun (design thinking) kautta. Muotoiluajattelun tehtävä on tuoda kehitysprosessiin laajaa ja jatkuvaa ymmärrystä asiakastarpeista ja tavoitteiden toteutumisesta koko ekosysteemin toiminnan optimoimiseksi.

Jotta arvontuotto olisi tehokasta, on toistuvat palvelunosat kyettävät tuotteistamaan. Koska tarjoamaa ei yhteiskehittämisessä voi tuotteistaa, on palvelun rakennetta katsottava erikseen kaupallisesta- ja teknisestä näkökulmasta (portfoliosta). Kaupallinen portfolio määritetään yhdessä asiakkaiden kanssa, ja teknisen portfolio jatkuva muokkaus tapahtuu imuohjattu, missä toistuvat palvelunosat toimivat tuotantovirrassa komponentteina modulaarisessa ratkaisurakenteessa.

Väitöskirjan sisältö on tuotettu ja testattu pääosin toimintatutkimuksena (action-design research), vastaten kysymyksen "Miten palveluhyöten on kehitettävä toimintaansa kytketään jatkuvan uudistumiseen digitaalisen ajan markkinamuutoksessa". Väitöskirja tuo neljä uutta näkökulmaa palveluiden kehittämiseen; SDL – konseptin kirkastamisen käytännön esimerkkejä, liiketoimintamallin kehityskehikon, toimintatutkimus ja muotoiluajattelun yhdistämisen yhteisten liiketoimintamahdollisuuksien määrittelyyn.

Asiasanat: lean, liiketoimintamalli, muotoiluajattelu, palveluorientoituunut markkinointilogiikka, toimintatutkimus, yhteiskehittäminen
Acknowledgements

Every traveller starting a journey must decide where he or she is going and which route to take. This journey started in 2011 when I started seeking a theoretical foundation for transforming a resource-oriented knowledge-intensive service provider in order that it would provide more value to its customers in the constantly changing market of digital services. As a big believer in lifelong learning and the sustainability of theoretically justified outcomes, I approached Aalto University within this problem. My previous studies had explored value-based marketing and productization, but discussion with professors directed me towards service-dominant marketing and business logic. It was a life-changing moment. I understood that all the work I had done on productizing services was outdated and that from here on, business development is, and will be, co-creational.

I established an action design research project to connect the real-world problem and theory together by transforming my employer’s business (Siili Solutions PLC, hereafter, Siili) so that it was prepared for the digital age, where value is co-created, business development is dynamic, and efficiency is driven by putting products into services. I formalized my doctoral research as a part of that process and at Oulu University, soon the home of two out of three of my degrees, I began to explore value co-creation in agile project development, seeking support for the study. I aligned my doctoral research with that project and applied for research support from the Department of Industrial Engineering and Management, particularly from professor Harri Haapasalo who had supported my earlier studies. We created a route from co-creative value proposition to encountering practices—a business model transformation into efficient service production—by using a modular service structure and, finally, wrapped up the journey with lean-inspired design thinking. I always will be grateful to Harri who not only supported the study but also inspired me to explore paths I did not know existed and encouraged me when I was lost.

This journey was both enabled by and about my ex-employer, Siili, and its ecosystem. I want to thank management team, board, and all the employees of Siili—it was a great journey. During both my time as a CEO of Siili and the time of this study, we developed its revenue ten-fold, its profit 20-fold, and its enterprise value 30-fold. The tight connection to theoretical groundwork brought interesting factors to the business development, for example agile steering which enabled a continuous steady 10% EBITDA over a seven-year journey.

I have been privileged to be able to work with so many smart and experienced people during this study, for example, the people in the Agile Project Development
(APD) project group, Erkka Niemi, and Arto Tolonen, to name just a few. This study has played a significant role in my life for years and also guided my professional development, giving me perspective to problem solving.

Of course, I also want to thank my wife and kids, who have always supported me in processing this study, even if it has played a significant role in the use of my spare time due to the demanding work. I also want to thank my existing employer, Enfo, for supporting the journey until this day, when these final words are written at last and I come to the end of this journey. The end of a journey is usually the start of the new one, and I am certain I will not only use this theoretical background in navigation but will also bravely go onto unexplored paths as well, requiring further studies.

– Espoo 26.1.2020, Seppo Kuula
Abbreviations

ADR       action-design research
Agile     agile development is a set of principles in which requirements and solutions evolve through collaboration between self-organizing, cross-functional teams
APD       Agile Project Development – project, executed in co-operation of Oulu University and University of Lapland
BIE       building, intervention, evaluation (in ADR)
CMS       competence management systems
DT        design thinking
FP        foundational premise (of SDL)
GDL       goods-dominant (marketing) logic
GDP       gross domestic product, the monetary value of all finished goods and services made within a country during a specific period
HRM       human resource management
IPR       intellectual property rights
IT        information technology
KIBS      knowledge-intensive business services
MVP       minimum viable product
NPD       new product development
PSS       product-service system
SDL       service-dominant logic (according to SDL, a service is the fundamental basis of exchange and all economies are service economies)
UX        user experience
7P        People, Product, Price, Promotion, Place, Process and Physical Evidence all make up the marketing mix.
List of original publications

This thesis is based on the following publications, which are referred to in the text by their Roman numerals:


Article I was published for a peer-reviewed scientific conference. Article II was published as a chapter in a peer-reviewed scientific monograph. Articles III and IV have been published in very high-quality journals. All the articles have undergone a double-blind review process. The author of this dissertation is the primary author in all the original publications. The researcher has been responsible for formulating the research problems, collecting the relevant literature, formulating the research questions, coordinating the collection of empirical material, analyzing the material, drawing conclusions, and finally, he was the primary author in all four articles. The role of the co-authors included reviewing and commenting on the article manuscripts of the first author.
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1 Introduction

Digitalization has changed the world in several ways, and the change is fueling itself at an accelerating pace. The internet and artificially assisted information management are connecting suppliers, customers, and other stakeholders together as ecosystems, breaking the industrialization-driven separation of marketing and management logics (Greer, Lusch, & Vargo, 2016). Every company is going through digital transformation; the developed technology and its usability change customer expectations and business processes, thus they constantly alter the business environment (Plattner, Meinel, & Leifer, 2011). This transformation is leading to service revelation, based on a perspective that service is seen as the use of one’s knowledge and skill to benefit other actors (Vargo & Lusch 2004). So, the digital transformation can be seen as a continuous adaptation to the constantly changing environment. To rephrase Megginson’s (1963) interpretation of Darwin, it can be said that it is neither the strongest nor the most intelligent company that survives—it is the company that is the most responsive to change.

The service sector has already dominated the output of developed economies for 20 years, accounting for over 75% of output in the most developed countries like the US, the UK, and France. Digitalization is further feeding globalization and service-oriented business development. In advanced industrial economies, the foundation is transitioning from consisting of physical inputs to consisting of intellectual assets (Powell & Snellman, 2004), and data is said to be the main source of value. According to an IBM-originated proposition (2013), in this decade 90% of the digital data in the world was created during the past two years. Alongside other effects, it has already significantly affected the purchase behavior of consumers and companies. Approximately 70% of purchase decisions are made before the selling organization is even aware of the process since the suppliers are shortlisted online before the purchase decisions and the flows of digital information are democratizing and consumerizing business procurement (Lingqvist, Plotkin, & Stanley, 2015). Therefore, the company’s opportunity to influence a purchase decision with a value proposition has changed.

Digitalization is not a phenomenon that merely occurs around us—it is an act of doing, responding to the constantly altering business environment and related opportunities. The word digitalization is mainly associated with technology but in principle it is more about how technology changes customer behavior and therefore business processes. A dynamic approach to creating human-centric services that are based on sensed real-world data is essential in the digital era (Kuula & Niemi, 2016).
So, from a company perspective, digital transformation is better seen as the continuous adaptation to the constantly changing opportunities in the marketplace. There is no longer time for a rigid strategy that is prepared for the next five years—the business model also needs to be dynamic. Therefore, digitalization is transforming strategy, organization, and leadership, which includes all business logic.

This dissertation defines a case company’s (Siili Solutions PLC’s, hereafter, Siili) business development journey over six years as an action-design research (ADR) project, generating a cross-case analysis for proving the described concepts. In addition of that, we used some other companies, partners, and customers to generate the multi-case studies with the credible outcomes. A constructive approach was used not only with original, real-world business development-oriented research questions but also in the whole dissertation as the questions were logically connected together as the business development journey of the studied company.

The goal of this study was to find a solid foundation and theoretical framework for transforming a resource-based IT-consultancy practice into a customer-oriented knowledge-intensive business service (KIBS) provider. Obviously, the case company continued generating revenue mainly from IT-related services, but the value proposition was clearly changing from the relieving IT-services to the enabling business services. In the broader perspective digitalization highlight a broad, knowledge-based view on technology and new ways of human-technology interaction (Wieland, Hartmann, & Vargo, 2017), and therefore we did want to highlight the knowledge-intensive nature of services over IT – related services.

The development was aimed to be agile and iterative with the outcome repeatable and sustainable. The development began with the business logic (why?) and continued onto the business model (when?), delivery efficiency (how?), and service design (what?).

1.1 Background

Over the decades marketing scholars and service researchers have actively sought to find differences between product and service marketing (Grönroos, 1990; Shostack, 1977), creating bridges from marketing-mix thinking to relationship marketing (Grönroos, 1996), using frameworks like solution marketing (Leff Bonney & Williams, 2009) and service logic (Grönroos & Ravald, 2011) to define the differences in perspective. Simultaneously the majority of Western countries’ gross domestic product (GDP) has been formed by services. In this millennium, digitalization is further supporting movement towards service-oriented marketing logic. At
the same time, more and more corporations are transforming their offerings into customer-focused solutions through services. This movement is called the *servitization of business* (Vandermerwe & Rada, 1988), and its scope reaches over the traditional marketing approach onto using organization-wide logic to think and do business (Grönroos & Gummerus, 2014).

A service is a value-creative process (Lovelock & Gummesson, 2004), and in this research, a service shall be seen as a perspective on value creation, not only as a part of an offering (Edvardsson, Skålén, & Tronvoll, 2012). Value creation itself is difficult to unambiguously define by its nature, even if it is used as a baseline for many world-changing frameworks. The co-creational approach to value creation led the study towards lean thinking. In value co-creation the supplier’s processes can be seen as a value stream where core competences are the pull-driven value particles, further bridging service-dominant logic (SDL) to lean thinking (Kuula & Niemi, 2016). Lean thinking is described as a value-creating process that is capable (value), available (value streams), adequate (perfection), flexible (agile), and pulled (co-creational) (Womack & Jones, 1996). In service marketing the customer is always seen to be in the middle of the value creation process (Sheth, Sisodia, & Sharma, 2000), and value emerges from the reciprocal interaction process between customers and suppliers (Payne, Storbacka, & Frow, 2008) that is embedded in the delivery stream as processes and competencies (Prahalad & Hamel, 1990). The most significant difference between industrialization-driven product marketing and digitalization-driven service marketing can be seen in the definition of value (co-)creation, and the exchange (integration) of resources (Vargo & Lusch, 2004).

In the digital age the perspective on marketing and business is not only dominated by service but based on service (Grönroos & Ravald, 2011). This transformation in the mental model and dominance in business logic (Prahalad & Bettis, 1986) is approached from various angles in research. Because of the research problem’s customer-oriented, engineering nature, we found the business and socially aggregate approach of SDL (Vargo & Lusch, 2004, 2008) to be a sound foundation for an agile, pull-driven business development of a KIBS. Vargo and Lusch (2004) introduced value co-creation rooted (SDL) through ten original foundational premises (FPs). They saw a service as the application of operant resource exchange (e.g., competencies, knowledge, and skills) that benefits both parties (co-creation). Within this logic, products are just a distribution mechanism for the service provision, the same thinking was supported also in solution business models (Storbacka, 2011).
The original FPs of SDL (Vargo & Lusch, 2004) were later further expanded (Vargo & Lusch, 2008) and finally translated into core axioms (Vargo & Lusch, 2014). The first axiom of SDL is that service is the fundamental basis of exchange, being the application of resources (primarily knowledge, competence, processes) for the benefit of the customer (the beneficiary). The second axiom is that the customer is always a co-creator of value, and the third is the claim that all actors are resource integrators. The fourth axiom defines value as experiential, and therefore always determined by the customer (Greer et al., 2016). SDL also suggests that competitive advantages are created by the experiences that the customer has over time. Industrialization created efficiency in scale whereas digitalization requires customer-oriented and value co-creational service development, organization-wide encountering, and lean service production (Article I).

In the case of Article I, we studied the relationship development of a focal company and its two customer companies. The first one was a leading finance corporation in the Finnish financial sector, employing several thousand employees around of the country. It is over 100 years old and has been able to renew itself many times. This corporation is well aware of the ongoing digital revolution in its business sector and has done continuous development for safeguarding its ongoing business and gaining its share of the new digitized financial services. Another one was one of the most respected wealth management and insurance services providers in Finland, having hundreds of thousands private customers, and tens of thousands corporate customers.

The framework for understanding a business as a system is the business model (Magretta, 2002). Hamel (2002) described the business model as a business concept that has been put into practice. Digitalization is returning the customer to the center of business modeling, reversing traditional thinking about mass production. The relevant business model–related question in all the business sectors is: How is the company influenced by and responding to digitality? (Chesbrough, 2007). Drucker (1994) saw already 25 years ago, that the theory of a business has to be tested constantly as it is only a hypothesis about things that are in constant change (markets, customers, technology). Now continuous testing is more important than ever as digitalization is driving technology development fast and the third wave of industrialization is reforming markets towards service-dominant change. Constant monitoring requires a framework for analyzing the need and scope of the required changes in the business model. Also, the logic of innovations needs to be understood in order to comprehend the dimensions of the required changes (Govindarajan & Trimble, 2010). Christensen (2010) also defined a type of technological shift
that he called *disruptive technology*, a shift that changes the basis of competition in an industry that is constantly monitored. After understanding the co-creational service development and delivery model of SDL, we focused on understanding the continuous development of the business model (Article II).

In the Article II, the main case company was a health care provider Heltti, although the business development was equally done in the focal case company Siili as well. Heltti was founded in 2013 by entrepreneurs outside the industry in order to challenge the traditional disease-treatment-oriented occupational health care model with a preventive one. Digital collaboration tools and a customer-care-oriented pricing model were an essential part of the business idea from the very beginning. Heltti offers three different service platforms, which may be supplemented with various additional services and welfare projects. Heltti’s service platform is designed to facilitate the co-creative service process.

The definitions of a *knowledge-intensive business service (KIBS)* extend its roots to Drucker (1967); he foresaw the developed economy relying more on intellectual capabilities and knowledge-based professional services rather than on physical activities or natural resources. KIBSs are professional resource-based solutions by nature. Within professional services, the same resources, activities, and processes drive both costs and revenues—and therefore profits. This makes professional service consultancy local and not scalable in nature. How to overcome or “blend” this challenge was the third research question after the business logic and business model were defined for continuous development. The case of Article III was done between 2014–2016, in the study we presented the results of two ADR cycles. In the first cycle we seek sustainable ground for the solution delivery, and in the second cycle we improved the delivery efficiency with the modularized service components.

Storbacka and Pennanen (2014) defined *solutions* as processes that comprise identified value creation opportunities, and by that definition co-created solutions shall be built modularly (Sawhney, 2016). Customizing products by using a modular production platform is an established way of serving a heterogeneous market efficiently (Baldwin & Clark, 2000). The commercialization of solutions is a conversion of the offering where the focus is on a company’s ability to understand the value-creation process of its customers and where commercial effectiveness is measured as the provided value in the customers’ eyes (Edvardsson et al., 2012). Efficiency is addressed to the internal processes and possible productization wherein the product is a repeatable task and is embedded as an element into a service (Sawhney, 2016). Based on SDL, in the commercialization of the co-creative
process, services are not added to products, but a product can be embedded in services, and embedded products are seen as vehicles for service delivery (Vargo & Lusch, 2014). In other words, co-creation requires simultaneously pull-driven, unstructured commercialization and a structured service process based on the developed solution platform. This dilemma was explored in our third paper (Article III) in order to further develop the efficiency of the service production.

Many business ventures fail, not because they fail to build what they set out to build but because they waste time, money, and effort building the wrong solution (Ries, 2011). After developing co-creational business logic, agile business model development, and an efficient service delivery platform, we focused on the problem space, ensuring the right problem was solved, and the right opportunity addressed. Design thinking (DT) is a widely accepted human-centric management practice that gives an advantage to design tools in business development (Brown, 2008). With its iterative testing nature, DT is related to the lean startup approach and its co-creational nature bridges it to SDL. The digital revolution is turning offering development outside in with value co-creation (Vargo & Lusch, 2004), and the most successful organizations move iteratively through a set of planned probing stages, moving from the establishment of objectives, through idea generation, concept development, service design, prototyping, service launch, and on to customer feedback (Bitner, Ostrom, & Morgan, 2008). Empathy, integrated thinking, and cross-organizational value creation, together with experimental and iterative learning process, are the key elements of DT (Plattner et al., 2011).

In our fourth article (Article IV) we explored service design in an SDL framework. We tested the developed approach through the deliveries to three customer companies of the focal case company. The first case company was, on a global scale, one of the leading pharmaceutical companies. The service innovation work focused on one of their specialty areas in the Finnish market. The second case was focused on the collaboration with an undisclosed insurance company on redefining a few of their key products and the ways in which they were bought and consumed. In the third case we partnered with an undisclosed manufacturing company that needed to find ways to span their business from a product-dominant business to a services business. It is good to recognize, that in this phase of the focal company Siili’s development some of these deliveries did not lead to IT-related solutions, but to the best co-created outcome to the exact customer needs.
1.2 Objectives and scope

Digitalization and the increasing size of the service sector in all developed economies around the world are amplifying demand for more service-oriented marketing logic. Service marketing is a relatively new phenomenon with a history beginning in the eighties when McCarthy’s traditional product marketing mix (McCarthy & Brogowicz, 1981) was revised for service offering (Zeithaml & Bitner, 1996). Service and services are two different things. Services have been subjected to industrialization thinking whereas service is changing the approach not only to making an offering but also to the whole business logic. The world is changing around of us and the internet is accelerating the change, and within this study, we have been trying to respond to the behavior-driven change that is supported by technology, and services have been subjected to industrialization thinking with a business-logical simplification and theoretical foundation. SDL has been created (Vargo & Lusch, 2004), but its practical implications are still missing, or at least they are not documented. Most of the studies around this topic are conceptual research papers that are waiting for feasibility testing.

The main objective of this study is to present a model for the co-creational business development of a KIBS. The model is created as a sum of multiple constructive ADR processes, and each of the results and the integrated outcome were tested in a real business environment. This constructive ADR was generated for two purposes: specifically, for modernizing the traditional resource oriented KIBS approach; and generally, for finding the solid theoretical foundation to support the required transformation of professional service providers for the co-creational digital age. Regarding the aforementioned background, the integral research problem of this dissertation is formulated as: How does a KIBS provider maintain its relevance in constantly changing market conditions?

In this study the research problem has been approached from four complementary perspectives that make up the content of this dissertation. In the literature review (Chapter 2), we present the major theories studied, and in Chapter 3, we define the practical approaches. Table 1 presents the research questions of the original articles.
Table 1. The research questions of this dissertation.

<table>
<thead>
<tr>
<th>RQ#</th>
<th>Research Question</th>
</tr>
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<tbody>
<tr>
<td>RQ1</td>
<td>How can SDL be systematically utilized in business development and encountering with a KIBS?</td>
</tr>
<tr>
<td>RQ2</td>
<td>What are the dynamics and the framework that enable iterative and co-creative continuous business model development?</td>
</tr>
<tr>
<td>RQ3</td>
<td>How can resources in cost-efficient service production be linked to the modular co-creation of a KIBS?</td>
</tr>
<tr>
<td>RQ4</td>
<td>How can the co-creational service design approach for cross-functional KIBS development be defined?</td>
</tr>
</tbody>
</table>

Each question is formulated to answer a specific business development–related question, and the answers are approached from the SDL perspective. Theories are explored in seeking the foundation to solutions, and literature is reviewed around the questions. All the studies are constructively built. The questions have required various interventions and development cycles, and theoretical foundations are strengthened when empirical validation is built.

A constructive study is useful when the researcher is trying to obtain an understanding of a practically relevant problem (Hyötyläinen, 2010). During the research process, we strengthened the theoretical foundation based on the validated results of interventions. The selected approaches were proved to work in the real-world business environment. The study was iterative by nature. Some of the studied approaches were proved to be unfit and fell out of the scope of the study.

The study sought theoretical justification, demonstrating the phases of solution creation and finally demonstrating the proven solution. The solution was developed in the ADR process, and the validation was performed through real-life case studies. Figure 1 clarifies the relation of the original articles to the research questions in the context of this dissertation. The four original studies are interlinked and contribute to the research objective of this study.
Fig. 1. The relationship of individual articles in the context of this study.

The research followed the case company’s (Siili’s) business development phases. First, we founded and tested the SDL as the foundation for transformation. Then we explored the definition of business model, establishing the required agility in it. After that we focused on the efficiency of service production, and after reaching a solid state in competence and solution management, we found a way to ensure the continuous focus on solving the right-problem. The journey was long, and also some missteps were taken, but within the direct connection to real-life business development, we were able to maintain the ongoing development until the expected results were reached. All the questions in Table 1 are related to Siili’s business development journey over six years, and therefore, the relevant connection between the theories and theory-based artifacts, including the tested frameworks, was proven in a real-world environment. Systematization was also an essential part of the framework creation as all of the questions were transformational by nature, answering to the needs in a dynamic marketplace.

The study was logical by nature, and its constructive nature was extended through the whole dissertation. The first original paper (Article I) created the foundation for the iterative business development, building the baseline for
encountering and for a customer-centric response to customers’ dynamic needs. Af-
ter that we explored the business model as a competitive offering, and dynamic
organization was clearly not enough for sustainable and scalable business develop-
ment. When business development found a solid state, we addressed the efficiency
challenge with a modular service structure, emphasizing repeatability in service
production while maintaining the co-creational commercial structure. Finally, we
questioned the problem space, seeking a systematical approach to the service and
business design of the created solutions.

1.3 The research process and environment

This dissertation has a pragmatic approach (Gallupe, 2007), and the original articles
(I–IV) are constructed alongside the longitudinal interpretive case studies (Klein &
Myers, 1999; Walsham, 2006) in order to provide in-depth knowledge about the
systematization of the co-creational and continuous business development of
knowledge-intensive services. The dynamic nature of the original problem, to-
gether with novel phenomena in practice, required a pragmatic approach. Pragma-
tists often conduct research using mixed methods, which gives the researcher prac-
tical flexibility (Johnson & Onwuegbuzie, 2004). Qualitative research aims at
generating in-depth knowledge of the phenomena under investigation and is
thereby a particularly suitable approach for exploratory work on topics that are new
and for which there is not much previous scientific knowledge (Myers, 2009).

The research was conducted between 2011 and 2017, mainly as ADR (Sein et
al., 2011). The nature of ADR is exploratory—the phenomenon is first defined as
an inductive response to solving managerial problems and then constructively de-
veloped based on the corresponding theories (Holmström et al., 2009). Hevner et
al. (2004) explained design science research by describing it as having two cycles
in which the solution in the real context is created and existing scientific knowledge
is used to solve the practical problem and contribute to improving the knowledge
base. These cycles can be iterative, as was the approach in this study.

ADR (Sein et al., 2011) is a research method for generating design knowledge
through building and evaluating artifacts in an organizational setting. ADR is based
on four stages, with numerous iterative loops of interactive constructive research.
The first stage is problem formulation, which identifies a research opportunity
based on existing theories and a real-world problem. The second stage—building,
intervention, evaluation (BIE)—is carried out as an iterative process in the target
environment. It includes the building of the artifact, intervention in the organization,
and evaluation. The third stage, reflection and learning, moves from building a solution to a particular problem onto applying the gained learning to a broader class of problems. The fourth stage aims at formalizing the learning from the study. This ADR is conducted in a case organization and, therefore, utilizes some principles of case study research as well.

All the researched companies are connected with a professional service provider, Siili Solutions Oyj, its ecosystem, and business development and were carried out between 2011 and 2017. The empirical case studies are presented in Table 2, and the organizations are introduced in backgrounds (1.1). Each of the sub-methodologies and cases are described in more detail in the related paper. The cases are mainly introduced anonymously, without any detailed customer-specific information, in order to maintain the confidential relationship between the customer and the supplier. The author has been an “involved researcher” in this research as the CEO of the company, but all the research articles have also had external practitioners to confirm the objectivity and sound theoretical connection (Walsham, 2006).

Table 2. The main theories, empirical cases, validations, and outcomes of the original studies.

<table>
<thead>
<tr>
<th>Orig. study</th>
<th>Literature review</th>
<th>The theoretical construct</th>
<th>Cycles of empirical analysis / validation</th>
<th>The main result</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>SDL, lean thinking, and value co-creation.</td>
<td>A lean SDL encountering framework to systematizing pull-driven B-to-B service development.</td>
<td>Siili’s service development, and 2 cases with 3 iterative development cycles utilizing SDL.</td>
<td>An encountering framework for the systematical utilization of SDL in a B-to-B environment.</td>
</tr>
<tr>
<td>III</td>
<td>A systematizing service offering in SDL, KIBSs, modularity, productization and lean thinking.</td>
<td>A modularized service delivery process for structuring and systematizing the service offering.</td>
<td>2 ADR iteration cycles with Siili, linking company resources to the cost-efficient co-creation of services.</td>
<td>Model for linking company resources to cost-efficient co-creation of services with SDL.</td>
</tr>
</tbody>
</table>
ADR (Sein et al., 2011) is practice-inspired research, resulting in a theory-ingrained artifact. ADR research consists of four stages:

1. **Problem formulation**
2. **BIE**
3. **Reflection and learning**
4. **The formalization of learning.**

In order to improve the validity of research, it has to be guided and evaluated by explicit quality criteria (Sarker et al., 2013) that critically evaluates interpretive case study research according to the seven principles published by Sein et al. (2011):

1. **Practice-inspired research.** The research started from a real-life problem in the case organization but did not settle for a simple solution or discreet question. Instead, we created generalized knowledge that can be applied to a wide range of similar problems regarding the studied notions in professional service organizations.

2. **A theory-ingrained artifact.** We typically explored multiple existing scientific theories before and during the research: (a) we conducted literature reviews to help the initial problem formulation and the design iterations of the artifacts, (b) we used several theories to analyze the practical approaches in the case organizations, and (c) we enriched existing scientific knowledge with our research discussion and generalizations.

3. **Reciprocal shaping.** We simultaneously developed the case organization’s business and studied solutions for the case organization and its customers.

4. **Mutually influential roles.** The involved researchers and the case organization’s employees brought practical knowledge and practices while the outside researcher and involved researchers brought their knowledge of scientific theories.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>Design thinking in SDL, and co-creation.</td>
<td>The double diamond as a collaboration model for cross-functional service design.</td>
<td>3 cycles on developing the model inside Siili and 3 cases on testing the solution in customer organizations.</td>
<td>A systematical service design approach to co-creational and cross-functional KIBS development.</td>
</tr>
</tbody>
</table>
5. **Authentic and concurrent evaluation.** We evaluated the research continuously during the research so that scientific knowledge was embedded in the process of building the artifact.

6. **Guided emergence.** The resulting artifact of our research reflects the learning and continuous shaping during 2011–2017 in a real-life organizational setting with evaluation by research participants and external users.

7. **Generalized outcomes.** We represent a generalized solution addressing problems conceptually, moving from an organization-specific instance onto a more abstract level.

The primary objective of this research was to gain the practical framework for the continuous sustainable transformation of the KIBS provider. This research consists of four published research papers, which all interpret pieces of the named challenge. The first paper defined how to systematically utilize SDL in a business-to-business environment and the elements of an encountering framework used to systematize service business, the second paper defined the framework for continuous business model development, the third paper aimed to systemize service deliveries in order to clarify the value creation and increase the cost efficiency, and the fourth paper defined a systematical service design approach for cross-functional KIBS development in a constantly altering business environment. Since the beginning of this internal process and business development initiative, it was linked with academic research in order to improve the credibility of the internal development, to guide development activities with systematic frameworks, and to provide novel contributions for external practitioners and researchers.

The definition of KIBS has its roots in the book *The Effective Executive* (Drucker, 1967), which described a knowledge economy that relies on intellectual capabilities and knowledge-based professional services more than physical activities or natural resources. The foundation for segmenting knowledge-intensive services so that they form their own sector of the economy is based on the three-sector theory introduced by A. Fisher (1939). The three-sector theory divides economies based on their activity, the activities being materials (primary) activity, manufacturing (secondary) activity, and services (tertiary) activity. Later Clark (1967) supported Fischer’s studies, underlining the fact that the main focus of the economy is shifting from the primary sector, through the secondary sector, and on to the third sector as the economy develops. As history shows, this has happened; in all the developed countries, the tertiary sector has dominated the output of the economy for over 20 years, now accounting for over 75% of the economy in most developed
countries. These “knowledge-intensive” (or also termed “knowledge-based”) services typically include information technology, media, culture, and research, as well as knowledge-based consultation, education, and design. KIBS firms mainly provide support for the business processes of other organizations with a highly educated workforce, and their clients usually co-produce the service solution along with the service provider (Eurofound, 2017), which is well aligned with SDL (Vargo & Lusch, 2004). These organizations often strive for co-creation close to the customer, which results in the need to distribute the employees and work to various locations, resulting in more customer-friendly solutions (Sydow et al., 2004).
2 Literature review

2.1 The theoretical framework

The foundation of service-oriented marketing is that customers consume services regardless of whether they buy goods or services, the service is a value-creative process, and service marketing is seen as relationships, networks, and continuous close interaction (Grönroos, 1990; Lovelock & Gummesson, 2004; Vargo & Lusch, 2004). In this dissertation we accept the basic principles of SDL, aberrating it from traditional goods-dominant product marketing thinking. The same paradigm shift can obviously be approached from various other angles, for example, from the service marketing angle (Lovelock & Gummesson, 2004), the service quality angle (Edvardsson, 2005), the solution marketing perspective (Gummesson, 2008), the servitization angle (Baines, Lightfoot, Benedettini, & Kay, 2009; Vandermerwe & Rada, 1988), or from the service-as-business-logic angle (Grönroos & Ravald, 2011). The common denominator for all of these is that the service provides a perspective on value creation rather than a category of market offerings (Edvardsson, 2005).

We see that SDL’s foundation principles (Vargo & Lusch, 2008) can extend far beyond marketing (Bolton, 2004), connecting all the elements in the business model of the professional service provider together with the principles and iterative nature of lean thinking (Leybourn, 2013). SDL is in alignment with service science in seeing service systems as the value-creational configurations of people, technology, value propositions, and shared information (Maglio & Spohrer, 2008). Value co-creation and integration are the cornerstones of SDL, and therefore, we have explored those theories in more detail, expanding them to the required encountering- and lean-based value stream definitions for service production. Value and especially value co-creation are difficult to unambiguously define (Grönroos, 2012), and SDL is claimed to be metaphorical in its construction and thus difficult to empirically study (Grönroos, 2012). In this study we have defined SDL and value co-creation based on extensive study connected to real-life development.

Agility as a term used in this context is rooted in lean production (Womack & Jones, 1996), and from there to iterative software and business development (Ries, 2011), and it means the ability to continuously respond to changes in an environment (Leybourn, 2013). Agility in business development requires a framework for change management; here we have used and studied the business model as the body
of the business (Magretta, 2002). The business model and its transformation theories (Govindarajan & Trimble, 2010) are explored, and the created framework is well grounded in them, from various angles. Further, productivity and organizational performance in service provision are viewed from productization and modularity angles.

The commercialization of solutions requires the ability to understand the value creation of the customers; solutions should be able to improve the customers’ value creation processes. Servitization is one of the major trends in service commercialization, which refers to the process of creating value and gaining competitiveness by adding services to products (Baines et al., 2009; Wise & Baumgartner, 1999). Based on SDL, in the commercialization of the co-creative process, the products can be embedded in services, and embedded products are seen as vehicles for service delivery (Vargo & Lusch, 2008). Customer pull-driven service production is difficult to standardize in order to increase productivity, as was learned in the service-line approach (Levitt, 1972). The original mass-production approach was never rooted in service production, but industrialization-based product portfolio management can give guidance regarding repeatability and scalability as prerequisites for systematization (Järvi, 2016; Tolonen, Harkonen, Verkasalo, & Haapasalo, 2015).

Digital transformation is about how technology changes customer expectations and business processes and thus constantly alters the business environment (Plattner et al., 2011). So, it is better to see digital transformation as a continuous adaptation to the constantly changing environment. Services are created within interactive processes between the seller and buyer (Svensson & Grönroos, 2008), which means collaborating with and learning from customers. Many business ventures fail, not because they fail to build what they set out to build but because they waste time, money, and effort building the wrong solution (Ries, 2011). Digital transformation–driven iterative market change requires continuous service design and testing of the hypothesis, leading to a continuous review of value creation, value capture, and resourcing. Service design should synthetize and creatively transform the collective knowledge through new service concepts. This approach is generally called design thinking (DT; Brown, 2008; Dunne & Martin, 2006; Lindberg, Noweski, & Meinel, 2010). DT combines a deep end-user experience, systems thinking, iterative rapid prototyping, and multi-stakeholder feedback (Brown, 2008). In this research we have also explored the required theories for finding a systematical service design approach to co-creational and cross-functional KIBS development. As an outcome, we have aligned the service deliverables (value
creation) and customer needs (value capture) by utilizing DT in the value co-crea-
tional SDL framework.

Services are now driving the growth in the global economy, and digital tech-
nologies are accelerating this development. Digitalization is giving us more oppor-
tunities to get individual services for our individual needs. This movement is fur-
ther driving the need for a more service-oriented approach to marketing and busi-
ness development. The mobile phone industry is a great example of this move-
ment where products are harnessed as the delivery vehicles of services. The gaming
industry is, in practice, giving products away to engage the users of services. In the
middle of this transformation, many researchers and businessmen still talk about
services as they were defined in GDL, as just other deliverables than products
(Vargo, Maglio, & Akaka, 2008).

At the beginning of the journey defined in this dissertation, we were seeking
the foundation of digital KIBS development. We saw that goods-dominant (mar-
keting) logic (GDL) was not working in B-to-B, professional services solution sales
and understood that the transformation has to be pull driven, beginning from cus-
tomer centricity. Solutions are customized (customer-centric) bundles of goods,
services, and intellectual property (Cova & Salle, 2008). The sales process for so-
lutions does not begin with a customer’s specification of discrete product require-
ments as the solutions sales model requires that salespeople and other encountering
interfaces invest more time and effort in identifying a customer problem and then
configuring the available resources in a manner that addresses the problem (Leff
Bonney & Williams, 2009). Solution sales led us towards a co-creational approach
and SDL.

Studying SDL required adopting a wide perspective towards service marketing
literature (Grönroos, 1990; Lovelock & Gummesson, 2004; Zeithaml & Bitner,
1996). The original literature search supplied 2810 sources, which we ranked based
on the citations. A significant amount of literature widely accepted the approach,
but challengers also appeared, value co-creation especially generated debate
(O’Shaughnessy & Jackson O’Shaughnessy, 2009; Svensson & Grönroos, 2008).
The Nordic school service marketing approach (Grönroos & Gummerus, 2014;
Grönroos & Ravald, 2011) takes a slightly different approach to the topic under the
service logic research branch. We saw these approaches to more complement each
than compete with each other, and because SDL was more widely studied and ex-
cessively argued about, we selected it as the foundational framework for our jour-
nel.
Co-creational approach was determined to be the foundation for the business development; in value co-creation, the supplier processes can be seen as a value steam where core competences are the value particles, which are pull driven, bridging SDL to lean thinking (Hines, Holweg, & Rich, 2004; Womack & Jones, 1996). Lean and agility were further examined from the core competence perspective (Prahalad & Hamel, 1990; Prahalad & Ramaswamy, 2000) and entrepreneurial management perspective (Spigel, 2017; Stevenson & Jarillo, 1990), finding a focus on encountering, seeing it as a key to co-creation. Encountering was especially explored from value co-creational perspective (Payne et al., 2008), but customer process management was also more widely explored (Geiger & Guenzi, 2009; Grönroos, 1996; Storbacka, Ryals, Davies, & Nenonen, 2009; Trkman, Mertens, Viaene, & Gemmel, 2015), although sales management in particular was clearly left out of the scope in this study.

A KIBS in the service-dominant and dynamic business environment has to not only understand the current and future needs of customers but also have visibility to the resource integration interface, providing the right experts at the right time to solve the right tasks (Teece, Pisano, & Shuen, 1997). This kind of information asset (Goodhue, Quillard, & Rockart, 1988) can be managed with competence management systems (CMSs) (Lindgren, Henfridsson, & Schultze, 2004). Efficient resource management is a baseline for efficient KIBS operations, and therefore this area was of interest to use from the early phases of this journey. There was a very limited amount of literature regarding the practical implications of competence management tools, processes, and practices and especially on how value co-creation can be aligned with systematic competence development, and therefore, we decided to take the development of that as a subject of an independent study (Niemi & Laine, 2016), which finally led to Erkka Niemi’s doctoral dissertation (2017). Also, other business process management–related theories were out of the scope of this study (Trkman et al., 2015), although the value of business process management as a competitive advantage is not underestimated (Hung, 2006).

Strategic thinking in the altering business environment cannot be limited to products, services, or marketing. The firm has to be capable of envisioning the future of its market and then going out to co-create it with its customers. The latest dynamic strategy literature approaches this question with scenario-based transformation analysis (Ritakallio & Vuori, 2018), but we narrowed the focus onto business model transformation. The business model is a sufficient entity to consider when the business environment and business logic are changing. The business model concept is neither unambiguous nor commonly understood. Literature talks
widely about the business model and clearly most business executives cannot de-
scribe the business model of their company, nor can most researchers agree about
it and consistently present it in the related literature (Pekuri, Suvanto, Haapasalo,
& Pekuri, 2014). First, we had to find a commonly understood, solid definition of
the business model itself in order to be able to use it in solving the transformational
question. Drucker (1994) explored the topic for the first time in the theory of the
business as “the assumptions about what a company gets paid for,” connecting the
business environment, mission, and core competencies to it. In the groundwork for
Article II, we explored tens of related articles, narrowing them down based on the
relevance and number of citations, and finally we explored nine different ap-
proaches in detail, defining the business model and its elements based on those.

Co-creational business model development requires a worldview, architectural
alignment, and structural flexibility of organizations that are held in common with
the supplier and the customer. Marketing content and stories in this environment
cannot be separated into internal and external channels (Parvinen, Tikkanen, & As-
para, 2007). Also, marketing itself is becoming co-creational (Ballantyne & Varey,
2008). Transformation begins from the customer interface, penetrating the business
model, and focusing on efficiency for both organizations. Transformation and its
management have been studied by many scholars. In our study, we approached it
from the system thinking angle (Ng, Parry, Smith, & Maull, 2010), following the
path set by Linder and Cantrell (2000). Business model dynamics were also already
studied in the light of digital convergence (Suikki, Goman, & Haapasalo, 2006),
and the framework for altering the business model was created (Chesbrough, 2007).
Cliffe (2011) and Christensen (Christensen, 2010; Johnson, Christensen, & Kager-
mann, 2008) were innovators and influencers for the final approach to the dynamics.
The dimensions leant on the widely accepted business change model (Govindarajan
& Trimble, 2010).

Service innovation in the SDL framework is broadened to involve three differ-
ent elements: the service ecosystem, the service platform, and value co-creation
(Lusch & Nambisan, 2015). The logic of innovations had to be understood in order
to comprehend the dimensions of the required changes (Coutelle-Brillet, Riviere,
& des Garets, 2014; Kuula & Niemi, 2016; Lusch & Nambisan, 2015) and blue-
printing for drafting the framework (Bitner et al., 2008), but otherwise we did not
go deeper into the theories of innovation. The business model canvas (Osterwalder
& Pigneur, 2002, 2010) is a blueprint for an agile, DT-oriented approach to forming
a hypothesis regarding the firm’s business model. A value proposition is ap-
proached from the resource, activity, customer relationship and segments, and
channel perspectives, and value capture is explored from the cost structure and revenue stream perspectives. Maurya (2012) connected this canvas to lean thinking, simplifying it to consist of four dimensions: customers, the offering, infrastructure, and financial viability. These approaches, together with the lean startup model (Ries, 2011), significantly affected the practical approaches in business model studies. The theoretical framework of this study is presented in Figure 2.

Value-based selling can be seen as one subdomain of co-creational sales that also requires a customer-focused approach and transparency up to the open-book pricing (Töytäri, Brashear Alejandro, Parvinen, Ollila, & Rosendahl, 2011). In other words, value-based selling leads to questions about value-based pricing. The goal of value-based pricing is to enable more profitable pricing by capturing more value (Harmon, Raffo, & Faulk, 2004). In this study we did not deep dive into sales management theories, and although we created a study about value-based pricing as an Aalto Executive Education’s Business Strategy Project (Nurmi et al., 2016), we intentionally excluded it from the content of this study. Conventional revenue
models are currently based either on time and materials, a fixed price, or target price agreements, and as none of these models directly compensates for the created value, the value-based revenue model is an important notion and one of the possible subjects for further study.

The efficiency of service provision is challenging to determine because of intangibility, uniqueness, and the immediate consumption of services. In this study we approached a service with embedded products as a solution (Cova & Salle, 2008). Solutions can be seen as processes that involve identified value-creation opportunities (Storbacka & Pennanen, 2014). The solution business requires simultaneous commercialization and industrialization, and product management literature divides productization and product portfolio management into commercial and technical parts (Tolonen, Harkonen, & Haapasalo, 2014). The connection between these is built into a solution platform (Sawhney, 2006). Modularity can be seen as a foundation for efficient solution business (Baldwin & Clark, 2006; Bask, Tinnilä, & Rajahonka, 2010) as customizing products by using a modular production platform enables efficient customized commercialization (Baldwin & Clark, 2006). The cost-efficient commercialization of value–co-creational services leads to the need for systemization, which we solved by developing products and embedding them into services, which is the advanced approach to modularity (Sawhney, 2016).

Servitization can be described as the process of tailoring value propositions to enable consumers’ greater efficiency in achieving desired outcomes (Baines et al., 2009). Servitization literature has diverged in two directions, GDL and SDL, and although both see value definition to be moving from exchange towards usage, our research is aligned with customer co-created servitization SDL (Green, Davies, & Ng, 2017). We see co-creational customer centricity as a model wherein the customer is an active contributor in value creation (Prahalad & Ramaswamy, 2000), and we see the service system as a whole to be managed within the solution platform and that the service is focused on effectiveness for both supplier and customer (Ng et al., 2010). In the other branch, servitization also refers to the process of creating value and gaining competitiveness by adding services to products (Wise & Baumgartner, 1999). We intentionally left that branch out of the scope of this study. Based on SDL, services are not added to products but a product can be embedded in services, and embedded products can be seen as vehicles for service delivery (Vargo & Lusch, 2014).

The delivery efficiency of services is studied from many different theoretical angles, such as industrialization (Levitt, 1972), standardization (Tether, Hipp, & Miles, 2001), and systematization (Björlin Lidén & Sandén, 2004). In this study
we did not further explore the GDL-oriented approaches but saw them as forming a developing path to productization. Originally productization was the systematization of service delivery (Järvi, 2016), also used for making the offered services more tangible and concrete for commercialization purposes (Harkonen, Haapasalo, & Hanninen, 2015). In this study we focused on productization in achieving cost efficiency, with *productization* meaning standardizing the service processes so that they imitated products, making service delivery less complicated and more replicable (Jaakkola, Orava, & Varjonen, 2009). Product-service systems (PSSs) are a combination of tangible and intangible elements wherein manufacturing firms may have to adopt horizontal service delivery structures behind the service integrators when moving into operational services (Oliva & Kallenberg, 2003).

A dynamic approach to creating user-centric services based on real-life data is essential in the digital age. The focus in the offering should be on the ability to understand and support the value creation process of the customers. The industrial revolution was product oriented in creating efficiency in scale whereas the digital revolution is transforming offering development so that it is pull driven and has value co-creation. Service design should transform the collective knowledge into new service concepts, facilitating the creative process through a set of planned stages, moving from the clarification of objectives, through solution design and prototyping, and onto customer feedback (Bitner et al., 2008). The lean startup loop, build–measure–learn (Ries, 2011), is built on supporting this iterative process. DT is a human-centric management practice that gives an advantage to design practices in service and business development, aiming to transform this integrated knowledge into new solutions by exploring the angles of value creation and capture (Brown, 2008; Dunne & Martin, 2006; Lindberg et al., 2010). DT is not a science but more like a framework: be curious, try things, reframe problems, embrace the process, and collaborate (Plattner et al., 2011). DT can also be approached through service blueprinting lenses (Bitner et al., 2008), an approach that was generally explored in the study when the encountering framework was created. Also, an entrepreneurial approach to management (Stevenson & Jarillo, 1990) supports opportunity management regardless of the control of resources, constantly sensing opportunities and responding to them (Haeckel, 1999). These theories were noted without detailed exploration.
2.2 Service-dominant logic

The change that SDL presents is greater than just orientation, defining service as the focus of economic exchange and as the application of competences that benefit each other and calling it service-for-service exchange (Ng et al., 2010). This thinking is changing the driver from being an operand resource exchange (goods for money) to an operant resource exchange (e.g., an exchange of competencies, knowledge, and skills). Some of this thinking goes back to an original foundational work on economics and value definition of Smith (1776) and aligned with the later foundational service science studies (Grönroos, 1990; Gummesson, 1987), but the view is still unique. Vargo and Lusch (2011b, 2018) have an evolutionary, developing SDL and defended it with tens of publications, getting thousands of citations.

SDL was defined in the form of FPs (Vargo & Lusch, 2004), which the authors further explored and defined in 2008. Since then, there has been continuous collaboration and iterative translations in the global academic community regarding this new theory and lexicon that (adopted and presented as understood)

- explain how service is the basis of exchange and operant resources are the source of competitive advantage and goods distribution mechanisms for service provision (FP1, FP2, FP3, FP4, FP5),
- define the nature of co-creational value creation (FP6, FP7, FP8),
- imply a pull-driven network orientation in resource integration, originally seen as a production–consumption circle and later (Vargo & Lusch, 2011a) sharpened towards service ecosystems thinking (FP9, FP10).

These FPs were consolidated into four core axioms (Vargo, 2011) centered on (1) the reconceptualization of service as the fundamental basis of exchange and as a process wherein an actor uses its resources for the benefit of another, (2) the integration of intangible resources, (3) the co-creation of value in interactive process, and (4) the networked value creation context in ecosystems within the determination of the beneficiary. This core conceptualization claims that all actors (individuals, firms, nations) are fundamentally doing the same core activities in engaging with the resource integration, exchanging service for service, and acting simultaneously as consumers and producers.

Solution marketing also defines the outcome and value from the customer’s perspective (Storbacka & Pennanen, 2014), just like SDL and lean thinking, and is thus aligned within this perspective. In solution marketing, customer offerings are integrated combinations of products and services, and the customers buy benefits,
no features (Sawhney, 2006). Solution marketing–aligned SDL and its core axioms provide a solid framework for further exploring value creation in modern, digitalized, and globalized business and society. Slywotzky (1996) presented a similar approach in his appreciated value migration theory that described how a company selects its customers, defines and differentiates its offerings based on the selected customer needs, defines the tasks it will perform, and configures its resources based on these. Edvardsson et al. (2012) further studied resource integration and value co-creation, suggesting that value is contextual and reliant on structure, which is iteratively changing itself with every instance of resource integration. Solution marketing still limits its view to the commercial structure of the offering and is therefore taken into account, but it is not in the core of this study.

GDL has its roots in industrialization, just like mass production and hierarchical management structures (Vargo & Lusch, 2014). Every service marketing theory before SDL was based on GDL thinking (Vargo & Lusch, 2018). Therefore we did not dig deeper into GDL-based service marketing approaches, like services complementing products (Levitt, 1972), service quality (Zeithaml & Bitner, 1996), or productization (Järvi, 2016). Technology plays a significant role in SDL service provision (Bitner et al., 2010). In this study we did not focus on that path, although the majority of ADR was executed in a technology company. Most manufacturing companies provide services to sell and support their products (Oliva & Kallenberg, 2003), and although this transformation is an interesting and aligned dilemma within the studied subject, we did not explore it in detail because of the knowledge-intensive nature of this study. Responding to change in the SDL frame was the main theme of the study. SDL also has a macro-economy view (Vargo & Lusch, 2011b) that we did not follow as it is not within the scope of this research. Transitioning from GDL-based service management to SDL is ongoing on many fronts (Gummesson, Lusch, & Vargo, 2010), and so we believe that this study with real-world examples clarifies the lexicon and approach in practice for various business developers.

### 2.2.1 Co-creation

Value-creating systems have been described as constellations of resources (Normann, 2001), a configuration of resources (Maglio & Spohrer, 2008), value networks (Vargo & Lusch, 2008), and service ecosystems (Vargo, Lusch, Archpru Akaka, & He, 2010). Prahalad and Ramaswamy (2000) described customer participation in product development as co-creation, stating that value co-creation with
the customer will replace the traditional goods exchange process because of the internet and collective knowledge of the available solutions. In this constellation customers are part of the enhanced resource integration network, co-creating business value (Aarikka-Stenroos & Jaakkola, 2012).

In SDL customers are simultaneously collaborators, co-developers, and competitors (Vargo & Lusch, 2008). Value co-creation is the cornerstone of SDL, changing the focus from being on value in exchange to being on value in use or “value-in-context” (Vargo, 2009) and value in social contexts (Edvardsson et al., 2012). Value co-creation is also presented as a fundament of service science (Maglio & Spohrer, 2008), defining service systems as value co-creational configurations of people, technology, value propositions connecting internal and external service systems, and shared information. Value itself is not an explicitly defined notion, even if it has been studied since Aristotle’s times (the fourth century BC), and the co-creational approach to it has obviously raised a lot of debate (Svensson & Grönroos, 2008). In this study we did not explore those arguments more than notions to theory as we prove that SDL is working well as the foundation of the real KIBS development, earning its position as an evolving endeavor for developing service-oriented business logic.

SDL implies that value is co-created with the customer rather than embedded in output (Vargo & Lusch, 2004). The objective of the supplier in a co-creational relationship is to customize the offering by participating in the customer value creation processes (Vargo, 2011). In this configuration, customers are part of the enhanced resource integration network; they co-create and extract business value and are simultaneously collaborators, co-developers, and competitors (Vargo & Lusch, 2008). In SDL, the competitive advantages are based on core competencies like knowledge, skills, and processes (Vargo and Lusch, 2008) and are created progressively through constantly improving the service experience (Van Bommel, Edelman, & Ungerman, 2014). Edvardsson et al. (2012) focused on resource integration and value co-creation, suggesting that value is contextual and reliant on structure, which is iteratively changing itself with every instance of resource integration. This approach is in line with the thinking of Chandler and Vargo (2011), meaning resources are used to offer “service streams” that ultimately fill and replace the context with service outputs, which are contextual. They see that resource integration is intimately connected with the value proposition and thus describes how an actor seeks to enable and control resource integration and value co-creation.

Value co-creation requires a change in the dominant business logic; it must change from “making, selling and servicing” to “listening, customizing and co-
creating” (Vargo & Lusch, 2004). Later studies (Grönroos & Ravald, 2011; Svensson & Grönroos, 2008) have questioned whether the supplier is always the value creator, but they agree that the supplier can co-create value with the customer in certain alignments. Transforming business logic requires transparent alignment between business development and delivery organizations and alters the traditional value chain so that it becomes pull directed. Slywotzky (1996) presented a similar approach in his appreciated value migration theory that described how a company selects its customers, defines and differentiates its offerings based on the selected customer needs, defines the tasks it will perform, and configures its resources based on these.

Obviously, co-creation also has some limitations. Stakeholders will not wholeheartedly participate in customer co-creation unless it produces value for them (Ramaswamy & Gouillart, 2010). In-depth dialogue requires a lot of trust, and the encountering process is very time and resource intensive. The customer and supplier activity can be mapped in detail through an activity mapping process called activity blueprinting or the customer experience mapping process (Bitner et al., 2008; Seybold, Marshak, & Lewis, 2001), making the relationship easier to manage. It is difficult to maintain operational efficiency in honest co-creation. Transparency requires an unusual degree of customer input into the solution delivery chain. Individual customers and consumers are at the heart of the co-creation experience, which makes it difficult to deal with the heterogeneous demands of the customer base. It is also difficult to define the liabilities of the parties, and demand forecasting is difficult in an unpredictable co-creation environment.

### 2.2.2 Lean thinking

The lean concept was originated by the Toyota Production System (Ohno, 1988) and was initially applied to optimize process performance in the manufacturing industry (Buckley, Prewette, Byrd, & Harrison, 2017). Lean thinking was studied, explained, and popularized by Womack and Jones (1996) and later explained as a transformational management strategy by Liker (2004). The common assumption in all lean literature is that the lean methodology aims to maximize the delivered value for customers while minimizing waste by eliminating processes that are not value creative, and the optimization process is iterative (Hines et al., 2004). The principles of lean thinking are identifying value (value is defined by the beneficiary, by the pull direction), mapping the value stream (seamless resource integration with

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the customer), creating flow (cross-functionality, culture), establishing pull (co-creation with the customer), and seeking perfection (iterative development).

As discussed earlier, the definition of value creation is not unambiguous, but lean thinking describes the value creating process as capable (creating value), available (through value streams), adequate (driving to perfection), flexible, flowing, and pulled (Womack & Jones, 1996). In other words, in lean thinking, firms just have to think about the created value from their customers’ perspective and learn, iterate, improve, and revisit the value definition.

Applying SDL means that the firm is not only restricted in making value propositions but also gets opportunities to actively participate in value creation with its customers, although value is always determined by the beneficiary (Vargo & Lusch, 2008). In other words, in value co-creation the supplier’s processes can be seen as a value stream wherein core competences are the pull-driven value particles, bridging SDL to lean thinking.

At the beginning of this millennium, Steve Blank introduced the lean startup approach (2007), used for already probing ideas and needs from the customer in the very early phase of product/service development. Similar thinking was in the air at the time, supporting the approach, e.g., Phillips, Ochs, and Schrock (1999). Based on this, Erik Ries (2011) presented the so-called build–measure–learn loop for probing the customer needs, pains, and the determination of value, answering the question “How can we learn more quickly what works and discard what does not work?” This process measures value creation from the customers’ perspective, and then guides whether to persevere or pivot the idea. Testing value creation in the lean startup model is done through the iterative, continuous, and cross-functional minimum viable product (MVP) development process. Lean turnaround (Byrne & Womack, 2013) presents the lean approach to business development through four lean fundamentals: take time (have the same pace as the customer), a one-piece flow (meeting customer demand), standard work (repeatability), and the pull system (connecting the customer to solution creation).

### 2.2.3 Encountering in co-creational sales

The assumption that value is defined and co-created with the consumer, where core competencies are competitive advantages (Vargo & Lusch, 2004), leads to the requirement for wide cross-organizational collaboration between the supplier and customer. Encountering in this context means that two-way actions between the customer and supplier can also be referred to as touch points and can be initiated
by either party. The encountering process lies in the middle of value creation (and co-creation) and is therefore taken into the focus of this study. Payne et al. (2008) explored value co-creative encountering in the context of SDL and developed a conceptual framework for understanding and managing value co-creation between the customer and supplier. In the value co-creation framework, customer processes are divided into three relationship–experience-based entities: emotion (feelings), cognition (thinking), and behavior (doing). In addition, supplier processes are divided into co-creation and relationship–experience design entities.

In our research we sought a framework for data gathering and analysis regarding the customer encounters of the case organization. However, during the research period we ended up adding elements from two other frameworks (Bitner et al., 2008; Cova, Ghauri, & Salle, 2002) and proposed an improved version. The customer liaison process is seen as a sequence of activities that are logically connected (Sawhney, 2001; Vandermerwe, 2000).

In goods-dominant thinking, encountering is done through a marketing organization (Kotler & Armstrong, 1991), but because of the co-creational nature of study and SDL’s foundation, we could not limit the relationship of management to marketing (Grönroos, 1996), and therefore, these earlier theories were not explored.

2.3 Continuous business model development

In this study we approach business models from the SDL perspective, taking into account constant change and continuous business model evolution (see, e.g., Chesbrough, 2007; Osterwalder & Pigneur, 2010). The suppliers’ ability to understand the customers’ value-creating processes, develop solutions that create value, create demand for these solutions, and sell them to customers for compensation based on the customers’ value in use (Leff Bonney & Williams, 2009) is the baseline for solution marketing and SDL. SDL and business models form a very little-researched area, so we decided to approach business models from the solution perspective.

2.3.1 Business models

The business model concept is neither unambiguous nor commonly understood. Literature talks widely about the business model, but researchers cannot consistently present it in the literature (Pekuri et al., 2014). Peter F. Drucker explored the business model concept in The Theory of the Business (1994), connecting it to the
business environment, mission, and core competencies. Drucker (1994) also requested clarity in definitions in order to enable companywide communication about the “theory” or the “model” of the business. One of the most-cited articles about business models was written by Timmers (1998), offering a framework of business models for e-commerce wherein elements were actors, value, and revenue sources. Another much-cited article about business models was written by Linder and Cantrell (2000) who presented the business model as “the organization’s core logic for creating value,” outlining three dimensions: revenue sources (value), revenue streams (from the offering, the value proposition), and resources. Hamel (2002) described a business model as a business concept that has been put into practice. For Hamel (2002) a business concept comprises four major components: the core strategy, strategic resources, the customer interface, and the value network. Al-Debei, Panagiotopoulos, Fitzgerald, and Elliman (2010) described a business model as “the rationale of how an organization creates, delivers, and captures value.” A clear definition of business design is not only important for management but also for being able to simulate alternative business development options (Osterwalder & Pigneur, 2002).

The business model and its innovational development have a long history, but the speed at which business models are transforming through industries today is unprecedented. For that reason, the latest studies have focused on the transformation and dynamics of the business model. Osterwalder (2010), the creator of the “business model canvas,” sees a business model as a set of hypotheses of a firm’s key resources, key activities, value proposition, customer relationships, channels, customer segments, cost structures, and revenue streams. Osterwalder’s (2002) study is widely accepted, especially in the IT industry, mainly because of its lean, agile, and therefore iterative, nature. McGrath has been studying strategy in uncertain and volatile environments (Cliffe, 2011) and explained the recently growing interest in business model innovation by giving three reasons for it: shorter product life cycles, inter-industry competition, and disruptions from business models that offer better customer experiences. McGrath underlined the need for continuous business model development in the rapidly changing market environment and for incorporating a discovery-driven approach into it (McGrath, 2010).

Linder and Cantrell (2000) defined a business model as the organization’s core logic for creating value, connecting the definition to the studied transition towards SDL. We widely studied the definition of a business model, focusing the transformational change model into it. This means that we did not step over to strategy studies, even if dynamic strategy theories especially often overlap with business
model elements (Ritakallio & Vuori, 2018). Another borderline can be seen between the business model and the operational level of its accommodation in business processes (Solaimani & Bouwman, 2012). In this study we decided not to cross this line over to business processes.

2.3.2 The change models

In the digital age any service-oriented business can be challenged and replaced by something more useful, better to use, and/or more cost-efficient solutions. New challengers compete not only with the new embodiment of the value proposition and value stream but also with the new business models. To be able to constantly monitor and manage the required changes in business design, the definition of a business model must be clear, constant, and unambiguous (Drucker, 1994). Drucker (1994) also saw that the theory of a business has to be tested constantly as it is only a hypothesis about things that are in constant change (markets, customers, technology). Linder and Cantrell (2000) saw the need for a “change model,” which was described as the core logic for a continuously changing company to remain profitable and reposition itself when required. This change model is seen as a key element for the continuous business model renewal that is required in the changing business environment, driven by digitalization.

Christensen (2010) defined a shift that changes the basis of competition in an industry and also challenges business models over time. The strength of the business model has to be constantly monitored in the changing business environment, and continuous iterative business development is required for an agile response to challenges and opportunities in the market. Also, Chesbrough (2007) presented the business model innovation framework for assessing and altering a business model.

Haeckel’s (1999) sense-and-respond–centered view bridges lean thinking and the lean startup philosophy to SDL’s foundation. The main idea in the sense-and-respond approach is to cultivate relationships that involve the customers in developing customized, competitively compelling value propositions in order to meet specific needs. The lean approach to sense and respond is the lean startup model (Ries, 2011). The iterative build–measure–learn process is created for iteratively turning ideas into services and products, measuring value creation from the customers’ perspective.

McGarthy (Cliffe, 2011) has been studying strategy in uncertain and volatile environments and explained the recently growing interest in business model innovation by giving three reasons for it: shorter product life cycles, inter-industry
competition, and disruptions from business models that offer better customer experiences. She recommends having a scenario process for an alternative businesses experiment with a portfolio of opportunities. The transition process and timing depend on the changes in the business environment. This thinking clearly relates to Clayton Christensen’s (2010) technology S-curve theory but applies it in another context.

As important as a business having the agility to transform itself is the magnitude of the required change. Christensen (2010) defined the difference between sustainable and disruptive innovation, and Govindarajan and Trimble (2010) defined the need for the similar separation from a business perspective. They created a framework where the company and its leaders balance the development actions between three different elements: preservation, destruction, and creation.

2.4 Efficient service production

Balancing between efficiency and customer orientation is a familiar challenge in all service companies. The low productivity of services has been a widely studied concern among service marketing schools (Grönroos & Ojasalo, 2000). It is said, that the service industry is behind the manufacturing industry because of the lack of efficiency, automation, repeatability, and quality (Saaksvuori & Immonen, 2008). The main question in this context is how service production can be efficient if is always responding to customers’ unique needs through co-creation. The move towards customer co-created solutions is grounded on the insight that customers have no interest in products and services per se—what they really want are solutions to problems they face in their lives and businesses (Edvardsson et al., 2012). In the solutions mindset, customer offerings are integrated combinations of products and services designed to provide customized experiences for specific customer segments (Sawhney, 2006).

Solutions are cross-functional by their nature as solutions can be seen as bundles of goods, services, and intellectual properties (Cova & Salle, 2008). Storbacka and Pennanen (2014) defined solutions as processes that comprise identified value creation opportunities. Efficient solution-business execution requires simultaneous commercialization and industrialization, exploring the connection between the differentiation and divergence of the offering. In the commercialization of solutions, the focus is on a company’s ability to understand the value creation process of its customers and its ability to offer a solution that improves the customers’ value creation processes.
Based on SDL, in the commercialization of the co-creative process, services are not added to products but a product can be embedded in services, and embedded products are seen as vehicles for service delivery (Vargo & Lusch, 2014). Industrialization refers to a company’s ability to standardize a solution in order to increase productivity (Levitt, 1972), and industrialization-based product portfolio management can give guidance regarding repeatability and scalability as prerequisites for the systematization of solution delivery (Järvi, 2016; Tolonen et al., 2015). Servitization is one of the major trends in service commercialization and refers to the process of creating value and gaining competitiveness by adding services to products (Baines, Lightfoot, Benedettini, & Kay, 2009; Wise & Baumgartner, 1999). Standardization (Tether et al., 2001) and systematization (Björn Lidén & Sandén, 2004) provide other angles on operational efficiency improvement, but in this study, we focused on modular service management structuring and technical portfolio management with repetitive modules (Tolonen et al., 2014). In this context, the productization of services means standardizing the service processes so that they resemble products, making service delivery less complicated and more replicable (Jaakkola et al., 2009).

Heiskala et al. (2005) attempted to synthesize the standardization and customization, arguing that the standardization of the service process is difficult because of the involvement of customers whose actions are difficult to standardize. Standardization and repetitive production processes are key to efficiency in production (Levitt, 1972) so the given statement was seen as a research challenge. Mass customization refers to the ability to provide customized products and services through flexible processes at a relatively low cost (Da Silveira, Borenstein, & Fogliatto, 2001). The answer to the productivity challenge lies in modularized solutions, where delivery components are productized (Jaakkola et al., 2009). In the productivity model of Jaakkola et al. (2009), the first step is to define the customer value, value proposition, and services, and the second step is to standardize the service components.

### 2.4.1 A modular service delivery structure for efficient service production

Delivery efficiency is approached from many different perspectives. Originally some industrialization-related theories were applied (Levitt, 1972), then standardization (Tether et al., 2001) and systematization (Björn Lidén & Sandén, 2004) were applied. In the last decade, these approaches have often been collected under
productization’s definition (Järvi, 2016). Svensson and Grönroos (2008) described a product as something that can be developed, produced, delivered, marketed, and consumed, and originally, productization was the systematization of the service delivery (Järvi, 2016). Productization also has another discipline in making the offered services more tangible and concrete for commercialization purposes (Harkonen et al., 2015).

The term solution business is used to describe a business model where a company co-creates solutions for their customers’ problems. Solutions include the identification and definition of value creation opportunities in co-operation with the customer; the integration and customization of goods, services, and knowledge; the deployment of the elements mentioned above in the customer’s processes; and compensation for the solution provider, based on the customer value (Storbacka & Pennanen, 2014). Customizing products by using a modular production platform is an established way of serving a heterogeneous market efficiently (Baldwin & Clark, 2006).

Modularity in engineering provides manageability for complex systems, enables parallel working with the solution, and accommodates responsivity to changes in the future (Baldwin & Clark, 2006). Modularity and platform thinking mean dividing the production process into modules, allowing a complicated process to be split up among different producers and using the same components to create different experiences for different target markets. In addition to production structure, modularity can also be found in the use of products, and therefore, a wide range of services are also modularized (Aarikka-Stenroos & Jaakkola, 2012; Sawhney, 2006). The service element is the equivalent to a product component. Similar modularity is also used in management, where organizations with better-developed bundles of options (modules) expand more aggressively in growing markets and persist longer in difficult markets than competitors that have less-developed option bundles (modules) (Bowman & Hurry, 1993).

Product management literature divides productization and product portfolio management into commercial and technical parts (Tolonen et al., 2014). A commercial product portfolio (see Figure 3) describes a company’s offering for the customers and sales organization; this is also called commercialization. A technical product portfolio structures the technical solution for products as they are engineered, supplied, and produced inside the company and by its suppliers. The price of the product is defined by the commercial product portfolio, and its cost is defined by the technical portfolio.
SDL frames co-creation as a baseline for the value stream, and we are aligning it with the pull-directed value stream of lean thinking. SDL also names operant resources (competences and processes) as the key components of service delivery but leaves the door open for “packaged” services, called productization in this paper, although developed products are only seen as components in value delivery. Value co-creation literature commonly assumes that suppliers make a value proposition and customers actualize value by using what is offered to them (Gummesson et al., 2010; Vargo et al., 2008). Within this value creation architecture, productivity improvement through the modularity and standardization of repetitive tasks can be achieved in the technical portfolio of the solution. SDL is defined to have a modular structure, a platform, in between the ecosystem and co-creation (Lusch & Nambisan, 2015).
2.5 Co-creational service design

In the goods-based industries, new product development (NPD) is a very widely studied and optimized notion whereas there are not many studies about service development processes (Fitzsimmons & Fitzsimmons, 2000). Services are created within interactive processes between the seller and buyer (Svensson & Grönroos, 2008). Aarikka-Stenroos and Jaakkola (2012) demonstrated that, in the context of a KIBS, customers may also exert a considerable influence on the formulation of the value proposition through negotiation and the contribution of their own resources, and customers do not just actualize value by using what is offered to them (Gummesson, 2008). When it comes to novel business opportunities, it is usually design innovation, not technological innovation, that causes disruption (Christensen, 2010).

Design science is fundamentally different in both the theory-building and theory-testing approaches that model themselves after the natural sciences and seek explanations based on observation (Holmström et al., 2009). Many business ventures fail, not because they fail to build what they set out to build but because they waste time, money, and effort building the wrong solution (Ries, 2011). Haeckel (1999) observed that successful firms move from practicing a “make-and-sell” strategy onto a “sense-and-respond” strategy. The boundary between well-structured and ill-structured problems is vague and not susceptible to formalization (Simon, 1973). In this study we used service design to co-create the formalization of given problems.

Service design brings service strategy and innovative service ideas to life (Ostrom et al., 2010), requiring the orchestration of a set of integrated components, which together enable customers to co-create valuable experiences (Patrício & Fisk, 2012). Shostack (1977) was a pioneering advocate of the idea that services could be designed intentionally, proposing that monitoring the service delivery process was the key methodology behind designing a successful service offering and she also created a visual representation that she called a “blueprint” of a service design. The service blueprint was further developed from a process description closer to service design elaboration (Bitner et al., 2008). On this development path there is also the sidetrack of focusing on the physical place of service delivery, called the servicescape (Bitner, 1992).

Offering development through service design requires an understanding of the customer outcome and customer process, and it does not seek scientific truth but strives for the enhanced viability and novelty of the solution (Plattner et al., 2011).
In SDL, service design is defined as the platform where diverse actors find a shared logic for obtaining a common perspective to worldview (Lusch & Nambisan, 2015). Service design should synthetize and creatively transform the collective knowledge through new service or product concepts. This approach is generally called design thinking (DT; Brown, 2008; Martin, 2011).

2.5.1 Design thinking

Industrial age management was created for stable and predictable market development. In the digital age, the market is unpredictable and unforeseeable, and thus, the solution definition requires an interpretive approach (Lester, Piore, & Malek, 1998). The development of solution designs or artifacts is a prerequisite for evaluating actions through business development with ill-defined managerial problems (Holmström et al., 2009). Solving ill-defined, wicked problems does not require the analytical scheme pursued in science, which follows an epistemological logic in order to achieve knowledge about scientific truth, since designers only strive for the enhanced viability and novelty of products (Martin, 2017). Design in this context is seen as the ability to create ideas, coordinate different disciplines, and find viable solutions (products, services, systems) for certain needs and groups of users (Krippendorff, 2005).

Designers use professional learning strategies like cognitive patterns to grasp the knowledge and multiple perspectives of others in order to synthesize and creatively transform the knowledge into new service or product concepts. In contrast to analytical thinking in science, we call those strategies design thinking (DT; Brown, 2008). To understand how this thinking works, it is useful to learn about the Double Diamond approach (presented in Figure 4; Design Council, 2015), used for separating the problem and solution space, as well as for the diverging/converging nature of the process (Liedtka, 2011).
In business, DT uses the sensibility and methods that have traditionally been used by designers to match people’s needs with what is technologically feasible and by what a viable business strategy can convert into customer value and market opportunity (Plattner et al., 2011). The idea of applying design approaches to management is still largely undeveloped although it has been discussed in numerous studies over two decades (Simon, 1996). First, DT can describe the cognitive processes of designers, particularly the way designers solve problems. Second is the application of a designer’s cognitive processes in order to solve business problems, drive innovation, and foster growth (Kimbell, 2012).

### 2.6 A synthesis of the literature review

Traditionally, service is defined as a process that consists of a chain of activities (Davenport, 1993) that are created within interactive processes between the seller and buyer (Svensson & Grönroos, 2008). SDL sees service as the application of specialized competences (knowledge and skills) through actions and processes for the benefit of another entity or the entity itself (Lusch, 2006). Service science is the study of service systems, which are dynamic value co-creational configurations of resources like people, processes, organizations, technology, and shared information. SDL can be seen as the philosophical foundation of service science, and the service system is its basic theoretical construct (Maglio & Spohrer, 2008). The value creation system consists of the most important resources, activities, and partnerships that are required in order to develop and produce an offering that will deliver the value created for customers during the order–delivery process (Osterwalder & Pigneur, 2002). SDL covers the whole value creation system, and thus, the same lexicon shall be used when discussing the business model and resource...
management, covering all the value creational activities, not only marketing. In this study we have connected encountering (marketing), business model development, service production, and service design to the SDL perspective. The outcome is a lean framework for an agile and co-creative business development in a constantly transforming market that follows the ADR method (Sein et al., 2011).

Digitalization is mainly associated with technology, but obviously it is more about how technology changes the market, customer expectations, and business processes, and thus constantly alters the business environment. From a firm’s perspective, digital transformation requires continuous adaptation to the constantly changing environment, generating the need to continuously sense and respond to the changes in the marketplace. In SDL, the company’s value stream no longer starts with a product but instead starts with the customer—changing direction of the stream from a push to a pull direction (Kuula & Niemi, 2016). An organization that produces services must therefore adapt its offering and deliveries according to the demand of the service market, aiming to co-create services for the customer’s changing needs in a pull-stream manner (Article I). Also, the company’s business model must follow the same logic and be tested continuously against changing needs and competition (Article II).

In the service-centered view, the consumer is always also involved in the continuous production of value. Even with tangible goods, production is an intermediary process, not the end of value creation (Vargo & Lusch, 2004). Value emerges for customers and is perceived by them (Grönroos, 1990). As the consumer is the beneficiary of the produced value, value creation is only possible when a good or service is consumed. An unsold good has no value, and a service provider without customers cannot produce anything (Gummesson, 1987). Value for a customer is created through interactions between the customer and the supplier (Grönroos & Ravald, 2011). SDL naturally underlines the collaborative nature of value creation (Payne et al., 2008; Vargo & Lusch, 2004). The cost-efficient commercialization of value co-creational services leads to the need for systemization.

In co-creation, the goal is to scale creativity by collaborating and integrating value with the entire value-creating ecosystem, from competitors and partners to customers’ customers (Lusch, 2006). A company that genuinely utilizes its network is smarter and more agile, and tolerates the instability of its operational environment better. When we are dealing with the customer’s strategic needs, it is important that marketing, product development, and delivery are aligned in order to produce the service (Article I).
Co-creation can be divided into two components: the co-creation of value (explained above) and co-production (Lusch, 2006). In the other words, we can talk about the commercial approach and technical approach to the same topic. A modular platform is required to gain efficiency in service production, systematizing solution sales. Commercial and technical items should be divided according to service structure levels in order to form the commercial and technical portfolios (Tolonen et al., 2014). The configurability of the commercial portfolio should be built based on value propositions, and the technical product portfolio should be structured utilizing well-defined, repeatable technical items.

Many business ventures fail, not because they fail to build what they set out to build but because they waste time, money, and effort building the wrong solution (Ries, 2011). DT applies design tools for iterative business development (Kimbell, 2012). In practice, this means that a problem is reframed in making sure that the right problem is solved and a vague picture of the service can initially be drafted and put on the market at an early stage to be boldly tested (Brown, 2008). When sufficient data is gained through DT to test the value proposition, the solution for value capture and the following business model can be prepared. Service innovation in the SDL framework involves three different elements: the service ecosystem, the service platform, and value co-creation (Lusch & Nambisan, 2015). Their study saw that a common worldview, architectural alignment, and the structural flexibility of organizations were required for co-creative service innovation. The service innovation in our study was always co-creational.

Table 3. The main topics of this dissertation.

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<thead>
<tr>
<th>Topic</th>
<th>Key concept</th>
<th>Main references</th>
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<tr>
<td>Efficient service production</td>
<td>Modularization, Service management</td>
<td>Cova &amp; Salle (2008), Storbacka &amp; Pennanen (2014), Tolonen et al. (2014)</td>
</tr>
<tr>
<td>Service design</td>
<td>Design thinking, Lean startup</td>
<td>Brown (2008), Bitner et al. (2008), Ries (2011)</td>
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Based on SDL literature, the delivery items are competences and processes, and products are the delivery mechanism for services. Lean thinking is turning the value stream from push to pull, which alongside of co-creational SDL and iterative development cycle is a real enabler for the equal partnership through the ecosystem. Wide organizational encountering, not only with a customer but with the entire ecosystem and pull-driven business design, is the baseline for SDL business development. A lean and iterative approach to business development is required in order to put SDL principles into practice. In our literature review, we also found that delivery efficiency was separately dependent on each different deliverable. Expertise is the foundation for delivering value, processes are a solution platform for systematization and reproducibility, and modular service components further improve the delivery efficiency and support solution formation. DT is an enabler for co-creative commercialization and continuous transformation as it requires responding to evolving needs in the changing market conditions.
3 The research contribution

3.1 SDL in KIBS development

The increasing size of the service sector in all developed economies is driving the need for more service-oriented marketing and business logic. The marketing approach has developed over the decades since Porter’s 4P (1985), and at the center of the transformation is value definition, which has transformed from value in exchange to value in use. Digitalization is accelerating globalization and the pace of business development. More importantly, it is returning the customer, instead of product, to the center of the business model. In industrial times, products were sold, but in the digital age, services are bought. The change in view is more than becoming customer oriented, it actually changes the whole value stream (Womack & Jones, 1986) from being push oriented to being pull oriented and having cross-organizational value determination and co-creation, where the supplier is adapting their operant resources to the customers’ dynamic needs.

Value creation justifies the existence of a company, being the foundation of its business. In this dissertation we have aligned the productized service deliverables (value in exchange) and customer needs (value in use) by utilizing a value co-creation SDL framework (Vargo & Lusch, 2004). SDL provides a solid foundational framework for exploring value co-creation and resource integration, particularly in the KIBS market.

SDL implies that value is co-created with the consumer rather than delivered in the output. In SDL, operant resources (i.e., core competencies like knowledge, expertise and processes) are the deliverables and all actors are resource integrators (Vargo & Lusch, 2008). The industrial revolution created GDL, which came to create efficiency in scale, whereas digitalization is service oriented by nature, short in lifecycle, and easy to copy, thus it requires continuous and iterative solution development and cross-organizational value co-creation. Cross organizational approach for value co-creation requires cultural backbone for common entrepreneurial customer service, and lean organization where people are respected and authorized for value creation (see Figure 5).
The first article (Article I) addressed the first research question of this dissertation: How can SDL be systematically utilized in business development and encountering with a KIBS? This interpretive case study research described the cornerstones for the systemization of service business by first reviewing literature to find out the approaches behind SDL, then conducting a feasibility study of SDL, and finally illustrating a practical application of the co-creation framework by applying the ADR method.

As discussed above, the cornerstones of SDL are service orientation, resource integration, and value co-creation (Vargo & Lusch, 2004). Because the customer is always seen as a value creator and value is always determined by the beneficiary, the value stream in co-creation can be also be seen as pull driven (Vargo & Lusch, 2004). Lean thinking is described as a value-creating process that is capable, available, adequate, flexible, flowing, and pulled (Womack & Jones, 1996), which aligns it with the main SDL and lean principles. In lean thinking, the suppliers’ efficiency can be measured with value density (the level of competency) and value stream density (optimizing the utilization of value-creating actions) (Article I). In pull-
directed value creation, the customer defines the need, but obviously a value proposition is required for creating the required trust and engaging the customers. The whole value architecture—including the delivered product and/or service, the revenue model, and the resources—has to interactively deliver, manage, and co-create the proposed value, Figure 6. Resource integration requires the close alignment of actors, which is explored in theory and practice. The starting-point for service-oriented marketing is that customers consume a service, regardless of whether they buy goods or services (Grönroos, 1990). In our paper we used these three elements as the foundation approaches.

In this context encountering means two-way actions between the customer and supplier, commonly seen as a sales process. The encountering process is the facilitator of the value creation (and co-creation) and is therefore an essential part of in this study. The theoretical foundation of our encountering process definition is based on the studies of Payne et al. (2008). The lean approach is aligned with this view and the approach is called the lean startup model (Ries, 2011). In brief, it answers the question: How can we learn more quickly what works and discard what does not work?

![Fig. 6. The value-based competence management process (Reprinted by permission from Article III © 2018 Springer Nature).](image)

The hypothesis that value is defined and co-created with the consumer (Vargo and Lusch, 2004) leads to the requirement for wide, cross-organizational collaboration between the supplier and customer. Turning marketing logic from “making, selling, and servicing” to “listening, customizing, and co-creating” (Vargo & Lusch, 2014)
requires the alignment of marketing, business, and delivery organizations (Article I). It also transforms the traditional value chain (Porter, 1985) so that it becomes pull directed (Kuula & Niemi, 2016). Slywotzky (1996) presented a similar approach in his appreciated value migration theory, which described how a company selects its customers, defines and differentiates it offerings based on the selected customer’s needs, defines the tasks it will perform, and configures its resources based on that.

Payne et al. (2008) explored value co-creative encountering in the context of SDL and developed a framework for understanding and managing value co-creation between customer and supplier. They saw three different dimensions to encountering: emotion (feelings), cognition (thinking), and behavior (doing). The literature review and our empirical research confirmed the need for a practical value co-creation framework with the three main components of customer value-creating processes, supplier value-creating processes, and encounter processes—the practices that take place within customer and supplier relationships. During the research period we ended up adding elements from two other frameworks (Bitner et al., 2008; Cova et al., 2002). In our synthetized framework we divided the approach of Payne et al. (2008) into three subdomains (Figure 7)—onstage, backstage, and support relations—based on the Service Blueprint concept.

![Fig. 7. The lean SDL encountering framework](Reprinted by permission from Article I © 2015 RESER).
The cross-organizational approach (considering business, technology, and marketing organizations) to value co-creation requires lean organization, where people are authorized for value creation, and there is transparency of competences and all the stakeholders in the value chain. Lean thinking is based on iterative governance, adaptive processes, self-organization, trusting people, and continuous improvement. The main principles of this approach are based on a focus on the customer, the vision of his or her needs, and a description of an iterative approach in getting to the desired target. On the way, one has to remove inefficiencies and waste, seek continuous improvement, and empower the people operating in the process, and one must do all this in a systematic way. Lean thinking in the company culture enables the distribution of decision-making and authority to customer liaisons to enable the co-creation of value.

Co-creation is an experience and a way to work, not an offering. This experience is based on the value added by each involved actor. Co-creational encountering is organized between the involved individuals and their experiences. The repayments are clear: the firm is more engaged with its customers and develops its offering based on real-world needs. The company has better transparency and therefore better trust in its commitment. Sales are not a cost but embedded in the value co-creation, and value creation is agile and iterative.

3.2 Continuous and co-creative business model creation

The internet is accelerating the speed of everything, and the life cycles of offerings are getting shorter. It is difficult to create a sustainable competitive advantage based on an offering in a constantly changing business environment, especially with digital components that are hard to protect. Service providers have to adjust their offering and resources based on the dynamic business needs of customers, constantly changing resource integration interfaces, and co-creational service development (Teece et al., 1997). The continuous and co-creational development of an offering is required in order to maintain the required value creation in a dynamically altering market.

Strategic thinking in the unpredictable business environment cannot be limited to products or services. In the digital age any service-oriented business can be challenged and replaced with something more user friendly, useful, and/or cheaper. The firm has to be capable of envisioning the future of its industry and then going out to co-create it with its customers. The business model is the right entity to consider when business logic is changing. New challengers compete not only with the new
offering and value proposition but especially with new business models. Business development in the constantly changing marketplace needs to be iterative and co-creational. The transformation penetrates the entire business model, requiring the continuous review of value creation, value capture, and resourcing.

The business model has to be tested constantly as it is only a hypothesis about things that are in constant change (Drucker, 1994). Digitalization is accelerating technology development, and the third wave of industrialization is revolutionizing markets towards service-dominant change. The change model describes how a company can analyze the need and scope of the required changes in a business model. Also the logic of innovations needs to be understood in order to comprehend the dimensions of the required changes (Christensen, 2010; Govindarajan & Trimble, 2010; Suikki et al., 2006). The second article (Article II) addresses the third research question of this dissertation: What are the dynamics and the framework that enable iterative and co-creative continuous business model development?

In this paper we reviewed literature to find out the acknowledged definitions and approaches of SDL and business model creation, and especially business model transformation. Then we created a synthesis of the studied literature in order to provide a framework for understanding and steering continuous and co-creative business model development. This provided the greatest value to the studied company and was the bridge to further elaboration. Then we studied how to systematically utilize the created business model development framework in a practical business-to-business environment using a qualitative and descriptive single case study. The results were clear and unquestionable. Finally, we discussed and analyzed the findings in relation to existing theories in order to represent a generalized solution addressing the wider use of the created framework.

Based on the literature review, we conclude that there are three common factors in all of the studied business model descriptions:

1. Value creation (who the customer is and what the customer values)
2. The revenue stream (offering, value proposition, commercialization)
3. Strategic resources (core competencies, key processes).

Already forty years ago Schumpeter (1983) connected innovation to economic exchange. He defined innovation as the foundation of business improvement. All of his founding reflects changes to the business model. Mainly based on the work of Christensen (2010), and Govindarajan and Trimble (2010), we selected optimization (preservation), transformation (sustainable innovation), and disruption (disruptive innovation) as the steps of business model development that give perspective
on the envisioned change. Without this perception, activities may be either a leap too far or inadequate, and in the worst case, they may address the wrong problem.

In our business model development framework, we combined the elements of the business model in the SDL-business environment and directed the development based on the described reasoning. Table 4 presents the created framework for continuous business model development.

Table 4. The framework for continuous business model development (Reprinted by permission from Article II © 2017 Springer Nature).

<table>
<thead>
<tr>
<th>Value offering</th>
<th>Revenue Stream</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td></td>
<td>Core competencies: What are the operant resources?</td>
</tr>
<tr>
<td>Foundation: What problem do we solve, what need do we serve?</td>
<td>Pricing model: What value does the customer pay for and how much do they pay?</td>
<td>Information: Is there any IPR customer (market) related, or other differentiation?</td>
</tr>
<tr>
<td>Proposition: How do we gain interest?</td>
<td>Margin model: How customer pay for the value we do provide?</td>
<td>Processes: R&amp;D, sales, purchasing, production, outsourcing, steering?</td>
</tr>
<tr>
<td>Segmentation: Who is our customer, and do we have the same offering for all segments?</td>
<td>Profitability: What is the cost structure (per revenue)?</td>
<td>Financial: Capital intensive, flexible, go-to-market?</td>
</tr>
<tr>
<td>Encountering: How do we liaise with the customer?</td>
<td>Sustainability: What is the resource reusability and velocity?</td>
<td></td>
</tr>
<tr>
<td>Optimization</td>
<td>Optimized?</td>
<td></td>
</tr>
<tr>
<td>Transformation</td>
<td>Developed?</td>
<td></td>
</tr>
<tr>
<td>Disruption</td>
<td>Changed?</td>
<td></td>
</tr>
</tbody>
</table>

The case study for proofing the ADR-developed framework in another environment was conducted in the health care professional service environment between 2014 and 2016. The goal was to test the created framework for understanding the applicability and any changes that may be required in the case company’s business model. In this study we also learned the importance of change perspectives when studying the change models. The case proved that the framework reflects the development path of an iterative business model development process and ensures that the required aspects are considered when continuous and co-creative business development is done.
3.3 Cost-efficient co-creation of KIBSs

In the customer-oriented, extremely dynamic business environment, it is important that a KIBS provider not only develops and provides the right operant resources (skills, competences, processes) but can also develop sustainable internal processes for competitive and cost-efficient service delivery. Internal process development includes the methods and tools for competence management, development, and acquisition, and the service management for providing the right solutions to customers’ altering needs. Solutions are cross-functional by their nature as solutions can be seen as bundles of goods, services, and intellectual properties (Cova & Salle, 2008). Storbacka and Pennanen (2014) defined solutions as processes involving identified value creation opportunities and requiring simultaneous commercialization and industrialization, exploring the differentiation of the offering.

The third article (Article III) addresses the third research question of this dissertation: How can resources in cost-efficient service production be linked to the modular co-creation of a KIBS? In this paper we again followed the value co-creational and system integrational views of SDL in exploring how relative profitability can be increased through efficient service productization. We explored the commercialization of co-created services (the servitization of product-service systems) and the enhancement of service production by service processes. We created a service management framework for modular service delivery where company resources are linked to cost-efficient co-creation services. Cost efficiency in this context means implementing the service processes and related tasks correctly, getting the desired outputs from the defined inputs without wasting resources re-engineering repetitive solutions.

The commercialization of solutions is a definition of the offering based on customer needs. In commercialization, the focus is on a company’s ability to understand the value creation process of its customers, offering a solution that improves the customers’ value creation processes. In the solution sales, a company may also be able to change its pricing model based on transactions or based on the provided value. Commercialization refers to a provider’s ability to understand the customer’s value creating processes, create solutions that enable improved value creation for the customers, create demand for these solutions, sell the solutions to the individual customers, and receive compensation based on the customer’s value in use (Payne et al., 2008). Therefore, we can say that SDL focuses on commercialization more than production.
Servitization is one of the major trends in service commercialization, referring to the process of creating value and gaining competitiveness by adding services to products (Baines et al., 2009; Wise & Baumgartner, 1999). Based on SDL, commercialization is a co-creative process wherein services are not added to products, but products can be embedded in services, and embedded products are seen as vehicles for service delivery (Vargo & Lusch, 2014). In this research question, our focus was on cost efficiency, and therefore we were especially interested in delivery-related organizational and operational service production where the productization of services means standardizing the service processes so that they resemble products, making service delivery less complicated and more replicable (Jaakkola et al., 2009).

It is important to separate service production and value creation: production is the process of making the resources available to customers, who integrate those resources in the value creation processes (Grönroos & Ravald, 2011). Modularization (Bask et al., 2010; Pekkarinen & Ulkuniemi, 2008b), and SDL (Vargo and Lusch 2004; Vargo, Maglio, & Akaka, 2008; Vargo & Lusch, 2008; Vargo, 2009) are the foundations of our theoretical framework, separating the commercial offering from the service production.

Customizing products by using a modular production platform is an established way of serving a heterogeneous market efficiently (Baldwin & Clark, 2006). Both the repetitive service production and processes—called the solution platform—together with modularity, are fundamentals for the repeatability and scalability of the service production. Product management literature divides productization and product portfolio management into commercial and technical parts (Tolonen et al., 2014). The commercial product portfolio defines service configurations, product families, and solutions, and the technical platform ensures efficiency. Figure 8 describes the modular service delivery process.
Productivity in the professional service business lies in functions between the pricing, resource costs, and internal efficiency of processes and competence management, including productized delivery modules. In SDL the customer determines the value of the outcome, so the waste reduction increases the supplier’s profit. Competence management is the foundation of efficiency for all professional service providers (Niemi, 2017), and service management is a key function lying behind the systematized delivery process, enabling the use of productized service components. In the case organization, the technical portfolio had well-defined competence portfolio management and sustainable processes for systematized and repeatable service production. The case company used the productized, repeatable service components to further improve the cost efficiency of the service delivery. Delivery efficiency is defined to be related to

1. efficient competence management,
2. transparent encountering,
3. enabling value co-creation, and
4. efficient service management, enabling re-use of the developed service components.
Figure 9 depicts the produced service management framework for modular service delivery.

In SDL, solution design begins with a definition of a customer problem and ends with the identification of the services that will be needed to solve the defined problem (Vargo et al., 2004). Within SDL the technical service portfolio can be used for structuring processes to provide solutions in a cost-efficient manner, but predefined productization might be more challenging to achieve because customers manifestly take part in the delivery. In the SDL environment, the co-creational service offering is aligned with customer needs through the earlier-described encountering process. Our framework supports decentralized organizations in operationally efficient value creation by modularizing the technical portfolio. Our framework is well aligned with modularization, and we suggest that customers influence the value proposition in a commercial portfolio and co-create value through the solution platform.
Value generation in this co-creational relationship is a process that includes actions from several actors: the service provider, the customer, and the other actors in the ecosystem.

3.4 Co-creational service design of (knowledge-intensive) business services

Digital transformation shall be seen as continuous adaptation to the constantly changing environment. By rephrasing the famous Darwin citation (Megginson, 1963), it can be said that it is neither the strongest nor the most intelligent companies that survive but the most responsive to change. A dynamic, iterative, design-led approach to creating human-centric services, based on tested real-world data, is key in seeking the co-creational approach to do the “right things.” Digital transformation requires a continuous review of value creation, value capture, and resourcing.

In the fourth article (Article IV) we answer the fourth research question of this dissertation: How can a co-creational service design approach for cross-functional KIBS development be defined? In this article we aligned the service deliverables (value creation) and customer needs (value capture) by utilizing DT in the value co-creational SDL framework. Applying the DT was a lengthy process. First, we sought to identify the usability, acquire user experience (UX) design capabilities, service design competences, and finally the business design expertise. Service design was almost possible to develop based on the existing understanding of the notion, but in ADR we were strengthening that competence by acquisition. Business design was the hardest angle to understand, but DT provided a solid foundation from which to see value capture connected to value proposition and creation.

Offering development through service design requires an understanding of the customer outcome and process. It does not seek scientific truth but seeks the enhanced viability and novelty of the solution (Plattner et al., 2011). In this study, we saw service design as an emerging professional learning strategy, coordinating different disciplines in finding viable solutions for the named needs of the named users (Martin, 2011). Service design takes a coordinating role for multiple stakes as a facilitator as it relies on the knowledge of others.

Service design synthetizes and transforms the collective knowledge into the new service concepts. This approach is generally called design thinking (DT). DT combines end-user experience, systems thinking, iterative rapid prototyping, and multi-stakeholder feedback as a solution to the particular problem (Brown et al.,
DT is a human-centric management practice that advantages the service design practices in business development. DT is focused on gaining an understanding of an area of human experience, aiming to transform this integrated knowledge into new solutions, taking account of the angles of value, creation, and capture (Brown et al., 2008; Dunne & Martin 2006; Lindberg et al., 2010). DT focuses on the end user’s expectations and experiences, assuming that a service provider must adjust its offering and operations to serve the customer in a value co-creational relationship.

DT is harnessed to disciplined processes where the modeled solutions lead to either failing fast or providing a solution through iterative development and testing. When compared to DT, lean startup (Ries, 2008) has strong similarities, like user centricity, iterative learning, and extensive team communication. DT starts by reframing the problem. Reframing starts with the people, with empathy, and makes sure that one is working on the right problem (Blank, 2013). A double-diamond shape is used to describe the DT process, aiming to visualize the thinking modes, and divergent and convergent thinking, along the design process (Figure 10.). In the divergent mode (upward) the designer aims to widen his or her point of view and understand all root causes for a challenge rather than accept the first, most obvious answers. Also, in the ideation phase, the designers aim to envision many possible solutions instead of just one. In the convergent mode (downward), the designer aims to analyze and synthesize his or her thinking in order to create clarity and focus (Design Council, 2015). Practical design methods like user diaries, journey mapping, and character profiles are used through all phases.

Fig. 10. The case company’s processes for co-creative service design in 2017 (Reprinted by permission from Article IV © 2020 IEEE).
The construction process of this article had three main iterations in order to find the solid state of the co-creational service design process. The third and final iteration (in 2016), combined business design and service design together under a DT framework and co-creational delivery management. The solution is defined in detail as an outcome of the framework development, assuming general applicability in KIBS business development processes. In this model the conceptual service design process follows DT in the exploration of the problem space, and a lean startup circle is used for defining and prototyping the solution. When the solution is proven to meet the expectations, the final solution is developed with agile methods through using the minimum viable product (MVP) technique. In the MVP phase the solution and development process have to pass the final acceptance from value-creational and value-capture angles. Within this process, our goal is to start from the customer’s strategy and service vision, aligning value-creational activities with early-stage experiences, evaluating alternative problem spaces, creating prototypes for iterative testing, evaluating ideas and concepts for solutions, and redefining the goal as a continuous process.

3.5 Results synthesis, and how the service provider maintains its relevance in constantly changing market conditions

Digitalization, globalization, and the increasing size of the service sector in all developed economies are driving the need for more service-oriented marketing and business logic. In this study we have tested SDL in a real business environment, applying it to management, a business model, service production, and encountering, including service design. Services, by nature, do not create customer needs but respond to them, and services are considered from the point of view of the buyer, not the seller. The industrial revolution created efficiency in scale whereas digitalization enabled creativity to be scaled up.

The world economy is moving towards ecosystems and related service platforms, which makes the co-creational approach to business development essential. Digitalization-driven continuous transformation of the markets requires iterative development. The value stream in the service economy is pull directed—the supplier needs agility when responding to the customer’s co-defined demands, not the other way around. Lean thinking helps firms to understand and act in this environment. Encountering in the co-creational relationship requires transparency and trust, and not all actors are capable of co-creation. Business, engineering, and marketing organizations have to be aligned in enabling co-creation. This requirement alone
holds back many companies from co-creation. In the times of industrialization, organizations were optimized for mass production and therefore built in silos. The created lean SDL encountering framework supports professional service firms in iterative value co-creation.

In the digital age almost any service business can be challenged and replaced by something more user friendly, useful, and/or cheaper; technology is running years ahead of innovation. New challengers compete not only with the new embodiment of the offering or value proposition but also with new business models. A business model has to be clearly defined and able to constantly monitor and manage the required changes in business design. Because customer needs are also dynamic, the approach to the desired development has to be iterative, based on a continuous response to sensed opportunities.

Services are consumed in their delivery, wherein, based on SDL, all actors are resource integrators. In this setup the whole value architecture, the revenue model, and the organization have to interactively co-create the proposed value. In the created business model development framework, we combined the simplified elements of the business model in the service-dominant business environment and synthesis was connected to the dimensioned change model based on the described rationale.

Co-creation unavoidably leads to a customized service, and the service provider still seeks the advantages of the economy of scale in service production. In other words, cost efficient co-creation simultaneously requires pull-driven, unstructured commercialization and a structured service delivery process, leading to modular solution delivery structure. A modular solution platform—where technical service structure is combined with a seamless competence management process with embedded repetitive service components,—enables efficient service production while the commercial portfolio remains co-creative and customer centric.

The cost-efficient commercialization of value-co-creational services leads to the need for systemization, and therefore, we composed a framework where the service deliverables are split into three categories: the technical portfolio, the commercial portfolio, and the solution platform. In our study we chose an approach where frequently performed service components were identified, productized, and made available to experts through a competence management system. The customer may or may not be aware of the modularized delivery process, but in gaining the benefit of productized services, the company should either have a transactional or value-based pricing mechanism, or productized components should be priced separately, which refers us back to the business model.
Based on the co-creative approach to service design, value stream begins with the pull from the customer. Through having multiple perspectives, service design should synthesize and creatively transform the collective knowledge through new service or product concepts. DT is focused on gaining an understanding of human experience and business targets based on data, making sure the right problem is solved. When it comes to the definition phase, it is important to remember that DT is explorative throughout the whole process, hence the definition phase can only provide hypotheses for the following co-creational and iterative development.

According to our study, the best possible way to succeed in service definition and design is to already deliver prototypes to stakeholders in the early phase, getting feedback soonest in order to guarantee the expected value and solution fit for the customer, and its clients’ needs. During validation we discovered that one of the most important things in the service design process is the organizational learning itself. The main outcomes of the executed research are listed in Table 5.

Table 5. The main outcomes of this dissertation.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Key concept</th>
<th>The main outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service-dominant logic</td>
<td>Co-creation, lean thinking</td>
<td>Service-oriented business logic, encountering in co-creation.</td>
</tr>
<tr>
<td>Business model dynamics</td>
<td>Business model, Change model</td>
<td>The definition and dynamics in the business model transformation.</td>
</tr>
<tr>
<td>Efficient service production</td>
<td>Modularization, Service management</td>
<td>Putting products into services while co-creating the solution.</td>
</tr>
<tr>
<td>Service design</td>
<td>Design thinking, Lean startup</td>
<td>A co-creational definition of the service design</td>
</tr>
</tbody>
</table>

Digital transformation penetrates the entire business model, requiring continuous review of value creation, value capture, and resourcing. The cross-organizational approach for value co-creation requires a common cultural backbone where people are authorized for value creation. Lean service production focuses on providing value, eliminating waste, facilitating communication, and easing technology and channel agnostic integration. Our studies demystified the whole KIBS process flow from design to delivery with a managerial approach.

Based on SDL, in the service economy neither product nor service creates value on its own, but the value is embedded in the value creation processes rather than provided as a service to the customer. In service co-creation, supplier processes are seen as a value stream while core competences are the value particles, and a suppliers’ operational efficiency can be measured with value density (the
level of competency) and value stream density (the utilization rate of value-creating actions), bridging SDL to lean thinking. In the lean process the competence development and quality of service are built into the system. Continuous co-creation requires lean processes, beginning from the pull of the customers’ value proposal.

Lean thinking is embedded into the leadership. With Lean thinking we can combine strategic insight, pull-driven competence management, and business control into an agile entity, which core is in insightful experimenting and iterative development. A business model needs to follow the iterative transformation of the marketplace. DT is focused on gaining an understanding of an area of human experience and supports the solution definition in making sure the right problem is solved. The value architecture including the delivered products and/or services, the revenue model, and the aligned organization, have to iteratively deliver and interactively co-create the proposed value. Figure 11 defines the business development framework for the co-creational approach in a KIBS.

Fig. 11. The framework for continuous co-creation.

Value co-creation requires a change in the dominant business logic from “making, selling and servicing” to “listening, customizing and co-creating.” A company cannot be agile in decision-making nor lean in leadership without empowerment and support from its owners and board. Cross-organizational value creation requires trust. Management can gain trust by giving a clear description of the firm’s

- value creation (who the customer is and what the customer values),
- revenue stream (offering, value proposition, commercialization), and
- strategic resources (competencies, processes, organization, culture).
With a common view of these guiding factors, the board and management can together constantly monitor and manage the required changes in business design, measuring efficiency in service production and ensuring customer-centric business development. It is good to notice, that customer relationship management in this setup is embedded into the operational leadership as defined in the Article I. Obviously, this lean leadership, which was embedded all the way into the development, was also a natural part of the focal company Siili’s culture and leadership structure. In this way we can say the other thing was leading to another one, and these two things were inseparable. Assumption that value is defined and co-created with the consumer, leads to requirement for wide cross-organizational collaboration between the supplier and customer.
4 Discussion and summary

4.1 Theoretical implications

In this study we have used co-creational value creation and ecosystem resource integration as the cornerstones when applying SDL in wide organizational encountering, business model development, modular service production, and continuous service design. Table 6 summarizes the theoretical contributions by publication.

Table 6. A summary of the theoretical contributions.

<table>
<thead>
<tr>
<th>Original publication</th>
<th>Theoretical contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Service Dominant Logic – how to systematize service business</td>
<td>A definition of lean cross organizational co-creation with KIBS processes. This framework provides a structured approach for integrating value creation across organizational boundaries.</td>
</tr>
<tr>
<td>II. Continuous and co-creative business model creation</td>
<td>A broadened view of a business model’s definition from the SDL perspective. This framework emphasizes the dynamic and co-creative nature of business model development.</td>
</tr>
<tr>
<td>III. Cost-efficient co-creation of knowledge-intensive business services</td>
<td>A co-creational service management framework for modular KIBS delivery. This framework supports the efficient coordination of service creation processes.</td>
</tr>
<tr>
<td>IV. Co-creational knowledge-intensive business service design</td>
<td>A systematical service design approach for co-creational and cross-functional KIBS development. This approach facilitates the design of services that are co-created with customers.</td>
</tr>
</tbody>
</table>

The first original publication (Article I) aligned SDL principles with KIBS business development. A value creation system consists of the most important resources, activities, and partnerships that are required in order to develop an offering that will deliver the value created for customers during the order–delivery process (Osterwalder & Pigneur, 2010), and therefore, SDL should not only be seen as marketing logic but also as the foundation for business transformation. Based on SDL, in the service economy neither product nor service creates value on its own—the value is co-created with the customer (Vargo & Lusch, 2008a). In other words, value is embedded in the value creation processes rather than provided as a service to the customer (Edvardsson et al., 2012). Furthermore, the customer co-creates the solution and pulls it in a customer-centric process (Gummeson, 2008). This thinking turns value chain–thinking (Porter, 1985) upside down. The practical definition of this co-creational relationship is thinly described and less studied in marketing.
literature. Co-creation is also generating debate among marketing scholars (Svensson & Grönroos, 2008).

Payne et al. (2008) explored the value of co-creative encountering in the context of SDL and developed a conceptual framework for understanding and managing value co-creation between customer and supplier. In our research we used the framework of Payne et al. for data gathering and analysis regarding the customer encounters of the case organization. However, during the research period we ended up adding elements from two other frameworks (Bitner et al., 2008; Cova et al., 2002) and proposed an improved version of the lean SDL encountering framework.

In the second publication (Article II) we created a business model development framework for continuous business development in the SDL business environment. Business model literature was reviewed and reflected through the SDL perspective, taking account of the continuous change in the market, and a synthesis was presented as a framework. Al Debei et al. (2010) described a business model as “the rationale of how an organization creates, delivers, and captures value.” Based on the literature review, we conclude that there are three common factors in all of the studied business model descriptions: value creation, strategic resources, and the revenue stream. Furthermore, we explained the elements of these three dimensions within the SDL lexicon.

In an early definition of business logic, Drucker (1994) already presented the idea that the key elements of the business have to be constantly tested as they are subject to change following the created hypothesis. Creating a sustainable competitive advantage in a constantly changing business environment is difficult, especially with hardly protected and rapidly developing digital technologies. The firm has to be capable of envisioning the future of its industry and then co-creating it with its customers. We explored literature about innovation and transformation thoroughly in defining the change dimensions in a business model. Christensen (2010) has explored the sustainability of business, creating a classification of sustainable and disruptive innovation, and developing an S-curve approach for testing the technological innovations. Govindarajan and Trimble (2010) used a similar approach for business development. Based on Christiansen’s, Govindarajan and Trimble’s ideas, we selected optimization (preservation), transformation (sustainable innovation), and disruption (disruptive innovation) as the measurable stages of business model development.

The created framework was giving a foundation to common value definitions. It was helping the focal company in defining the expected influence of the co-created solutions. Often, companies want to loosely use the benefits of digitalization
to support their business, without being able to define more precisely what goals are essential to their business. The created matrix was not only leading focus on areas where development is expected, but also defined the depth of the expected transformation.

In the third publication (Article III) we studied the linear profitability growth challenge of professional service firms; the same resources drive growth and costs. Modularization with the embedded products—putting products into services, also called productization—is proposed as a solution to this dilemma. This thinking is based on modularization theory (Sawhney 2016), productization theory (Järvi, 2016), and SDL’s foundations (Vargo & Lusch 2004), which are bridged to lean thinking (Hines et al., 2004; Liker, 2004; Womack & Jones, 1996) and service management theories (Tolonen et al., 2014). The challenge is in productizing the professional service based on individual expertise, which requires the definition of a continuously co-creational solution.

KIBS providers inevitably face challenges in the repeatability of their service production. Besides co-creational definition the cost efficiency is essential in the service production and it can be expected to improve along with standardized service production. Modularity can be seen as a means to standardize service production and, thus, achieve better customer value and profitability.

Product management literature divides productization and product portfolio management into commercial and technical parts (Tolonen et al., 2014). A commercial product portfolio describes a company’s offering, and a technical product portfolio structures the technical solution for deliverables. In the co-creational SDL environment, the commercial part is pull driven, based on the customers’ individual needs and resources. A modular service portfolio approaches service delivery from the systematization perspective where the technical portfolio can be productized with the embedded components. This productized service structure also further enables the digitalization of the selected service elements.

We explored the commercialization of co-created services (the servitization of product-service systems) and the enhancement of service portfolio management by using a modular service delivery framework wherein company resources are managed for the cost-efficient co-production of services. Co-creation allows for customized services (products) while still taking advantage of economies of scale. A KIBS sets knowledge as a fundamental resource for service business. SDL frames co-creation as a baseline for the value stream, aligning it with the pull-directed value stream of lean thinking. In both philosophies, the customer determines the value of the offering. KIBSs and SDL also name operant resources (competences,
i.e., knowledge and processes) as the key components in the service delivery. Based on lean thinking, the supplier processes can be seen as a value stream in service co-creation, where core competences are the value particles, and the suppliers’ efficiency can be measured with value density (the level of competency) and value stream density (the optimized utilization rate of value-creating actions).

A dynamic approach to creating user-centric services based on tested data is essential in the digital age. Services are created within interactive processes between the seller and buyer (Svensson & Grönroos, 2008), leading to a wide encountering interface for understanding end-user value definition (Article I). Offering development through service design requires an understanding of the customer outcome and customer process (Plattner et al., 2011). Service design must take on a coordinating role for multiple stakes as it relies on the knowledge of others. Through multiple perspectives, service design should creatively transform the collective knowledge through new service or product concepts. This approach is generally called design thinking (DT; Brown, 2008; Martin, 2011).

The main contribution of the fourth publication (Article IV) is in validating DT as a definition process for a co-creational commercial portfolio with a KIBS. In our study we developed and described a co-creational service design approach for cross-functional service development in a constantly altering business environment for our case company, aiming to systematize the delivery process. Service design as a lean methodology when a company, in this case an IT company, helps its customer to create a new service.

The overall theoretical contribution in all the published articles is the combination of SDL and lean thinking especially in the defined digitally transforming environment. Beginning from the organizational setup through all the development, we maintained pull-driven approach, keeping the customer needs in the focus of iterations. This iterative approach enabled the continuous co-creation, leading to the long-term relationship, which altered the encountering with the customers.

4.2 Managerial implications

This dissertation demonstrates that agile responsiveness in the transforming market requires SDL, an iterative business model development, lean operations with modular solution structure, and the continuous review of value creation (DT). The goal of this study was to find a solid foundation and theoretical frameworks for transforming a resource-based consultancy practice into a customer-oriented KIBS provider. Development began from business logic (why?), continuing onto the
Table 7 summarizes the managerial implications by publication.

**Table 7. A summary of the managerial implications.**

<table>
<thead>
<tr>
<th>Original publication</th>
<th>Managerial implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Service-dominant logic – how to systematize service business</td>
<td>Turn from relieving services to enabling services with co-creational solutions.</td>
</tr>
<tr>
<td>II. Continuous and co-creative business model creation</td>
<td>Focusing to customer specific business solutions, not just digitization.</td>
</tr>
<tr>
<td>III. Cost-efficient co-creation of knowledge intensive business services</td>
<td>Building lean service production by putting products into services.</td>
</tr>
<tr>
<td>IV. Co-creational knowledge-intensive business service design</td>
<td>Ensuring the right problems are solved, continuously.</td>
</tr>
</tbody>
</table>

This journey began with a managerial question: How can a resource provider be transformed into a service provider? The author has extensive experience of developing different international service businesses, but at this time, the challenge was new as it covered the entire business. Based on earlier experience, the author explored the productization theories and the first transformation journey, supporting the research plan, was “The productization of professional services, from resources to services.” In that early phase, the bottom-line was service quality theories like 7P (Brown et al., 1991), service management theories (Grönroos, 1990), relationship marketing theories (Grönroos, 1996), and key account management (Hakanen, 2014). A solution-oriented customer-centric offering, transparent business model, agile deliverables with lean project management, and the best customer experience–seeking company culture were named as hypothesis of success. My thesis supervisor was leading the study towards SDL (Vargo & Lusch 2004; Gummesson, 2008; Grönroos & Gummerus, 2014; Vargo, 2018), which became the foundation for the transformation journey and this dissertation.

The first original publication (Article I) aligned SDL principles with KIBS business development. Based on SDL, in the service economy neither product nor service creates value on its own—the value is co-created with the customer (Vargo & Lusch, 2008). This co-creation was an integral guideline through all the business development activities during the study. The definition of a co-creative solution
begins with the customer’s needs, which pull along value-creative actions as the value stream from all related actors. The first research question was related to the management of this value-creational configuration in practice. A lean SDL encountering framework was built as an ADR, where three real-life customer cases were used as the building platform, related theories were applied, and cross-organizational value creation was documented. We believe that the results of this study can support numerous organizations in understanding pull-steered value co-creation in their business development process. We proved the usefulness of the lean SDL framework for the case organization with our empirical results, documented in three different customer cases. We believe that the same encountering frame is useful for all professional service companies, although it was tested only with a KIBS.

In the second publication (Article II) we created a business model development framework for continuous business development in the SDL business environment. The business model dimensions have to be constantly tested in the changing business environment, and iterative business development is required for an agile response to challenges and opportunities. Business model development is an under-studied notion, especially in the value co-creative business environment where business development happens continuously and co-creatively with the customer. The main contributions of this paper are applying change model thinking in business model evolution, which is based on Christensen’s S-curve theory (Christensen, 2010), and the framework for continuous business model development in a service-dominant, co-creative business environment, which we present through a descriptive case study of business model innovation in the health care business.

In the executed case analysis, we revealed three important aspects of how SDL is changing business model thinking. The first aspect is that business model development is a process rather than a series of separate transactions carried out by a specific function. The second related aspect is that business model development has to be iterative, systematic, and measurable. The third aspect is how the required changes are defined: how big a leap is required and which components of the business model it affects. In the study we learned how continuous and iterative business model development sharpens a firm’s offering and increases its competitiveness. We believe that the results of this study could help numerous service organizations to understand the need for structured and continuous business model development as an essential part of sustainable business development.

Professional service firms have a linear profitability growth challenge whereas the same resources drive growth and costs. Modularization with the embedded products—putting products into services, also called *productization*—is proposed
as a solution to this dilemma in the third publication (Article III). We have explored how relative profitability can be increased through efficient service productization and created a service management framework for modular service delivery wherein company resources can be linked to the cost-efficient co-creation of services. The managerial implications of the efficiency study involve the cost-efficient co-creation of a KIBS, based on the commercial service product portfolio and technical service process portfolio according to the product structure concept. The commercial service product portfolio describes the service offerings as solutions, product families, service product configurations, and service sales items. The technical portfolio consists of version items, service processes, capabilities, and resources. Modularization together with competence management and embedded product portfolio management, is a key to the efficient co-creation of services. Based on the service product management literature (Tolonen et al., 2015) and two major ADR cycles, we have created a framework for efficient service management and modular service delivery.

The cross-organizational approach to value co-creation requires lean organization and a modular service structure divided to a commercial portfolio, solution platform, and technical portfolio. Based on our study, we chose an approach where frequently performed service components were identified and productized in the technical portfolio and co-creational problem solving was done in the commercial portfolio. Service management, done on the solution platform, is a key function in enabling the systematized delivery process and the use of productized service components. As we learned in the study, this systematization is a demanding process when solution development is pull directed, but it is possible to reach and maintain a solid state with the structured technical portfolio. We also learned that the component definitions should be clear and accessible, preferably integrated into the competence management system. Lean thinking is the underlying key theory in systematizing the processes and value creation. The customer may or may not be aware of the modularized delivery process, but in gaining the benefit of productized services, the company should either have a transactional or value-based pricing mechanism, or productized components should be separately invoiced. Value-based pricing was left out of this dissertation as the results of the particular study were ambiguous.

Many business ventures fail, not because they fail to build what they set out to build but because they waste time, money, and effort building the wrong solution (Ries, 2011). Through multiple perspectives, service design should synthesize and creatively transform the collective knowledge through new service or product
concepts. DT starts by reframing the problem, making sure that people are working on the right problem and enabling the ongoing and responsive development of business and services (Blank, 2013). The main contribution of the fourth publication (Article IV) is validating DT as a definition process for a co-creational commercial portfolio with a KIBS. In our study we developed and described a co-creational service design approach for cross-functional service development in a constantly altering business environment for our case company, systematizing the delivery process.

Overall the learnings of this dissertation and an answer to the original research question (How does a KIBS provider maintain its relevance in constantly changing market conditions?) can be summarized in five phases, as follow:

- **Phase 1.** Adopt SDL; products are sold, services are bought; value co-creation, pull, encountering; SDL & co-creation.
- **Phase 2.** Define the value stream of critical (operant) resources and the management system (tools and processes); competence management and competence acquisition; continuous learning; lean thinking.
- **Phase 3.** Enable the dynamic capability to respond to continuous change through continuous business model creation; change management, dynamic strategy; the business model.
- **Phase 4.** Sense the change, challenge the problem, and continuously design the services; DT.
- **Phase 5.** Develop productivity by putting products to services; modular product-service delivery.

We have seen, that SDL together with lean thinking is providing a sound foundational framework for understanding continuous value creation in a service-dominant age. In the service economy, the supplier has to understand the customers’ value creation, and the supplier has to be able to transparently collaborate and co-create the value offering with the customer. After that, the supplier has to be able to provide a fluent value stream and a corresponding business model. Service and business development have to be iterative in order to be able to respond to the changes in the business environment.

The created approach was first taking the focal case company from the resource provider position as the trusted advisor, added the continuous business development capabilities in creating the meaningful recurring business with its customers, optimized the continuous value delivery, and created an approach for continuous value definition.
This pull-driven, value-focused development was working extremely well in Siii’s digital-oriented ecosystem, also with the less IT-oriented companies like a health care company Heltti. During the time of this study, we developed its revenue ten-fold, its profit 20-fold, and its enterprise value 30-fold. The tight connection to theoretical groundwork brought interesting factors to the business development, for example agile steering which enabled a continuous steady 10% EBITDA over a seven-year journey. We strongly believe that the same approach, focused on continuous value-adding, will work in other service industries, such as marketing or utility construction, to name a few.

4.3 Reliability and validity

The main quality criteria in qualitative research are the confirmation of findings and credibility. In this research we connected ADR to develop the business of a publicly listed company, using its ecosystem to further examine the studied theories and developed frameworks. The presented development was monitored not only by the development project members but also by the management team of the named subject of the study. The results are publicly seen as the real-world business development results, and the collected data, including the interviews and case studies, is also partially documented in the published annual reports and other company releases. In this study, the researcher established the credibility of the findings during a research project that was over six years long. The research process was regularly reviewed with the supervising professor and other doctoral researchers. Pragmatic action research meets Lincoln and Guba’s (1985) principle of trustworthiness as a combination of action research and design research provides sufficient quality criteria to ensure the results of the research. In order to improve the validity of research, it should be guided and evaluated by explicit quality criteria (Sarker et al., 2013) and (as presented before, in Section 1.3) we closely followed these guidelines.

According to Hevner et al. (2004), design science research should explicitly present a theoretical contribution in order to differ from regular system development. We have designed, implemented, and evaluated each development step in the case organizations in order to understand how to systematically reach and maintain relevance in the evolving service market. The management of the case organizations was involved, it evaluated the designs and appreciated the results, and the main case organization has grown extraordinary steadily and profitably, both during and after the research period. Therefore, this ADR is a “weak market test” realization of market-based research validation (Kasanen et al., 1993) because there are
one or more case organizations using the designed construction and appreciating its usefulness.

According to Brymand and Bell (2003), qualitative research can be viewed from four observational perspectives that give an understanding about the validity and reliability of the research: (1) the trustworthiness perspective, (2) the perspective of the validity of the results in different environments, (3) the perspective of the repeatability of the observations, and (4) the perspective of the impact of the researcher’s experience and the overall value of the results. Trustworthiness was built based on the defined process. The results were measurable in the real-world environment and proven over several years of research and development. The approach was always based on extensive literature review, and if the theory did not meet the practice in the interventions, multiple ADR cycles were used. The interviews for this study involved not only the main studied company, but also other companies in its ecosystem, customers and suppliers, were used to develop and prove the repeatability of the developed approaches. The interviews were organized in a semi-structured manner, thus allowing the freedom to collect additional viewpoints during the interactions between the researcher and interviewees. In this study, when the researcher was actually heading the business development as a CEO of the main subject of research, the researcher obviously influenced the subject of research, which was the ADR projects. Otherwise the researcher did his best to remain as objective as possible during the analysis.

In summary, we believe that the results of this study could help numerous organizations to understand SDL and co-creation in practice. We encourage other researchers and practitioners to apply the created frameworks in other service companies in order to strengthen the market test and collect wider experience from different business environments.

4.4 Recommendations for further research

Service design and development in the digital age are breaking down traditional barriers between industry segments, creating completely new value chains and new business opportunities that may not be filled by incumbent players or business models. The new, unseen, and born-global services amplify demand for service-oriented business and marketing logic. Rapid and agile business development is required for responding to change. In this study we have created an encountering framework for KIBS co-creation in an IT-oriented ecosystem, but we believe it is useful for wider use in professional services and even beyond that. We would like to use the same
service-dominant lean thinking in, for example, the construction industry and marketing services space, applying the same approach to optimize the continuous value co-creation.

The revenue stream is an essential part of the chosen business model. In service co-creation, supplier processes are seen as a value steam wherein core competences are the value particles, and the suppliers’ operational efficiency can be measured with value density (the level of competency) and value stream density (optimizing the utilization of value-creating actions). The concept of value differs depending on the context and viewpoint, and it is dependent on different factors. Therefore, pricing can very rarely be directly tied to value creation. Value-based pricing would be an interesting subject of further investigation, especially if studied together with dynamic business model development.

Co-creative service design with responsive business design, modularization (including modern productization), and supportive process development are proven to bring success to a KIBS in the digital age. Obviously, we want to seek other companies, also with another nature, in order to repeat the successful development and its exploration; we now have a business development project ongoing with the similar business case that is based on the frameworks created in this dissertation, and when implementation is ready, we will present the results as an article. Also, longitudinal perspective would be good to examine, within this study we made continuous improvement and long-term continuity could not be verified.
List of references


Original publications


Reprinted with permission from RESER (Article I), Springer Nature (Articles II and III), and IEEE (Article IV).

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


734. Mahmood, Shahriare (2020) The substantive approach for managing demand and supply sustainably in fashion industry

735. Laukka, Aleksi (2020) The effects of microalloying on the scale formation of AISI 304 stainless steel in walking beam furnace conditions

736. Ali, Samad (2020) Learning-based predictive resource allocation for machine type communications


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CONTINUOUS CO-CREATION OF KNOWLEDGE-INTENSIVE BUSINESS SERVICES