Department of Industrial Engineering and Management

# Customer Orientation in Industrial Service Innovation

## Deepening the Understanding on Customers, Needs, Involvement, and Value

Heidi M. E. Korhonen

Aalto University

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**Heidi M. E. Korhonen**

A doctoral dissertation completed for the degree of Doctor of Science (Technology) to be defended, with the permission of the Aalto University School of Science, at a public examination held at the lecture hall TU1 of the school on 2 September 2016 at 12.

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**Abstract**

Customer orientation is a business approach that emphasizes customer value and satisfaction of customer needs. As a general approach it is widely seen as beneficial for business and innovation. Yet there is a need to better understand it in the context of industrial service innovation. This dissertation is aimed at filling that research gap. The traditional view of innovation in the industrial context has emphasized technology and physical goods. Recently manufacturers' focus has shifted from goods to services, product-service systems and customer solutions. Simultaneously the discussion on user driven and open innovation has questioned the role of technology. The importance of customer orientation for manufacturers has grown as they have turned to service providers and as open innovation has gained ground in industry. At the same time industry has had challenges in becoming customer oriented and in innovating industrial services.

This article dissertation based on four published studies employs abductive case research strategy. The empirical data has been collected from 31 manufacturing and technology companies in the B2B context: 16 in the supplier role and 15 in the customer role. Two of the published studies are multiple case studies, one is a single case study, and one is a theoretical study.

The theoretical contributions are a novel framework of customer needs in the B2B context, an illustration of different innovation types through a single conception of innovation, and novel perspectives on utilizing open and closed innovation. The four studies together deepen the understanding on nested customers, business customers' needs, customer involvement and customer value.

The dissertation examines customer orientation as an evolving concept that can be applied in various ways in different contexts. The managerial implications highlight transformation of industry that has manifested itself as servitization and that is foreseen to accelerate in the near future. It is suggested that a wider view than the customer-supplier interaction should be taken and that industrial service innovation should be seen as nested systems change. Then innovation not only encompasses products and services but wider ecosystems where humans and the society are essential actors and beneficiaries. Customers and other stakeholders are inherently involved in innovation. The new approach on customer orientation requires a focus on value co-creation at multiple systems levels and in multiple directions. It also requires management of co-development utilizing both open and closed innovation, and creation of favorable dynamics for interactive learning.

**Keywords** customer orientation, industrial service business, service innovation, business customers' needs, customer involvement, value creation, open innovation, user driven innovation, system innovation, business ecosystem, abductive case research

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**Tiivistelmä**

Asiakaslähtöisyys on asiakasarvoa ja asiakkaan tarpeiden täyttämistä korostava liiketoiminnan menettelytapa. Se nähdään laajalti hyödyllisenä ohjeena liiketoiminnalle ja innovaatioille. Sitä on kuitenkin tarpeen ymmärtää paremmin teollisuuden palveluinnovaatioiden kontekstissa. Tämän väitöskirjan tarkoituksena on täyttää tuo tutkimusaukko. Perinteinen näkemys teollisuuden innovaatioista on korostanut teknologiaa ja fyysisiä tavaroita. Viime aikoina huomio on siirtynyt palveluihin, tuote-palvelu -järjestelmiin ja asiakasratkaisuihin. Samalla keskustelu käyttäjälähtöisestä ja avoimesta innovaatiosta on kyseenalaistanut käsitystä teknologian roolista. Asiakaslähtöisyyden merkitys teollisille yrityksille on kasvanut kun ne ovat siirtyneet palveluntarjoajiksi ja kun avoin innovaatio on saanut jalansijaa teollisuudessa. Toisaalta teollisuudella on ollut haasteita asiakaslähtöisyyden ja palveluinnovaatioiden toteuttamisessa.

Tässä neljään julkaistuun tutkimukseen perustuvassa artikkeliväitöskirjassa käytetään abduktiivista tapaustutkimusstrategiaa. Empiirinen tutkimusaineisto on kerätty 31 valmistus- ja teknologiayrityksestä: 16 yrityksestä toimittajan roolissa ja 15 yrityksestä asiakkaan roolissa. Kaksi tutkimusjulkaisua perustuu monia yrityksiä sisältävään tapaustutkimukseen, yksi yhden tapauksen tutkimukseen ja yksi teoreettis-käsitteelliseen tutkimukseen.

Väitöskirjan teoreettiset kontribuutiot ovat uusi malli asiakastarpeista yritysmarkkinakontekstissa, erityyppisten innovaatioiden havainnollinen esittäminen yhden innovaatiokäsitteen avulla ja uudet näkökulmat avoimen ja suljetun innovaation hyödyntämiseen. Kaikki neljä osatutkimusta yhdessä kasvattavat ymmärrystä asiakkuuksien sisäisistä kytkennöistä, yritysasiakkaiden tarpeista sekä asiakkaiden osallistamisesta ja asiakasarvosta.

Väitöskirja tarkastelee asiakaslähtöisyyttä kehittyvänä käsitteenä, jota voi soveltaa eri tavoin eri tilanteissa. Käytännön suositukset korostavat teollisuuden transformaatiota, joka on ilmennyt palvelujen lisääntymisenä ja jonka ennakoidaan kiihtyvän lähitulevaisuudessa. Suosituksissa kehotetaan ottamaan asiakas-toimittaja vuorovaikutusta laajempi näkökulma ja tarkastelemaan teollisuuden palveluinnovaatioita monikerroksisena järjestelmämuutoksena. Siten innovaatiot eivät koske ainoastaan tuotteita ja palveluita vaan laajempia ekosysteemejä, joissa oleellisia toimijoita ja hyötyjiä ovat ihmiset ja yhteiskunta. Asiakkaat ja muut sidosryhmät ovat luontaisesti osallisia innovaatioissa. Uusi lähestymistapa asiakaslähtöisyyteen edellyttää huomion kohdistamista arvon yhteistuottamiseen monilla eri systeemitasoilla ja monilla eri suunnilla. Se edellyttää myös yhteiskehittämisen johtamista avointa ja suljettua innovaatiotoimintaa yhdistelemällä ja suotuisan dynamiikan luomista vuorovaikutteiselle oppimiselle.

**Avainsanat** asiakaslähtöisyys, teollisuuden palveluliiketoiminta, palveluinnovaatiot, yritysasiakkaiden tarpeet, asiakkaiden osallistaminen, arvon yhteistuottaminen, avoin innovaatio, käyttäjälähtöinen innovaatio, systeemi-innovaatio, liiketoimintaekosysteemi, abduktiivinen tapaustutkimus

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# Acknowledgements

No Man Is an Island

No man is an island entire of itself;
every man is a piece of the continent, a part of the main.
If a clod be washed away by the sea, Europe is the less,
as well as if a promontory were,
as well as if a manor of thy friends or of thine own were.
Any man's death diminishes me,
because I am involved in mankind.
And therefore never send to know for whom the bell tolls;
It tolls for thee.

MEDITATION XVII
Devotions upon Emergent Occasions
John Donne (1624)

During the course of this dissertation journey I have learned to understand the way my work is intertwined with the work of others, and the way it rests on the ground laid by scholars before me. My research in this dissertation lives on and takes new forms in future discourse as new contributions are made by new researchers to come. Looking to the nearest future, I am particularly curious to see where the discussion will take me at the public defense of my dissertation. I will be honored to have Professor Faïz Gallouj from University of Lille 1, France as my opponent. I highly appreciate his work and would like to thank him in advance for sharing his thoughts and guiding my journey.

Associate Professor Daniel Kindström from Linköping University, Sweden and Professor Kim Wikström from Åbo Akademi University, Finland have been the preliminary examiners of this thesis. I would like to express my gratitude for their valuable insight and constructive comments, which have helped me to improve this dissertation to its final form.

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helped me to refine and better express my view and learn in the process. Her work and dedication has left an important mark in my dissertation and in me.

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I also want to thank sincerely my co-author Ilari Kaarela whose contribution and support has been essential. It was a great learning experience to write articles with someone that is so intelligent and such an excellent writer, someone that understood so well what I wanted to write about and shared his ideas with me. His constructive criticism was also very important for me. It was always easy to sit down to write with him as we had so much fun and laughter when working together.

Getting support from a peer in a similar situation has also been very important during the writing of this summary part of my dissertation. My colleague Kirsi Hyytinen has given me such support and I want to thank her deep from my heart for sharing with me the joy and despair of dissertation writing.

This dissertation has been written in the course of several research projects. Many individuals have contributed to the setting up of those projects and to the carrying out of the project work. My sincere gratitude goes to all the people that have been involved; this research would not have been possible without the contribution of you all.

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I also wish to sincerely thank my closest collaborators at VTT in the single case study in a consultative setting: Iiro Salkari and Dr. Tiina Apilo. I am particularly grateful for the representatives of the welding solutions company for

their support and sharing of insight, and for letting me do academic research in such a project.

I did part of the writing in the FutIS research program. FutIS has also connected me with a wide community of industrial service researchers. I would like to thank VTT's FutIS team: Markku Mikkola, Ilari Kaarela, Dr. Tapio Koivisto, Joona Tuovinen, Magnus Simons and Iiro Salkari, as well as our FutIS collaborators in Fimecc and the different universities and companies.

Leaders at VTT have also made it possible for me to write this dissertation. They have given me encouragement and support, opened doors for me, helped me with funding, and allowed me to take time for the writing. Many of them have acted as project responsible directors in these projects. In particular, actions to further service research at VTT have been important. Thank you Iiro Salkari, Dr. Peter Ylén, Dr. Maaria Nuutinen, Markku Mikkola, Päivi Mikkonen, and Dr. Matti Kokkala.

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I am grateful for the input from the editors and anonymous reviewers. It has been invaluable for my research. It has often been through trial and error and the hard work of editors and reviewers that I have learned.

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The research funding I have received from Tekes – The Finnish Funding Agency for Innovation – and in particular from the Serve Programme, has been very important in enabling this type of persistent research on industrial service innovation. The research projects have also been funded by VTT and the companies involved. The finalizing stage of the dissertation has been funded by The Finnish Work Environment Fund and VTT. I am very thankful for all the research funding.

I am grateful for my closest ones, my friends, relatives and family for being there for me, for supporting me during this journey and for reminding me of the life outside the research chamber. I want to thank my parents-in-law and my brothers-and-sisters-in-law with their families for always being there for our family and helping with our children. I want to thank my parents and my brothers with their families. They have always had great faith in me and encouraged me with my studies. Mom, you taught me to appreciate and seek for the beauty in life. Dad, you taught me to seek for the truth and never take it for granted. I am grateful for your love and having you in my life. My deepest gratitude goes to my husband and my children. Your love nourishes me and wakes

me up to appreciate what is truly precious. I want to thank you Heikki for your support, for being my husband and a father to our children. Tuuli and Tuukka, you have been so patient with my scientific endeavors and grown to be such caring, smart and capable individuals. I am so proud of you.

Science helps us understand the world. We should use this understanding to make the future better. Looking simultaneously to the past and to the future I would like to end these acknowledgements with a quote from The New Science of Giambattista Vico (1725)

*"… there shines the eternal and never-failing light of a truth beyond all questions: that the world of civil society has certainly been made by men, and that its principles are therefore to be found within the modifications of our own human mind."*

Espoo, 30 May 2016
Heidi M. E. Korhonen

# Contents

# List of abbreviations

| | |
|---|---|
| ASO | Augmented service offering |
| B2B | Business-to-business |
| CDL | Customer-dominant logic |
| CKM | Customer knowledge management |
| CRM | Customer relationship management |
| C-Understanding | Development of customer understanding in strategic industrial services (a research project) |
| e-business | Electronic business |
| FutIS | Future Industrial Services (a research project) |
| Fimecc | Finnish Metals and Engineering Competence Cluster |
| ICT | Information and communication technologies |
| IHIP | Intangibility, heterogeneity, inseparability and perishability of services |
| IMP | Industrial marketing and purchasing |
| IT | Information technology |
| KAM | Key account management |
| KET | Key enabling technologies |
| KIBS | Knowledge intensive business services |
| MARKOR | A measure of market orientation by Kohli et al. (1993) |

| | |
|---|---|
| MKTOR | A measure of market orientation by Narver & Slater (1990) |
| NPD | New product development |
| NSD | New service development |
| OI | Open innovation |
| OSI | Open service innovation – practices and outcomes (a research project) |
| PS | Product service |
| PSS | Product-service system |
| R&D | Research and development |
| RDI | Research, development and innovation |
| RQ | Research question |
| SDL | Service-dominant logic |
| SL | Service logic |
| TAPI | Business-to-business service innovation based on customer needs (a research project) |
| UDI | User driven innovation |
| Tekes | Tekes – The Finnish Funding Agency for Innovation |
| VTT | VTT Technical Research Centre of Finland |
| WPS | Welding procedure specification |

# List of figures

# List of tables

# List of original publications

This dissertation is based on the following original publications. They have been reproduced with kind permission from the publishers.

**Article I** Korhonen, H.M.E. & Kaarela, I., 2011. Corporate customers' resistance to industrial service innovations. *International Journal of Innovation Management*, 15(3), pp.479–503. Available at: http://www.worldscientific.com/doi/abs/10.1142/S1363919611003343X. © Imperial College Press

**Article II** Korhonen, H., 2013. Organizational needs: A co-creation and human systems perspective. *Journal of Business Market Management*, 6(4), pp.214–227. Available at: http://www.jbm-online.net/index.php/jbm/article/view/65. The original article was published under a Creative Commons Attribution No Derivatives 3.0 Unported License CC BY-ND 3.0.

**Article III** Korhonen, H.M.E. & Kaarela, I., 2015. Practices for involving organizational customers in service innovation. In R. Agarwal, W. Selen, G. Roos, R. Green, eds. *Handbook of service innovation*. London, UK: Springer-Verlag, pp. 591–615. Available at: http://www.springer.com/br/book/9781447165897. © Springer International Publishing.

**Article IV** Korhonen, H.M.E., 2014. Widening the perspective on industrial innovation: A service-dominant-logic approach. *Technology Innovation Management Review*, 4(5), pp.31–39. Available at: http://timreview.ca/article/791. 

# Contribution of the author to the publications

**Article I** As the main author of Article I, I developed the idea for the study. The C-Understanding project team from VTT participated in the data collection. I chose the guiding principles and theoretical frameworks and analyzed the data. The literature review was conducted, paper was written and conclusions were drawn in collaboration with Ilari Kaarela.

**Article II** As the sole author of Article II, I developed the idea for the study. I chose the guiding principles, conducted the literature review, created the framework, wrote the paper and drew the conclusions. Language check was carried out by Semantix Finland Oy.

**Article III** As the main author of Article III, I developed the idea for the study. The OSI project team members from VTT and Aalto University participated in the data collection. The guiding principles and theoretical frameworks were chosen, literature review and data analysis were conducted, paper was written and conclusions were drawn in collaboration with Ilari Kaarela. Transcription of the interviews was carried out by Tutkimustie Oy and language was checked by Semantix Finland Oy.

**Article IV** As the sole author of Article IV, I developed the idea for the study. The company representatives and other VTT researchers in the development program participated in the data collection. I chose the guiding principles and theoretical frameworks. I conducted the literature review and the data analysis. I wrote the paper and drew the conclusions. Language check was carried out by the journal.

# 1. Introduction

This doctoral dissertation discusses customer orientation in industrial service innovation. The research is focused on customer orientation and innovation; and the context is industrial service innovation. The empirical studies have been carried out in business-to-business context and most of the case companies are manufacturing companies but there are also some technology companies among them. The dissertation brings together two separate theoretical backgrounds – innovation research and marketing research – concentrating especially on the intersection of research on open and user driven innovation and research on service marketing. The dissertation consists of two parts. The first part presents an overview of the dissertation, which includes introduction, theoretical foundation, research questions and process, methodology, results and discussion. The second part presents the original Articles I-IV on which the dissertation is based.

The concept of service is used by scholars in two different ways: it can emphasize the distinction between goods and services (Edvardsson & Olsson 1996) – or it can emphasize service as value creation (Vargo & Lusch 2004). Scholars accentuating the significance of services as a type of offerings distinct from physical goods are getting rarer. Instead, it is increasingly common to emphasize the nature of service as focus on customer solutions and value – i.e. as serving the customer in the sense of acting for the benefit of the customer. Both these perspectives are essential for understanding innovation in industrial context. On one hand the share of service-type offerings as distinct from goods is increasing in the manufacturing sector. On the other hand more and more manufacturers are adopting the service marketing view that both goods and services should render customers valuable service – they should work for the benefit of the customer (Veugelers 2013). The two perspectives are very interesting from the viewpoint of innovation and the empirical studies of this dissertation take them both into account. They are both important aspects in the phenomenon of servitization, which means the spreading practice in all kinds of industries to add services to core corporate offerings in order to improve customer value and create closer and more lasting customer relationships (Vandermerwe & Rada 1988; Oliva & Kallenberg 2003; Neely 2008; Baines, Lightfoot, Benedettini, et al. 2009; Baines, Lightfoot, Peppard, et al. 2009; Wilkinson et al. 2009).

While service in its both forms, as services-type offerings and as customer value, has become increasingly important for industry, manufacturers to a large extent still rely in their innovation efforts on the stage-gate model (Cooper & Kleinschmidt 1986) that emphasizes technology push and product development. When it comes to service innovation research, a large part of research efforts have especially focused on knowledge intensive business services (Gallouj & Savona 2009). It seems that the studies on industrial services and servitization of industry only rarely discuss innovation theories explicitly. As manufacturers' margins and ability to renew themselves is more and more dependent on the successful innovation of industrial services, there is clearly need for more research on industrial services that is focused on the phenomenon of innovation.

Customer orientation as a business approach underlining satisfaction of customers' needs and creation of customer value is the core essence of marketing. As such it is widely accepted today and found especially important for innovation. In addition to customer orientation being important for innovation in general it is accentuated in service innovation: service in the sense of a type of offering distinct from goods underlines customer orientation due to the nature that services as offerings typically have; and service in the sense of focus on customer value underlines customer orientation even more as the focus on customer value is the core idea of customer orientation.

The first philosophical underpinnings of customer orientation were stated by Drucker (1954) in his highly influential book on practice of management (Mohr & Sarin 2009; Carpenter 2010). This classic book is considered a turning point in how management is seen today as a scholarly and practical field (Zahra 2003; Webster Jr 2009). In the book, Drucker (1954) redefined the role of a firm, not just as a hierarchy of resources for creating a profit in a competitive environment, but as a social institution that contributes to the environment shaping it and that enables people to use their talents and develop in what they do. He emphasized the essential role of customers in determining what a business is, what it produces and how it succeeds, and stated that the purpose of business is to create a customer (Drucker 1954). Another pioneering contribution accentuating customer orientation was Levitt's (1960) classic article where he described how the myopic vision of managers, focusing on products instead of customer needs, makes even the strongest growth industries fall. He stressed that "the entire corporation must be viewed as a customer-creating and customer-satisfying organism" and that "management must think of itself not as producing products but as providing customer-creating value satisfactions" (Levitt 1960, p.56).

These two landmark publications (Drucker 1954; Levitt 1960), both influenced by the concept of creative destruction (Schumpeter 1942), laid the ground for the study of customer orientation. It has since then been a topic of vivid discussion among management practitioners and scholars. It is a central issue for strategy creation; key strategic choices for any firm being which customers to serve and how to serve them (Porter 1985; Kim & Mauborgne 2005). Customer orientation, focused on both present and future customer needs, is

fundamental for innovation success (Christensen 1997). It is the core idea of the marketing concept – the "sense-and-respond" philosophy highlighting that in order to succeed an organization needs to be oriented towards satisfying customer needs, wants and aspirations better than competitors (Levitt 1960; Kotler & Keller 2006; Webster Jr 1988; Kohli & Jaworski 1990).

After great initial excitement, Levitt's (1960) article received major criticism stating that companies also need to focus on competition and capabilities in their strategies, not only customer value (Mintzberg 1994). As a reaction and a sign of a new wider focus, the term "customer orientation" was in most instances replaced by the term "market orientation". The concept of market orientation can be seen as a further evolved and broader version of the concept of customer orientation. That is why the core contents of these two terms are the same and they are often used interchangeably. Some authors find no relevant difference between the terms (c.f. Shapiro 1988) while some others treat customer orientation as a central subcomponent of market orientation (c.f. Narver & Slater 1990).

Several studies indicate that customer orientation is essential for superior business performance (Narver & Slater 1990; Jaworski & Kohli 1993; Slater & Narver 1994; Deshpandé & Farley 1998). However, despite decades of research and evidence, companies still have a hard time understanding their customers (Narver et al. 1998; Christensen & Raynor 2003; Mason & Harris 2005; Grönroos 2007). They still fail in innovation the same way as described in Levitt's (1960) seminal article. It is well known that many innovation efforts fail in their commercialization as customers do not adopt or buy the new innovations (Rothwell et al. 1974; Crawford 1977; Cooper 1980; Tidd et al. 2005; Barczak et al. 2009).

There is great variance also in the performance of industrial service innovations after their commercial launch (Ettlie & Rosenthal 2012). While some manufacturers succeed in their industrial service business exceptionally well, there is a substantial group of servitizing manufacturers that struggle to break even as their customers are unwilling to pay for the new industrial services and revenues are low (Reinartz & Ulaga 2008). Most manufacturers find it extremely difficult to generate service revenues at a level that corresponds to the level of development costs (Gebauer et al. 2005; 2006). It is quite common that manufacturers do not know which services their customers want (Anderson & Narus 1995). They often struggle on two fronts when trying to become service providers: at the customer front and within the company itself (Vandermerwe & Rada 1988). In other words, servitizing manufacturers are often struggling when trying to get their industrial service innovations adopted. Yet, it is very hard to find previous research on the reasons why manufacturers are having such difficulties with getting customers to adopt industrial service innovations.

There are however studies on the transformation processes of manufacturing organizations turning into servitized organizations. The transformation is usually seen as slow and difficult (Gebauer & Fleisch 2007) and it is often seen as necessary for manufacturers among other things to develop their customer

orientation in order to succeed in the transformation process (Oliva & Kallenberg 2003). Recently it has been suggested that the role of customer orientation in the transformation may be even bigger, as it may be possible for customer oriented manufacturers to apply the most advanced service strategies successfully right from the start (Turunen 2011).

Simultaneously with the servitization of industry and the discussion on customer orientation within marketing, there has been a parallel discussion about the role of customers and customer value among practitioners and academics in the fields of innovation management and research and development. This discussion has highlighted the role of actors external to a company – especially customers – in innovation. Von Hippel (1988) pointed out that the sources of innovation shift, and often the innovation process is centered on the user who recognizes the need, solves the problem, makes the prototype and proves its value in use. Christensen (1997) further pointed out that it is the customers rather than the management, who in practice control what a company can or cannot do, and what is the fate of a certain technology. These prominent ideas have led to the development of demand and user driven innovation practices and policies and they can also be seen as applications of customer orientation. Chesbrough (2003) further built on the understanding that outside forces such as customers, suppliers and competitors have a much greater impact on market and technology development than anything that happens inside a single company. He therefore replaced the idea of an innovation process confined within firm boundaries (closed innovation) with the idea of open innovation (OI), in which both external and internal ideas and paths to market are utilized. This can be seen as a widening of the concept of customer orientation to other parties.

From the very start, customer orientation was about the purpose of business and the core job of management (Webster Jr 1988). However, marketing – whose role is to ensure that the voice of customer and customer needs are incorporated in business practice – is often thought of as plain selling and advertising. Comparatively, research and development is often focused on technological development and products lines, not on customer value. Marketing has been seen to be in crisis (Bartels 1974; Brown 1995; Holbrook & Hulbert 2002; McDonald 2009; Webster Jr & Lusch 2013) which has given rise to renewal movements such as relationship marketing and service marketing. Lately, the service-dominant logic of marketing (Vargo & Lusch 2004; 2008) has risen from this background and revised the marketing concept and customer orientation by accentuating the importance of customers as value co-creators.

The service-dominant logic of marketing (SDL) is a restatement or reinterpretation of customer orientation (Vargo & Lusch 2006). This restatement is visible in the logic in many ways, but the most important issue is the view of service as value co-creation. Service (singular) in SDL is defined differently from services (plural), which are a category of non-goods offerings. Service in SDL means the process of an actor using its resources for the benefit of another party or itself (Vargo & Lusch 2008, pp.2, 6). As different actors integrate

resources this way in networks of networks, value creation becomes interactive and therefore it is referred to as the *co-creation* of value (Vargo 2009).

As has been discussed above, customer orientation has been approached in many different ways and using many different terms in innovation research and marketing research. The term "customer orientation" is used in this dissertation instead of e.g. marketing orientation in order to accentuate the dissertation's specific focus on interaction with customers. There are also many different concepts very close to customer orientation that have been used in literature. Such concepts are e.g. user driven, customer focus, customer centricity, customer insight, customer understanding, customer based, customer driven, and customer interaction. The reason I have chosen to use the concept of customer orientation and not one of these other concepts is that customer orientation is a top level concept that is wider than any of these other concepts. The discussion on customer orientation includes these other discussions. Further, the use of the concept allows me to emphasize customer interaction not just as information collection about the customer but as mutual interaction that takes place in both directions.

After six decades of discussion started by Drucker (1954), it is reasonable to conclude that customer orientation is important for innovation and business performance, but the question is still far from resolved. We are witnessing ever-new expressions of customer orientation in innovation research and marketing research as represented by e.g. user driven innovation, open innovation, and service-dominant logic of marketing. All these new mindsets are visible also in the practice of corporate strategy and innovation management, how people regard innovation and how they behave in their development efforts. This dissertation aims to deepen understanding of customer orientation in the specific context of industrial service innovation.

The rest of this summary part of the dissertation is structured as follows. The section two describes the theoretical foundation of the work starting with theory on customer orientation as a concept, continuing with innovation theories on innovation drivers and processes, then bringing these two discussion streams together in the context of service innovation, further deepening the theoretical discussion on industrial service innovation, and ending in a synthesis of the theory. The third section presents the research questions and research process. The fourth section describes the methodology of the dissertation. It first starts by describing the research approach through the choice of epistemological and ontological choices and then continues by explicating the abductive case study research that utilizes both multiple and single case studies. The end of the methodology section also discusses the validity, reliability and generalizability of the research. The fifth section presents the core results research question by research question. The sixth section is a discussion section that synthesizes the results; describes the theoretical, managerial and policy implications of the dissertation; and presents limitations and prospects for further research.

# 2. Theoretical foundation

The dissertation is theoretically grounded on customer orientation, innovation, and the relationship between them. Therefore, the theoretical introduction starts with customer orientation and its logic of learning about and responding to customer needs. It is the common theme that is approached from different angles in the four original articles. Second, innovation theories are discussed in order to clarify their view of innovation processes: what these processes are like and what drives them. Next, the focus will be narrowed to theories of service innovation in specific. The understanding of the close relationship between customer orientation and innovation will be deepened in a discussion of service innovation and the central role of customers in it. Then, the focus will be further narrowed from service innovation in general to the specific application area in industrial and technology companies. Thus the discussion is lead from service innovation to industrial service innovation and servitization of industry. Theoretical basis of industrial service innovation will be introduced as this is the context of the research. It will also be discussed, what are the new views that the service-dominant logic of marketing brings to the discussion on industrial service innovation.

One of the original articles of this dissertation also utilizes some other theories, such as organization theories and theories on human needs. These theories are not introduced here as they are tightly linked to the specific argumentation of the article that discusses needs. They are introduced and utilized in the article and in the chapter discussing its results to carry out the analysis in them.

## 2.1 Customer orientation as a concept

This chapter presents the evolution of the discussion on customer orientation starting with the ground laying early works, the influence of strategic planning and relationship marketing and proceeding to the plethora of operationalizations and quantitative research. The chapter then presents customer orientation among other constructs of strategic orientations and discusses the multiple dimensions of customer orientation. The chapter ends with the most recent perspectives on customer orientation – the dominant logics. The end of the chapter in particular focuses on the service-dominant logic that has been claimed to mean more than traditional customer orientation (c.f. Vargo & Lusch 2004; 2008).

### 2.1.1 Early views on customer orientation and the influence of strategic planning

The highly influential early proponents of customer orientation, Drucker (1954) and Levitt (1960) both viewed customer orientation as a top priority for management, but at the same time they saw that it was too important and all-penetrating to be left as the responsibility of management and marketing functions alone. Rather, customer orientation is the whole business as seen from the customer's point of view, an aspiration of the whole organization. This is the view taken by many present marketing scholars as well (Grönroos 2000; Gummesson et al. 2014).

However, the idea that a firm should define itself in terms of customer needs has not been accepted by all. It was especially Ansoff (1965), who argued that it is not enough for a company to focus on customers but that it also should define its strategy based on technical competencies and its own ability to respond to customer demand. The original idea of customer orientation turned to market orientation and merged with strategic planning and management (Webster Jr 1988). Management attention shifted away from customers with the perspective of strategic planning although it is in no way inconsistent with customer orientation; also the difficulty of dealing with constant change implicit in customer orientation and the emphasis on financial management systems and short term performance added to the shift in attention (Webster Jr 1988).

As the concepts of customer orientation and market orientation have changed multiple times over history, it is very difficult to make a clear distinction between them. This closeness of the terms can be seen e.g. in the way that Shapiro (1988, p.120) states that " I've also found no meaningful difference between 'market driven' and 'customer oriented', so I use the phrases interchangeably" as well as in Kohli & Jaworski's (1990) definition of market orientation discussing management issues related to customer needs. On the other hand, Narver & Slater (1990) make a clear distinction between the two terms, but even for them customer orientation is the focal component of market orientation that is seen as consisting of customer orientation, competitor orientation and interfunctional coordination. When such a distinction is made, many researchers still consider customer orientation to be the most fundamental

aspect of market orientation (Heiens 2000). Gummesson (2008, p.316) also points out that "Both in literature and practice the concepts of customer and marketing orientations are mixed up. Marketing orientation is broader, not only including customers but also competitors and how markets function." As can be seen, different authors have somewhat different definitions for customer orientation and market orientation; even today no shared definitions exist of these elusive concepts. Yet, the definitions of both concepts by a wide range of influential authors (Shapiro 1988; Kohli & Jaworski 1990; Narver & Slater 1990; Deshpandé et al. 1993) include similar core content of organization wide focus on customer value. As this dissertation is focused on the customer, the term customer orientation is used. The same idea of customer orientation is also often expressed using the terms customer focus (Webster Jr 1988; Sharp 1991; Vandermerwe 2004; Gulati & Oldroyd 2005) or customer centricity (Sheth et al. 2000; Shah et al. 2006; Kumar et al. 2006; Gummesson 2008a; 2008b; Gebauer et al. 2011).

### 2.1.2 The influence of relationship marketing on the application of customer orientation

Management focus has shifted to different aspects of competitiveness in line with the advancing of strategic management and evolving conceptualizations of market orientation. Lately, the focus in the practice of marketing has reshifted towards more emphasis on customers. This happened as relationship marketing – originally coined by Berry (1983) and strongly influenced by work on services marketing (Grönroos 1983; Gummesson 1987) – became the key marketing issue of 1990's (Ballantyne et al. 2003). Among other macro-environmental forces, the trend was also influenced by the rise of the service economy and total quality management practices as well as technological development that allowed for companies to collect and manage data about their customers, better respond to customer demand, and transfer some responsibilities of the service process to the customers (Sheth & Parvatiyar 1995).

Relationship marketing changed the focus from aggregate demand of mass markets to the relationships with individual customers each having their particular needs. Also, in comparison to early generation services marketing that stressed the short term services episodes, moments of truth (Normann 1984) or critical incidents (Edvardsson 1988) when customer expectations were not met; relationship marketing shifted the emphasis from episodes to the long term of customer relationships (Storbacka et al. 1994; Liljander & Strandvik 1995). Companies adopted key account management (KAM) practices (McDonald et al. 1997) and strategic partnership practices (Anderson & Narus 1991). Further, customer perceived value was strongly emphasized, first in service marketing and relationship marketing (Grönroos 2000) and later in service-dominant logic of marketing (Vargo & Lusch 2004; 2008). Also, in the relational view the customer is a subject, not just an object of marketing efforts. On the information technology (IT) front, software vendors have developed tools for customer relationship management (CRM) and customer knowledge management (CKM) which have been eagerly adopted by compa-

nies (Rowley 2002; Xu & Walton 2005). The growth of e-business, internet economy and big data has further fueled the trend. As marketing often has been viewed as a separate function that stimulates demand through promotional activities; recent technological development has been expected to enable a companywide focus on the customer where marketing is seen as an approach for adjusting the capabilities of the company to respond to customer need (Lyons et al. 2012).

### 2.1.3 The surge of operationalizations and quantitative evidence on customer orientation

The idea of customer orientation has evolved from the marketing concept – the ground laying business philosophy of marketing – and together with marketing. McKitterick (1957) was the first to use the term marketing concept but the central tenet was introduced by Drucker (1954). It suggests that in the long term the purpose of a company is to satisfy customer needs in order to make a profit (Webster Jr 1988). When Shapiro (1988, pp.120–122) described a customer oriented company through the characteristics that "information on all important buying influences permeates every corporate function", "strategic and tactical decisions are made interfunctionally and interdivisionally", and "divisions and functions make well-coordinated decisions and execute them with a sense of commitment", the discussion transferred from defining the marketing concept to definitions of customer orientation. The definitions by Kohli & Jaworski (1990) and Narver & Slater (1990) were the most influential. For them respectively, customer or market orientation is "the organizationwide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organizationwide responsiveness to it" (Kohli & Jaworski 1990, p.6) and "the business culture that most effectively and efficiently creates superior value for customers" (Narver & Slater 1990, p.20) and that "consists of three behavioral components – customer orientation, competitor orientation, and interfunctional coordination – and two decision criteria – long-term focus and profitability" (Narver & Slater 1990, p.21). Ruekert (1992, p.228) defines "the level of market orientation in a business unit as the degree to which the business unit: (1) obtains and uses information from customers; (2) develops a strategy which will meet customer needs; and (3) implements that strategy by being responsive to customer needs and wants". For Deshpandé et al. (1993, p.27) customer orientation is "the set of beliefs that puts the customer's interest first, while not excluding those of all other stakeholders such as owners, managers, and employees, in order to develop a long-term profitable enterprise". For Day (1994, p.37 referring to Day 1990) "market orientation represents superior skills in understanding and satisfying customers".

In dictionary terms, "orientation" means "general or lasting direction of thought, inclination or interest" (Merriam-Webster 2015). Orientation can be seen on both individual level and organizational level. Here the discussion is about organizational level. The early authors describe customer orientation in different ways as a business philosophy (Levitt 1960; Webster Jr 1988), as or-

ganizational behavior (Shapiro 1988; Kohli & Jaworski 1990), and as an organizational culture leading to specific behavior (Narver & Slater 1990; Slater & Narver 1998). These perspectives can also be united (c.f. Deshpandé et al. 1993; Day 1994; Deshpandé & Farley 1998). Hooley et al. (2000) further point out that the conceptualization of Narver & Slater (1990) encapsulates the main aspects of the conceptualization of Kohli & Jaworski (1990). Different authors also emphasize different aspects in relation to customer orientation: Shapiro (1988) is interested in decision making, Kohli & Jaworski (1990) in information processing, Narver & Slater (1990) in interfunctional coordination based on customer and competitor information, Ruekert (1992) in strategy process, Deshpandé et al. (1993) in corporate culture as a set of beliefs, and Day (1994) in organizational capabilities. The view taken in this dissertation is that all these different definitions and perspectives reveal important aspects of customer orientation.

Customer orientation is typically measured using Likert scale questionnaires of self-evaluation for senior managers. Researchers often develop their own measuring instruments, but the most prevalent instruments reused by other researchers are MARKOR by Kohli et al. (1993) and MKTOR by Narver & Slater (1990). There are many empirical studies showing a positive relationship, according to some researchers a moderated relationship, between customer orientation and business performance (Narver & Slater 1990; Ruekert 1992; Jaworski & Kohli 1993; Deshpandé et al. 1993; Slater & Narver 1994; Greenley 1995; Pelham & Wilson 1996; Fritz 1996; Avlonitis & Gounaris 1997; Gatignon & Xuereb 1997; Han et al. 1998; Baker & Sinkula 1999; Pelham 1999; Slater & Narver 2000; Gounaris et al. 2004; Cano et al. 2004; Tsiotsou 2010). However, there are also studies that show different results (Appiah-Adu 1998). The strength of the relationship also varies in different studies and depending on what measures of performance are used. All in all, there is a wide consensus that customer orientation is beneficial and this consensus is only rarely questioned. The importance of customer orientation – especially proactive customer orientation – is emphasized in product development, and several authors argue that the impact of customer orientation on business performance is at least partially channeled through innovation or that customer orientation moderates the effect of innovation on business performance (Atuahene-Gima 1995; 1996; Han et al. 1998; Li & Calantone 1998; Li et al. 1999; Wren et al. 2000; Matear et al. 2002; Agarwal et al. 2003; Kok et al. 2003; Narver et al. 2004; Langerak et al. 2004; Baker & Sinkula 2005; Atuahene-Gima et al. 2005; Kok & Biemans 2009; Wong & Tong 2012). Further, customer orientation is considered especially important for service business and service innovation (Gummesson 1987; Grönroos 1990; Edvardsson & Olsson 1996; Edvardsson et al. 2000; Alam & Perry 2002; Cano et al. 2004; Matthing et al. 2004; Vargo & Lusch 2004; 2008; Alam 2006; Edvardsson et al. 2007).

### 2.1.4 Customer orientation among other strategic orientations

Customer orientation is one orientation in the wide discussion of strategic orientations or "strategic directions implemented by a firm to create the proper

behaviors for the continuous superior performance of the business" (Gatignon & Xuereb 1997, p.78). Depending on their strategy, firms can be oriented at almost anything, like innovation, learning, technology, entrepreneurship, service, research and development (R&D), production, and finance (Siguaw et al. 2006; Calantone et al. 2002; Zhou et al. 2005; Lumpkin & Dess 1996; Lytle & Timmerman 2006; Chaganti & Sambharya 1987) and they also reorient themselves (Day 1999a). Originally the orientation discussion was interested in finding the one best orientation resulting in superior business performance (Hakala 2011). This led to criticism of customer orientation claiming that it is too narrow a focus (Ansoff 1965). As a sign of a new broader focus, the term market orientation was adopted by most scholars (Webster Jr 1988). Since then other wider, more balanced or just different constructs have been further developed what partially explains the plethora of overlapping orientation constructs. A later stream of discussion has seen different orientations more as strategic alternatives that can either be equally good for achieving the same business objectives, or that are more or less effective depending on the situation and its circumstances (Hakala 2011). A further stream of discussion views different orientations as complementary and focuses on combining different orientations together (Hakala 2011).

Recently, increased especially by the interest in servitization, there has also been discussion on organizational service orientation (Martin Jr & Horne 1992; Lytle et al. 1998; Homburg et al. 2002; Lytle & Timmerman 2006; Gebauer, Edvardsson, Gustafsson, et al. 2010; Gebauer, Edvardsson & Bjurko 2010; Kowalkowski, Witell, et al. 2013; Kowalkowski, Kindström, et al. 2013). Service orientation is not the same as customer orientation but the constructs are closely related as most authors view that customer orientation is critical for a firm to be able to implement service orientation. There are basically two alternative ways these concepts are seen as closely related. First, it is often seen as necessary to combine customer and service orientations in the same company in a complementary way so that the company is *both* customer *and* service oriented. Second, the idea of customer focus is often *included* in the concept of service orientation; which is an approach that carries resemblance to the relationship between customer orientation and market orientation as defined by Narver & Slater (1990).

### 2.1.5 Customer orientation as a construct with multiple dimensions

Customer orientation is clearly not an on-off construct and there are multiple ways of being customer oriented. Kohli & Jaworski (1990) as well as Narver & Slater (1990) made the point that customer orientation is a continuum. More customer oriented does not necessarily always mean better, as there probably is an optimal level after which the incremental cost of increasing customer orientation exceeds the incremental benefit (Narver & Slater 1990). This optimal level may change from firm to firm so customer orientation is not necessarily as important for all firms or firms in different circumstances may need to apply customer orientation in a different way.

An important criticism towards customer orientation that relates to different ways of being customer oriented is that a focus on only present customer needs may lead to trivial product development and loss of industry leadership (Bennett & Cooper 1979; Bennett & Cooper 1981; Bower & Christensen 1995; Christensen & Bower 1996; Christensen 1997; Berthon et al. 1999; Berthon et al. 2004). The importance of renewal was the point that Drucker (1954) and Levitt (1960) originally tried to make. Also, Kohli & Jaworski's (1990, p.6) definition of customer orientation explicitly includes both "current and future customer needs". As a response to the criticism, Slater & Narver (1998) make a strong comment that being customer-led and reactive to follow customers' expressed needs should not be confused with the proactive kind customer orientation. Day (1999) also responds to the criticism by claiming that it is possible to lead and follow customers simultaneously, and to stay close to both current and potential customers, and to balance technology push with market pull. Narver et al. (2004) further state that although almost all empirical analyses on customer orientation have focused on expressed needs, there is both a responsive and a proactive dimension to customer orientation. Ketchen et al. (2007) explain that these strategies are really two separate dimensions and not just two ends of a continuum. Firms can fare low on both dimensions of customer orientation, operating only reactively; they can be responsive to current customer needs; they can anticipate future customer needs proactively; or they can be simultaneously responsive to current needs and proactive to future needs (Ketchen et al. 2007). However, as Ketchen et al. (2007) explain, simultaneous proactive and responsive customer orientation is highly resource intensive, it does not come without a cost, which is a point also made by Atuahene-Gima et al. (2005).

Jaworski et al. (2000, p.45) extend the idea of proactivity by introducing the strategy of driving markets, which "implies influencing the structure of the market and/or the behavior(s) of market players in a direction that enhances the competitive position of the business." Storbacka & Nenonen (2011; 2015) call this market scripting. Market driving firms are guided by visionaries who see opportunities to fill latent needs or offer unprecedented customer value, which involves high risk but when successful enables these firms to revolutionize industries and reap vast rewards (Kumar et al. 2000). The blue ocean strategy or value innovation approach by Kim & Mauborgne (1997; 2005) is also a market driving strategy. Normann (2001) also has been influential in the topic describing driving markets figuratively as the map changing the landscape.

### 2.1.6 New perspectives on customer orientation – dominant logics

Recently Vargo & Lusch (2004; 2008) have suggested that marketing could be evolving towards a new dominant logic, i.e. a new worldview or change in perspective, a mental model guiding managers as well as researchers (for dominant logic see also Prahalad & Bettis 1986) which they call the service-dominant logic (SDL). This logic according to them is inherently customer oriented and relational, meaning more than traditional customer orientation.

Customer orientation from the new perspective means "collaborating with and learning from customers and being adaptive to their individual and dynamic needs. A service-centered dominant logic implies that value is defined by and cocreated with the consumer rather than embedded in the output" (Vargo & Lusch 2004, p.6). Further, "outcomes (e.g. financial) are not something to be maximized but something to learn from as firms try to serve their customers better and improve their performance. Thus, a market-oriented and learning organization (Slater & Narver 1995) is compatible with, if not implied by, the service-centered model" (Vargo & Lusch 2004, p.6). In SDL marketing and innovation are the same since marketing involves "the creating, increasing and recreating of markets" (Vargo & Lusch 2014, p.245). In other words SDL unites together those two functions that Drucker (1954) saw as *the* basic functions and the *only* basic functions of any business: marketing and innovation. Up to this time these two functions have been seen as separate and sequential, first comes the innovation and then its marketing. The new perspective on the nature of customer orientation represented by SDL views them both as interaction and essentially the same. As put by Vargo & Lusch (2006, p.46) SDL is a restatement of customer orientation.

There are also views stating that SDL is not customer oriented enough and suggesting a customer dominant logic (CDL) (Heinonen et al. 2010; Heinonen et al. 2013) which "refers to a view that positions the customer in the center, rather than the service, the service provider/producer or the interaction or the system" (Heinonen et al. 2010, p.534). As representatives of CDL, Strandvik & Heinonen (2015, pp.116–117) also criticize customer orientation as defined by Kohli & Jaworski (1990) and others for focusing on customer needs as defined by the provider company and suggest that it should rather be focused on "deep insight into customers' contexts, logic, and activity patterns". They want to ground CDL on Drucker's (1974) thought that "the customer is the basis for business success, because without customers there is no business" (Strandvik & Heinonen 2015, p.112). They also stress that it is not possible for a firm to drive markets but it is customers who orchestrate markets.

CDL is a direct descendant of Grönroos' (2006a) service logic (SL) which he developed as a response to the discussion on SDL. The main difference between SDL and CDL (or SL) is the locus of value creation. This difference is closely related to SDL and CDL (or SL) having a different meaning for the concept "value co-creation". In CDL (and SL) value is always created by the customer and the role of the firm is to facilitate this process by providing value supporting resources but no value is created in the facilitation (Grönroos & Helle 2010; Grönroos 2011a; 2011b). The firm is only able to participate as a co-creator of value in customer's value creation process when it is in direct interaction with the customer, although even direct interaction does not necessarily imply value co-creation – value co-creation only takes place if the firm is *directly and actively* able to influence the *flow of the customer's process and its outcome* (Grönroos 2011a, pp.244–245; Grönroos 2011b, p.290 italics added). In contrast, in SDL value is interactively co-created in networks of networks by interdependent actors (including e.g. firm, customer, suppliers,

competitors, government and other stakeholders) and this interaction can be *direct or indirect* (Vargo 2009, p.374 italics added). The actors participate in mutual value co-creation by integrating resources in their *own* value creating activities (a firm in its *own* production and a customer in its *own* activities) but they are *dependent* on the nested service provision from other actors for this resource integration (Vargo 2009, pp.374–375 italics added). In this dissertation "value co-creation" is used in the meaning implied by SDL unless otherwise stated.

Discussing the new logic, Gummesson (2008a; 2008b) emphasizes that customer orientation as a focus on one party only is not possible in practice and is too limited a foundation for marketing. Instead, he suggests, firms should strive for a balanced stakeholder centricity where customer is one of those stakeholders. Edvardsson et al. (2011) on their part suggest a social-dominant logic in which exchange and value co-creation is firmly placed in social context.

## 2.2 Innovation drivers and processes

This chapter discusses innovation theories' views on what innovation processes are like and what drives them. The chapter starts by presenting the groundings laid out by Schumpeter for studying innovation as a driver for economic development. Next, the discussion on technology push, demand pull and evolutionary change is presented. Thereafter micro level views on the role of customers and on open and networked innovation are described. The chapter ends with a description of how innovation processes are modeled in diffusion models.

### 2.2.1 Schumpeter's legacy for the study of innovation

Both theorists and practitioners unanimously agree that innovation spurs economic growth in the learning economy. Learning economy refers to knowledge flows enabling learning and innovation as opposed to knowledge being stocked (c.f. Lundvall & Johnson 1994). In learning economy local peaks of economic growth exist in locations that have favorable dynamics for innovative activity (Lundvall & Johnson 1994), the so called innovation hot-spots (von Hippel 2005). These ideas originate from Schumpeter's (1934; 1939; 1942) work that stressed the importance of innovation as a driver for economic development. Schumpeter (1934) had a wide notion of innovation as new combinations in the form of 1) new products, 2) new methods of production, 3) new markets, 4) new sources of supply, and 5) reorganizing industries for business. However, innovation theory has been built on much narrower ground of technological innovation in manufacturing activities for decades after Schumpeter. It is the recent growth of interest after 1980's in Schumpeterian wide perception of innovation that has built ground for the study of service innovation (Gallouj & Weinstein 1997). As stressed by Kline & Rosenberg (1986) innovation is wide system level change.

Schumpeter (1942) also presented the idea of "creative destruction" that laid ground for further studies of innovation as a socioeconomic evolutionary process. He viewed innovation as interplay between social inertia and entrepreneurs advocating for novel solutions. Schumpeter (1934) emphasized that the way resources are connected for production in industries forms a value system with high level of stability. His work is often divided in two eras emphasizing the importance of different aspects for overcoming this social inertia through innovation: he first stressed the heroic spirit, leadership and vision of individual entrepreneurs, and later the co-operative entrepreneurship, resources and capital of large firms. Entrepreneurial activity is also today seen as an important driver of innovation, especially when defining entrepreneurship broadly the way Stevenson & Amabile (1999, p.149) do as "the pursuit of opportunity beyond the resources currently controlled". The study of entrepreneurship differs from innovation management especially in its focus on the person of the entrepreneur and on the starting and growing of firms (Trott 2012). It is noticeable that anyone can act entrepreneurially in the broad way defined above, not just entrepreneurs. However, Schumpeter emphasized pro-

ducers and he saw that producers in a way taught consumers to want new things, and that they carried out activities leading to innovation as new combinations. Schumpeter's ideas have proved to be extremely powerful and even today most innovation studies follow his legacy and adopt his producers' model as the dominant model for innovation. This prevailing producers' model assumes that most important innovations originate from producers, who then sell them to consumers as products and services (Baldwin & von Hippel 2011).

### 2.2.2 From push and pull to evolutionary change

Following Schumpeter's example, innovation was originally studied at macroeconomic level. The early macro level discussion especially centered on linear models of technology push and demand pull. This dichotomy has a counterpart in more recent micro level innovation management discussion of stage-gate processes and user driven innovation. Here, the macroeconomic discussion is presented first and then the micro level innovation management discussion on the role of customers and on open and networked innovation, where after discussion on innovation diffusion is described.

The linear model of innovation views scientific advancement or basic research as the driving force for innovation and its birth is usually related with Bush (1945). The demand-pull model of innovation emerged in the 1960's as an alternative to the linear model. The expression of push and pull comes from Carter & Williams (1957) who suggested that as a result of supplier push and customer pull, firms simply adopt others' ideas from the outside without much original scientific work of their own. Godin & Lane (2013) describe how a number of studies further claimed that need is what drives innovation (Little 1965; Materials Advisory Board 1966; Sherwin & Isenson 1969; Price & Bass 1969; Rothwell & Robertson 1973; Utterback 1974) and that there is a necessity to couple scientific discoveries with needs (Gruber & Marquis 1969; Myers & Marquis 1969; Price & Bass 1969). According to them, these studies met opposition by proponents of the linear model, and as a consequence pull and push were contrasted in numerous innovation studies to follow (Langrish et al. 1972; Nelson & Winter 1977; Freeman 1979; 1982; 1996; Freeman et al. 1982; Kamien & Schwartz 1982; Walsh 1984; Rothwell & Zegveld 1985; Coombs et al. 1987; Rothwell 1994; Kleinknecht & Verspagen 1990; Howells 1997; Piva & Vivarelli 2007; Nemet 2009) although most of these studies agreed that both pull and push are needed.

Godin & Lane (2013) in particular emphasize that when criticizing the early empirical management studies of the 1960's Mowery & Rosenberg (1979) replaced the concept of human and societal *need* deriving from sociology and psychology with the more "scientific" economics concept of market *demand*. Following this emphasis on the science of economics, innovation studies since the 1980's have referred to the economist Schmookler (1962; 1966; 1968) as the father of the demand-pull model contrasting him with Schumpeter as the father of the supply-push model. In addition, in the same manner as strategic planning included customer orientation as one component in more complex strategy approaches, there was a shift in innovation studies to multidimen-

sional models where demand was incorporated as just one factor among many, which led to dampening down the discussion on needs. Godin & Lane (2013) suggest that it is this substitution of need with demand that has caused a blind spot in innovation studies leading to the present producer centric view, which albeit added dimensions and complexity, still in essence follows the linear idea of technology push.

The contrasting of technology-push versus demand-pull peaked in the 1970's and mostly settled down around the time when Nelson & Winter (1982) published their highly influential evolutionary theory of economic change and when Dosi (1982) developed his notion of technological paradigms carrying resemblance with the notions of techno-economic paradigms (Freeman & Perez 1988), technological regimes (Nelson & Winter 1977; 1982) as well as sociotechnical regimes (Geels 2002). Dosi (1982; 1988) made a parallel between technological paradigms and Kuhn's (1962) scientific paradigms contributing also to the discussion on long waves in economy (c.f. Clark et al. 1981; Freeman 1983; Perez 1985). He suggested to make an end to the debate on technology-push versus demand-pull and claimed that demand plays a role in innovation including e.g. selection criteria for new paradigms, but that technological paradigms channel innovation and constrain demand. Since around then, the main line of thought concerning the debate of push versus pull has been that innovation is affected by both technology-push and demand-pull with an emphasis on science and technology as driving innovation and demand being understood as an important complementary. In line with this integrative view, both technology-push and demand-pull based instruments have been used in innovation policy (Peters et al. 2012). On the other hand, adoption based policy instruments have been rare in industrialized countries (Jaffe et al. 2005). Companies mostly use some form of the stage-gate model by Cooper & Kleinschmidt (1986) that emphasizes a linear step by step flow of activities from initial screening of ideas to market launch and that checks the customer demand or need at specific steps in the process.

### 2.2.3 Customers and users as innovators

In the micro level discussion multiple terms such as customer, client, user, consumer, citizen or beneficiary are often used to refer to the parties behind demand pull (see also Sundbo & Toivonen 2011). In this dissertation the term mostly used is customer as the topic is customer orientation and as the main context of application is industrial service innovation. Further, in this dissertation the term customer is used in a wide meaning as a top level concept referring to all the organizational or individual parties behind demand pull. Other terms are used when it is necessary to do so for the sake of clarity or because, as e.g. in the case of "user driven innovation", there is a strong scholarly convention for using a specific term when discussing certain theories. The term customer is normally linked to a business relationship or transaction, the buying of goods or services, and refers to a customer organization, a potential or former customer organization, any representative of such an organization, or a consumer. Client can be used in the same way as customer, but it also has a

connotation of a long lasting and close business relationship, being often used to refer to an organization or a person as a receiver of professional services. Consumer is linked to the consumption process – the direct use of products and services rather than reselling them or using them for production or manufacturing – and it is most often used to refer to individuals although organizations can also be seen to consume. User is a very wide concept referring to an organization or an individual benefiting from the direct or indirect use of a product or a service. A citizen is an individual that may take many roles, some of those being a user and a consumer, but citizens especially have a legal right to enjoy the service of a state or a nation and to influence decisions made in that state or nation – they make a nation. Therefore they have the right and obligation to be active participators in the planning and production of public services. A beneficiary is a recipient of value and the term is mostly used in contexts where no distinction is made whether it is e.g. the customer or the seller, which is on the receiving side. All these roles can be seen as representing "demand" as a driver for innovation. In this dissertation the term business customer is used in situations where it is emphasized that the customer relationship is a business relationship and not a relationship with consumers or citizens or a non-profit relationship. Also, business-to-business (B2B) context is used to emphasize that the relationship takes place in such a context.

Most of the discussion on technology-push versus demand-pull is conceptual and remains at macro level (Di Stefano et al. 2012). Empirical studies on micro level innovation processes have shed new light on the issue of demand versus push and scholars now emphasize firms' competencies to match the two sources for innovation (Di Stefano et al. 2012). In particular, von Hippel's work on user driven innovation (UDI) has been pioneering. He studied how the locus of innovation varies and noticed that not only are users, suppliers and manufacturers all important sources of useful knowledge but it is often users themselves who innovate (von Hippel 1988). He referred to "sticky information" (von Hippel 1994) and explained that users not only possess the richest needs information but they are also motivated to innovate due to the way they directly benefit from innovation through use (von Hippel 2005). Also firms can be seen as users and they often make process innovations for in-house use (Enos 1962; Freeman et al. 1968; von Hippel 1976; Pavitt 1984). A large proportion of consumers innovate (Lüthje 2004) and in some cases major innovations of commercial companies may actually be made by end users instead of the companies themselves (Shah 2000). In particular, users are often socially motivated to aid other innovators in communities of practice (Franke & Shah 2003). Further, Harhoff et al. (2003) show that under suitable conditions users benefit from freely revealing their innovations to others and claim that this type of behavior is common and intentional. A study sampling UK manufacturing companies found that 66% of companies indicated customers as an information source for innovation (Laursen & Salter 2006). On the level of firm processes user involvement is often seen to improve innovation performance (Neale & Corkindale 1998) but some studies find that it makes no difference (Campbell & Cooper 1999) while some see that it depends on the

type of customers involved and the phase of the innovation process that they are involved in (Gruner & Homburg 2000).

The discussion on the important role of users in innovation has led to the question how to better feed users' ideas and improvements into firms' innovation processes and especially how to get in such close contact with lead users (c.f. von Hippel 1986). The question is closely linked to Cohen & Levinthal's (1990) strong argument that absorptive capacity – a firm's ability to value, assimilate and exploit external knowledge – is critical for its innovation performance. Instead of conventional market studies that deal with random customers and that are unable to induce these customers to formulate emerging needs, some companies utilize the lead user method (Lüthje & Herstatt 2004). The method has been shown in certain companies to produce much higher novelty, expected turnover, sales and market share while offering as good a fit to existing divisional goals and as high protection of intellectual property as conventional methods (Lilien et al. 2002). Hienerth & Lettl (2011) emphasize that it is the interplay between lead users and their communities that leads to new user innovations and their diffusion as the community members act as testers, provide feedback and spread the innovations also outside the immediate community.

As a practical and cost effective approach many companies have set up virtual environments for customer involvement. However, it is necessary for managers to clearly define the roles of customers in innovative activity before setting up these environments (Nambisan 2002). This is because high involvement of customers may lead to their dissatisfaction (Goodman et al. 1995) and it may affect the innovation process in undesirable ways. Franke et al. (2013) make a strong point that participation not only depends on expected benefit but also on expected fairness. Firms also lose some of their control to user communities. User innovators may themselves be a competitive threat to firms or they may benefit existing competitors (Baldwin et al. 2006; Hienerth 2006). Yet, hosting virtual environments may benefit firms either because they make user innovations available to other users or because they help firms to pick up and integrate user innovations to their own offerings (Jeppesen & Frederiksen 2006).

One way to give users certain freedom to innovate and satisfy their heterogeneous needs while keeping control within the firm, is to provide them with innovation toolkits (Franke & von Hippel 2003). According to some empirical studies users may be willing to pay more for solutions they are able to design themselves (Franke & Piller 2004; Schreier 2006). While such toolkits for mass customization (Pine II 1993; Piller & Walcher 2006; Salvador et al. 2009) may reduce risks related to innovation (Ogawa & Piller 2006), they only allow for limited design space.

### 2.2.4 Open innovation and networked innovation

In line with von Hippel's (1988) notion that there are more possible loci for innovation that just the firm and its customers, many companies have adopted a network perspective to innovation focusing in their innovation efforts also on

suppliers and other stakeholders such as research institutions and universities. The collaboration of two or more partners for innovation is the essence of networked innovation (Maurer & Valkenburg 2014). Swan & Scarbrough (2005, p.6) define networked innovation as "innovation that occurs through relationships that are negotiated in an ongoing communicative process, and which relies on neither market nor hierarchical mechanisms on control" referring to the discussion of inter-organizational collaboration by Phillips et al. (2000). Deeds & Hill (1996) demonstrate that firms can speed up their innovation cycle by entering into strategic alliances with firms that possess complementary assets, but that the relationship is inverted as the number of alliances grows too large. Stuart (2000) further emphasizes that it is not the number of alliances per se that leads to benefits, but alliances provide access to resources and therefore the most valuable associates are especially large firms that possess the leading-edge technological resources. Also, alliances with most valued partners signal social status and recognition aiding the focal firm to build its reputation and gain access to further resources (Stuart 2000). The flexibility of alliances for acquiring innovative competences is especially useful in high technology sectors whereas low technology sectors use more mergers and acquisitions (Hagedoorn & Duysters 2002). However, mergers and acquisitions provide greater control of innovative capabilities when they come closer to the core competences of the firm (Hagedoorn & Duysters 2002). As the understanding of innovation as a networked phenomenon has grown, universities and research institutions have been called upon to tighten their collaboration with industry and adopt a knowledge transfer and broker role in order to accelerate innovation. It has been suggested that it may be problematic if research institutions due to this change become dependent on private firms for funding, as it may undermine the quality of basic research and prohibit free information flow, thereby impairing the knowledge base and slowing down the innovation system (Lee 1996). Some others hold the opposite view that open research and third party funding from large organizations reducing their internal research activities leads to accelerated and energized research (Gassmann et al. 2010).

The concept of open innovation popularized by Chesbrough (2003) has resemblance to the network perspective of innovation described above but synthesizes the idea of innovation alliances from a novel perspective. It builds on the antecedents that innovative ideas often come from outside firm boundaries, that profiting from innovation depends on business strategy, not just coming up with an invention (Teece 1986), and that business models mediate between technical inputs and their economic benefits (West et al. 2014). OI further owes to von Hippel and others as UDI has had great impact on OI and as it is currently seen to belong to the wide concept of OI. The locus of innovation however is not seen to reside at any specific actor but at the network as whole (Chesbrough et al. 2011) which highlights the levels of ecosystems and national innovation systems although research on OI so far has mostly been done at the organizational level (Vanhaverbeke et al. 2014). OI has been defined as "the use of purposive inflows and outflows of knowledge to accelerate

internal innovation, and expand the markets for external use of innovation, respectively" (Chesbrough 2006, p.1) and more recently as "a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model" (Chesbrough & Bogers 2014, p.17). However, the inbound mode of knowledge flows is much more researched than the outbound mode (West & Bogers 2014). Also, OI as applied today is basically an extension of the stage-gate model and therefore inherently a linear approach focusing on technological advancement without feedback mechanisms (Trott & Hartmann 2009). Correspondingly, Gassmann et al. (2010) suggest that the future of OI will bring about a move from stage-gate processes to more iterative and interactive probe-and-learn processes such as described by Lynn et al. (1996). Many scholars on OI and UDI claim that innovation research is witnessing a change of paradigm in the sense of Kuhn (1962) (West et al. 2006; Gassmann et al. 2010; Chesbrough & Bogers 2014; Baldwin & von Hippel 2011), although Mowery (2009) views it more as recurrence of the old.

### 2.2.5 Diffusion models of innovation

The linear technology push view of innovation can also be seen in many traditional models of innovation diffusion. Diffusion models can be divided into epidemic models, where the speed of adoption is basically dependent on the speed of communication or information diffusion, and probit models, where individuals also differ from each other in some characteristic that affects their probability of adopting the innovation (Geroski 2000). An S-curve in the usage of novelties is seen as innovations diffuse first slowly, then take up speed, and slow down again. Rogers' (2003) broad theory of innovation diffusion that has a special character being written from a sociological perspective, is the most referred to amongst diffusion theories and being originally written in 1962 also the first one. Another major contributor is Bass (1969). Rogers (2003) describes individuals' decisions of innovation adoption or rejection as a five step process of knowledge, persuasion, decision, implementation, and confirmation. Organizational decision processes are more complex and he describes them as comprised of agenda-setting, matching, redefining or restructuring, clarifying, and routinizing. Further, he classifies them as optional, collective, authority, and contingent decisions (Rogers 2003).

Epidemic models of diffusion represent a simplistic view of innovation as discrete invention that is then diffused in a push mode. Recently, Peres et al. (2010) have suggested that diffusion as a theory of interpersonal communication should be extended to include social interdependence of all kind. Such an approach would change the linear view making models of diffusion more akin to the complexity of real life. After all, as Kline & Rosenberg (1986) clearly point out, innovations do not emerge at some precise point in time but they go through drastic changes in their lifetimes. Also Sundbo (2008) emphasizes the importance of after-innovation that takes place after the official launching of a service. The processes of adoption are intertwined with the processes of invention which accentuates the role of interaction in the diffusion process. When

there is interdependence between potential users' adoption decisions, adoption is accelerated or decelerated depending on others adopting or not adopting the innovation (Lim et al. 2004). Also, social signals affect adoption as people follow the consumption behavior of those in their aspiration groups (Van den Bulte & Joshi 2007). Further, network externalities or network effects affect users' motivation for adoption. In essence, products often have little value in isolation but become more valuable when combined with complementary products (Katz & Shapiro 1994). Network effects also lead to increasing returns, path-dependence and lock-in (Arthur 1989; 1990; 1996) resulting companies and their innovations co-evolving in ecosystems (Moore 1993; 1996; Iansiti & Levien 2004; Rong & Shi 2015). Therefore network effects accelerate or decelerate adoption depending on the competitive strength of complementary products in the same ecosystem. Even in the case of a competitor's upgrade, windfall value can be gained (Markovich & Moenius 2009). Such ideas provide a new view of innovation diffusion as affected by complex system dynamics.

## 2.3 Service innovation and customer orientation

Research on innovation has its roots in the era of rapid industrialization. That is probably why mainstream innovation practice that has the status as "normal" innovation practice focuses on technological innovation within manufacturing. This chapter narrows the focus from innovation research dealing with this mainstream innovation practice to theories of service innovation; and further sheds light on the relationship between service innovation and customer orientation. The chapter first describes services as distinct from goods and how innovation studies have dealt with service innovation, then going deeper to the role of customers in service innovation and the benefits of customer-orientation for service development, and proceeding to issues of performance and value in service innovation.

### 2.3.1 Services as distinct from goods

Although the differences between services and goods are no longer emphasized in academic discussion, definitions of services typically view them as distinct from goods. Services have existed throughout history and the early definitions date back to Smith (1776) who viewed services as products that perish at the very instant of their production and compared them to goods that could be shipped and sold abroad for export income. There have been many other definitions of services since then, e.g. Lovelock (1991, p.13) defines services as "deeds, processes, and performances". From the service marketing viewpoint, according to Grönroos (2000, p.47 italics in original) "1. Services are *processes* consisting of *activities* or a *series of activities* rather than *things*. 2. Services are at least to some extent *produced and consumed simultaneously*. 3. The customer *participates in the service production process* at least to some extent." The definition by Hill (1977, p.318) of a service as "a change in the condition of a person, or a good belonging to some economic entity, brought about as the result of the activity of some other economic entity, with the approval of the first person or economic entity" has been adopted worldwide in International Standard Industrial Classification of All Economic Activities (ISIC 2008). Delaunay & Gadrey (1987) have expanded on Hill's (1977) work to develop the definition of service to general use. For them, "a service activity is an *operation* intended to bring about a *change of state* in a reality C that is owned or used by consumer B, the change being affected by service provider A at the request of B, and in many cases in collaboration with him or her, but without leading to the production of a good that can circulate in the economy independently of medium C" (Gadrey 2000, pp.375–376 italics in original; see also Gadrey 1992).

One way of describing the difference of services from goods has been the IHIP characteristics – intangibility, heterogeneity, inseparability and perishability – of services that emerged from the early services marketing research in the 1960's and 1970's (Fisk et al. 1993). Intangibility refers to both the physical and mental intangibility of services; heterogeneity refers to variability of service results; inseparability refers to the indivisibility and interactivity of pro-

duction and consumption of services; and perishability refers to the transitory nature of services (Biege et al. 2013). The IHIP characteristics however are no longer considered relevant by all service scholars (Lovelock & Gummesson 2004; Gummesson & Grönroos 2012). In addition to the service product (what is produced and consumed) and the service process (how it is produced and consumed) which are often difficult to distinguish from each other (Bessant & Tidd 2007), innovation can also be made in the interaction interface between the customer and the service provider where production and consumption processes meet, which is often referred to as servuction (Eiglier & Langeard 1976; Langeard & Eiglier 1987).

### 2.3.2 Services in innovation studies

Since the 1990's, research on services innovation has grown as an important branch of innovation studies. Importance of innovation in services is related to the phenomenon of servitization (Vandermerwe & Rada 1988) which is sometimes also referred to as servicizing (White et al. 1999; Reiskin et al. 2000; Plepys et al. 2015) or servicification (Schmitt & Hatfield 2008; Lanz & Maurer 2015). The contemporary society is often referred to as a service economy due to the growth of the service sector and the growing importance of services in the manufacturing sector. Fuchs (1965) noticed that net growth in post-war United States took place in the service sector and introduced the concept of service economy. He also paid notion to the previously neglected point that in services "the consumer frequently plays an important role in production" (Fuchs 1965, p.368). The service sector is the most important sector in OECD today (Wölfl 2005). Quantitatively, services total about 75 % of GDP, 80 % of employment and two thirds of foreign direct investment inflows in OECD economies (Nordås & Rouzet 2015). The rapid growth of services has drawn attention to the points that technological innovation is not the only form of innovation spurring economic growth, that services involve innovations that are not captured by traditional indicators of innovation, and that manufacturers' R&D processes are not the only way to innovate. A field or research that first started as a narrow peculiarity in technology studies has recently burgeoned to a wide multidisciplinary body of knowledge (Randhawa & Scerri 2015). As the interest in services and services innovation has rapidly grown, past research on services innovation has been summarized describing the different perspectives as assimilation, demarcation and synthesis (Gallouj 1994; Coombs & Miles 2000) which is a categorization found useful by numerous authors to follow (Morrar 2014; Carlborg et al. 2014; Toivonen & Tuominen 2009; Droege et al. 2009; Gallouj & Savona 2009; Drejer 2004; Gallouj 2010; Gallouj 1998; Gallouj & Gallouj 1996)[1].

[1] There are slight differences in the terminology used in literature. Gallouj (1994; 1998) and Gallouj & Gallouj (1996) refer to the different approaches as technologist/industrialist, service-oriented, and integrative. Coombs & Miles (2000) use terms assimilation, demarcation and synthesis. Gallouj & Savona (2009) refer to technologist *or* assimilation approach, service-oriented *or* differentiation approach, and integrative *or* synthesis approach.

As the name implies, the *assimilation perspective* considers service activities similar to manufacturing activities and correspondingly innovation in services similar to product and process innovation. Assimilation perspective is blurred with the so called technologist perspective that views innovation in services to be mainly driven by technology and capital investment (Gallouj & Savona 2009). In this perspective R&D expenditure and submitted patents form the basis for innovation indicators and the main issue of innovation policy is to manage technological trajectories (Barcet 2010). The assimilation perspective is especially interested in the impact of information technology on services, and the use of ICT technologies has steadily grown in the service sector (Djellal 2000; Djellal 2002). Barras (1986), often viewed as the first true service innovation researcher and cited as a representative of the assimilation perspective, referred to the long waves in economy and suggested that the normal product cycle introducing a major new technology is accompanied by a reverse product cycle in user industries such as services. He saw the innovation cycle in services taking place in reverse order compared to manufacturing: whereas manufacturing innovation starts from a product change and continues to a process change, service innovation is stimulated by ICT development which leads first to a process change and only thereafter to a product change. Consequently, Barras saw suppliers and users dominating different phases in growth cycles. Gallouj (1998) critiqued the model for underestimating the variety of non-technological innovation in services. It is exactly the focus on technological innovation that leads to Barras' idea of reverse product cycle since from this perspective services can only be innovated when providers first introduce enabling technologies.

The proponents of the *demarcation perspective* view that autonomous concepts and separate understanding is needed for innovation in services (c.f. Edvardsson & Olsson 1996; Sundbo 1997; Preissl 2000). The demarcation approach emphasizes the unique nature of services different from goods and correspondingly the need for distinct processes for services development and product development. It focuses on the non-technological innovation output such as new solutions and organizational structures and is thereby enabled by the wide Schumpeterian notion of innovation. Also, within the demarcation perspective it is seen that innovations do not necessarily follow technological paradigms in the sense of Dosi (1982; 1988) but as suggested by Sundbo (1997) something more adequately described as strategic paradigms that especially in the case of service innovations often follow service-professional trajectories instead of technological trajectories.

As discussed more closely in the next subchapter, customer or user has been in a very central position in the service innovation research developed within the demarcation perspective and later. This is especially due to the indivisibility and interactivity of the production and consumption processes in services. A very important discussion topic within demarcation has been organizing for innovation, describing new service development (NSD) as opposed to new product development (NPD). Proponents of the assimilation perspective find no real difference between them. As an example of such assimilation approach

Cooper & Edgett (1996) described a formal stage-gate process for NSD claiming that the success of NSD depends on an adherence to such a process just like in the case of NPD. Instead, the proponents of the demarcation approach have found it necessary to modify the stage-gate process of NSD. Alam & Perry (2002) put high emphasis on the role of customer interaction in the different stages although their NSD process in other aspects resembles a NPD process. Many proponents of the demarcation perspective point out, that services often emerge without a planned process and are recognized only afterwards as ad hoc innovations or a posteriori innovations (Gallouj & Weinstein 1997; Gallouj 2002b; Preissl 2000). In line with this but also in the case of more formal NSD processes, service firms often do not have a formal R&D function, but services are developed in close cooperation with different functions of the firm.

Gallouj & Savona (2010) note, that the demarcation perspective adds very little to existing innovation theories. Lately, in order to take a wider view on innovation, several researchers previously known from their demarcation perspective have become representatives of the so called *synthesis perspective*. The synthesis perspective is a synthesis of the earlier manufacturing and services views on innovation and as such in line with the broad neo-Schumpeterian view of innovation (Gallouj & Savona 2009; Gallouj & Windrum 2009). From this perspective, the study of product and service innovation is complementary and supports generation of new insight on innovation in general. The study of product innovations freshens up the study of service innovations, and vice versa. The synthesis perspective encompasses both technological and non-technological innovation and both goods and services provision in the same united perspective (Gallouj & Windrum 2009; Gallouj & Savona 2009). The so called Nordic school of service marketing has been suggesting the removal of the division between goods and services for decades (Gummesson & Grönroos 2012).

Two prominent conceptualizations of provision in the synthesis perspective are the characteristics based approach by Gallouj & Weinstein (1997) and the service-dominant logic approach by Vargo & Lusch (2004; 2008). In the approach by Gallouj & Weinstein (1997) that builds on the work of Lancaster (1966) and Saviotti & Metcalfe (1984), the treatment of goods and services as products is unified. The final characteristics (Y) of such a product, i.e. the benefits provided to the customer, are obtained through a set of technical characteristics (X) and competence characteristics (C). The technical characteristics describe tangible and intangible aspects of the product including processes and other systems for service production; and the competence characteristics describe the individual skills of the service provider and user. In the model by Gallouj & Weinstein (1997), innovation is any change in any one of the characteristics (Y), (X) or (C), and leads to changes in the other characteristics as well. Analysis of these changes leads them to classify models of innovations as radical innovations, improvement innovations, incremental innovations, ad hoc innovations, recombinative innovations, and formalization innovations (Gallouj & Weinstein 1997). The model has been further elaborated by de Vries (2006), Windrum & García-Goñi (2008), and Gallouj & Toivonen (2011).

Valente (1999) as another example of the synthesis approach contributes to evolutionary economics utilizing the characteristics based approach of Gallouj & Weinstein (1997) and the concept of customer preference or need. He criticizes evolutionary economics for being focused on the supply side of markets and on productivity enhancing innovations which is why the analysis cannot deal with product performance-enhancing innovations or even more importantly innovation of totally new products. For tackling these issues he studies evolution of demand and complexity of technological innovation to suggest a model of market evolution as co-evolution of demand and supply sides.

In their service-dominant logic Vargo & Lusch (2004; 2008) also focus on the benefit provided and activation of systems of resources such as competencies, skills and also physical resources. They define service (different from services) as the process of an actor using its resources for the benefit of another party (Vargo & Lusch 2008, pp.2, 6). Further, they claim that "service is the fundamental basis of exchange" (Vargo & Lusch 2008, pp.6–7; 2014, p.240; see also Vargo & Lusch 2004). From this it follows that all economies are service economies (Vargo & Lusch 2004; 2008), and that goods and services are both ways to provide service. SDL suggests that the primary purpose of organizations, markets and society is to provide service which emphasizes the role of service innovation in society.

### 2.3.3 The central role of customers in service innovation

Customers have a very central role in service innovation. Lack of demanding customers even causes a major barrier for service innovation (Howells et al. 2004). The very experiential nature of services emphasizes the role of the customer (Helkkula & Holopainen 2011; Carù & Cova 2015). Also, in comparison to goods innovations, the position of the customer is highlighted in service innovations due to the indivisibility and interactivity of the production and consumption processes in services. As described in subchapter 2.2.3 Customers and users as innovators, instead of the term customer, other terms can also be utilized such as client, user, consumer, citizen or beneficiary (see also Sundbo & Toivonen 2011). Often, end customers are also discussed and they can be just as important or in some cases even more important for service development as the direct customers. Potential customers are also important, in some cases more so than current customers. The service process penetrates both customer's and provider's processes in an interactive manner, and this is why it would be difficult to leave either one out of the innovation process. Often the customer is not only a consumer, but also a producer in the complex service process (Normann 1984). Möller et al. (2008) emphasize that the focus should not be on the customer alone but that it should be balanced. Both parties are important actors in both the development and the production of services. Also, in addition to enjoying from the final results of the process, the customer often benefits in different ways from the service process itself (Grönroos 1990). These issues have led to customer involvement being a central topic for service innovation (c.f Alam 2002; von Hippel 2001; Matthing et al. 2004).

Customers can be seen in innovation as targets or as active participants in the innovation process. They can take the role of an informant of their own needs and circumstances; they can act as designers; and they can act as test populations for prototypes (Alam & Perry 2002). The two most preferred ways of involving customers are to consult them extensively in a planned process and to obtain information and feedback on specific issues; whereas customers taking initiative to provide input to development and true customer representation in the development team are rarer (Alam 2002). Gaining deep understanding of the customer's needs, expectations, usability process, quality perceptions and values is important but not sufficient – the real challenge often is to create a service strategy and culture in line with customers' value perceptions and priorities (Edvardsson et al. 2000).

The customer can be brought in the innovation process in different phases and the involvement intensity can differ depending on the stage (Alam & Perry 2002; Alam 2002; Edvardsson 1997; Edvardsson et al. 2012; de Jong & Vermeulen 2003; Kindström & Kowalkowski 2009; Scheuing & Johnson 1989). According to von Hippel (1994) problem solving often involves the use of sticky information, and therefore is carried out at the locus of such information. When multiple sites of sticky information are called for, problem solving may iterate between these loci or be partitioned into sub problems (von Hippel 1994). He further argued that it is the users who often are most motivated to innovate and who also have the richest needs information (von Hippel 2005). Therefore, as needs information is very sticky, customer input can be especially valuable in the so called fuzzy front end (Koen et al. 2001; 2002; Alam 2006) when the idea is just taking shape and concepts are being formed. Kindström & Kowalkowski (2009) view service innovation through a circular model that identifies the four overlapping stages of market sensing, development, sales, and delivery; and find that although companies typically focus on the early stage of development and possibly also on market sensing, the latter stages of sales and delivery must be equally in focus. This is in line with Sundbo's (2008) findings of after-innovation taking place in services, as services are not completely ready when taken to the market but instead are still improved after the official launching. Sundbo (2008) even argued that customer involvement should not be looked for in the early phases of innovation but in the later stages. In such after-innovation the involvement of customers is very important.

Service piloting involves simultaneous demonstration and development of service in an operational or near to operational environment, which is comparable to pilot production in key enabling technologies (c.f. Butter et al. 2015). The real use environment puts certain demands on the maturity of the service, especially if customers are paying for the piloted service or if test failure would have serious consequences. Yet, piloting is an open and collaborative form of prototyping that takes advantage of the idea that a service does not need to be – or even should not be completely ready when introduced to customers. There may be several successive pilots as prototypes or the necessary iteration may be carried out as successive changes within a single pilot. In addition to

such iterative development, pilots are often used for demonstrating the value of a new strategic initiative in just a single trial, as described by Davidson & Büchel (2011). Demonstration of service value through pilots can be used as reference and therefore it is important that pilot customers and locations are chosen to ensure credibility, replicability and feasibility of pilots (Davidson & Büchel 2011). However, if development is misunderstood for demonstration, piloting becomes more like a dress rehearsal where the customers and other stakeholders might not be very forgiving (Davidson & Büchel 2011). A typical pilot involves both development and demonstration and therefore it is important to ensure that customers' expectations are in line or below the maturity of the developed service. Then piloting can be carried out as a learning process in which the innovation proceeds through a series of limited scale iterative trials; and customers are brought in to participate as partners in joint learning and dialog at each step.

As in any form of co-development, it is essential for success that the customers involved are motivated to participate. The innovation is developed step by step as pilots are tested together with customers in their use contexts. Such development through piloting lowers risk by increasing flexibility and allowing controlled live experiments on a small scale, which is especially important in large, fuzzy and complex development contexts. Piloting also helps create understanding of service experience and value, and of the behavioral change related to innovation adoption. It allows both the supplier and the customer to learn and improve the solution, and it forms a platform for relationship development. By making the phases of innovation from ideation to implementation overlap, it can accelerate the innovation process. Service piloting may also bring further benefits, such as community building, encouragement of service usage, and alignment of stakeholders' interests (Rizzo & Cantù 2013). Development through pilots can even help realize such radical innovations that otherwise might seem unfeasible (Jones & Samalionis 2008). The reason why customer involvement in the fuzzy front end, the piloting phase and the after-innovation phase needs to be emphasized is the interactive, intangible and hard to grasp nature of services. Final customer experience or behavior and even the technical and economic feasibility of a service often cannot be known in advance without actually testing the service with the customer.

### 2.3.4 Benefits of customer-oriented service development

Customers benefit from customer-oriented service development practices through better services but they also benefit directly from the development process (Edvardsson 1997; Grönroos 1990). B2B customers' motivation to participate in service innovation originates from them finding it intrinsically attractive or from them feeling that they need to participate in order to ensure quality (Martin et al. 1999). Service providers benefit as their customers become better served, but they also get new ideas and knowledge from the customers. Relationship marketing has also brought forward that customers' loyalty to services increases when they are used as informants in the development process. When customer involvement is implemented in such a manner as to

speed up the innovation process, like e.g. in rapid application, the service provider also benefits from this acceleration of the process (Toivonen 2010). Customer involvement may also increase the adoption of the service due to the role that customers have in the phase when service innovations are put to use (Sundbo & Toivonen 2011). Further, value outcomes of customer involvement for service providers can be described as economic value, better customer relationships, facilitation of development and innovation activities, and knowledge spill over; and for customers themselves as better fitting offering, improved perceived quality, greater perceived value, economic value, and better skills of creating value from the offering (Mustak et al. 2013).

### 2.3.5 Performance and value of service innovation

The purpose of service innovation is to increase performance, which can refer to productivity or economic efficiency but also to longer term effectiveness of the innovation in producing different kinds of beneficial outcomes (Djellal & Gallouj 2013). However, there is a gap between the reality of service innovation and what innovation indicators are able to perceive (Djellal & Gallouj 2010). Not only are service innovations themselves difficult to define and measure, but it is also difficult to define and measure their performance impact which leads to a "double gap": an innovation gap and a performance gap (Djellal & Gallouj 2010). Measurement of innovation is based on linear thinking, which does not reveal the complex dynamics leading to innovation (Smith 2000; Arnold 2004; Smits & Kuhlmann 2004; Ahrweiler 2010; Patton 2011). Much of the performance impact of service innovation is hidden due to the analysis of performance as productivity – i.e. as an input-output function (Djellal & Gallouj 2010; Djellal & Gallouj 2013; Patton 2011). The linear analysis is unable to describe the complex dynamics between actors that lead to performance impact in the "grand challenges" such as ecological sustainability, societal well-being, health, safety and equality (Hyytinen et al. 2014).

Djellal & Gallouj (2010; 2013) have illustrated this issue describing visible and invisible innovation as well as visible and invisible performance. When using traditional economic measures such as R&D intensity, patents, industry standards and number of start-ups; technology-based innovations are visible but non-technological innovations remain invisible. Both visible and invisible innovations can lead to visible performance impact in productivity and growth as well as invisible performance impact such as ecological sustainability and societal well-being (Djellal & Gallouj 2010). The visibility of innovations and their performance impact is further blurred due to the time dimension. Innovations do not occur at a specific point in time but their nature is evolutionary. Also their performance impact takes place in the passage of time: there are short term impacts and long term impacts. If attention is only paid to the visible performance impact of visible innovation, then the "double gap" causes a challenge for public policy target setting, steering and planning (Djellal & Gallouj 2010).

Edvardsson (2014) claims that SDL helps to understand service productivity better. He explains that service productivity has not so much to do with re-

sources themselves but how they are integrated and used by the actors to co-create value in service ecosystems. He argues that in the future this will be the most important basis for service productivity research and management. In SDL "service is input *and* output… Service is exchanged for service" (Edvardsson 2014, p.82 italics in original).

The Nordic school of service marketing (Grönroos & Gummesson 1985; Grönroos 1991; Edvardsson & Gustafsson 1999; Gummesson & Grönroos 2012; Gummesson 2006) has emphasized that it is the customer that experiences and interprets the value of the service for itself, not someone else. Instead, the service provider is seen to make value propositions. In other words, service quality and value depends on the view of the customer (Edvardsson 1988; Edvardsson & Olsson 1996) – it is perceived service quality (Grönroos 1991). Service quality or value is seen to extend beyond cognitive assessment e.g. to emotions (Edvardsson 2005) and values (Enquist et al. 2007); and to be experiential (Holbrook & Hirschman 1982; Gilmore & Pine II 2002; Prahalad & Ramaswamy 2004; Schembri 2006; Sandström et al. 2008; Helkkula 2011; Helkkula et al. 2012) and embedded in social systems (Edvardsson et al. 2011). Within the Nordic school, service is seen not as a category but as a view on value creation (Edvardsson et al. 2005). In other words the point is not to make a distinction between the categories of goods and services but to make a distinction between different views of how customer value is created: Does value reside within products of different categories like goods and services or does it reside within customer's service experience that is formed as the customer uses both goods and services? It is exactly this emphasis on customer value that links together the discussion on service and customer orientation. According to Grönroos (2006b) the great impact of service marketing has been to penetrate and explore the consumption process, which in goods based marketing models has been a black box. The perspective is deeply grounded on an understanding of nested networks and relationships (Gummesson 1987; 1996; 1999; 2011). These customer centric views are essential also for SDL by Vargo & Lusch (2004; 2008). However, there is continuous scholarly discussion on specific details of value creation.

Although there is much similarity between the ideas of networks and systems, SDL stresses systems. "The network concept captures much of the complexity of value cocreation but it is still somewhat static" (Lusch & Vargo 2014, p.161). There are many different approaches to systems and some of them are quite static as well. This dissertation uses a wide definition of a *system* as "a set of elements or parts that is coherently organized and interconnected in a pattern or structure that produces a characteristic set of behaviors, often classified as its 'function' or 'purpose'" (Meadows 2008, p.188). It is more than the sum of its parts and it may exhibit behaviors that are adaptive, dynamic, goal-seeking, self-preserving, or evolutionary (Meadows 2008, pp.11–12). Systems often have the property of self-organization, i.e. they are able to create new structure, to learn, diversify and complexify, which causes them to generate a hierarchy, always evolving from the lowest level up (Meadows 2008, pp.81–84). It is this self-organized hierarchy from the pieces to the whole – from sub-

systems to systems – that is meant by *nestedness* of systems in this dissertation. In such nested systems there are both direct and indirect linkages between the parts. The term *nested customers* used in this dissertation refers to customerships being self-organized into such nested hierarchies. Also service science, having much in common with and drawing from SDL, emphasizes the study of systems as the basic unit of analysis – service is seen as rising out of systems of interacting components (Maglio & Spohrer 2013). "Service science is the study of service systems, aiming to create a basis for systematic service innovation" (Maglio & Spohrer 2008, p.18).

The emphasis on systems and on value as experienced by customers, leads to SDL having a specific perspective on value that differs from the perspective of mainstream economics. Economics usually considers value as exchange value and as created by the producer. As described above in this subchapter, SDL as well as the Nordic school of service marketing stress value as experienced and interpreted by the customer. Therefore it is often called use value or experiential value. SDL also stresses that value is co-created. Differing from this view, some representatives of the Nordic School view that value is not co-created but created by the customer alone (Grönroos & Helle 2010; Grönroos 2011a; 2011b). The service-dominant logic view of value is that value is co-created. Co-creation of value in SDL refers to different actors integrating resources in their own value creating activities so that in a systemic context value creation becomes interactive in networks of networks (Vargo 2009). It is this integration of resources for the benefit of another party or oneself that in SDL is called service (Vargo & Lusch 2008). In other words, the co-creation of value is the essential nature of service.

## 2.4 Industrial service innovation

Vandermerwe & Rada (1988) described how modern corporations increasingly offer bundles of customer-focused goods, services, support, self-service, and knowledge; and especially how there is a trend of servitization in almost all industries as services are starting to dominate the other type of offerings also in traditional manufacturing (see also Jacob & Ulaga 2008; Raddats & Easingwood 2010; Matthyssens & Vandenbempt 2008; 2010; Kowalkowski et al. 2011). This trend can also be called service infusion (Lay et al. 2010; Holmström et al. 2010; Kowalkowski et al. 2012; Kowalkowski, Witell, et al. 2013) or the tertiarization of industry (Miles 1993; Chang et al. 2014); primary industry meaning extraction of raw materials; secondary industry meaning making things from other things; and tertiary industry meaning doing or transforming things. Miles (2002) points out that this also corresponds to tertiarization of innovation studies. This chapter discusses industrial service innovation by first presenting quantitative indicators of industrial servitization and then describing industrial service innovation as strategy, the relationship of servitization with technological development, systemic views on industrial service innovation, and how manufacturers organize for industrial service innovation.

An industrial service innovation is a service innovation where the service innovated is industrial service. In line with Toivonen & Tuominen (2009, p.893) "a service innovation is a new service or such a renewal of an existing service which is put into practice and which provides benefit to the organization that has developed it". Industrial service is defined as *service that supports customer companies' industrial value creation processes or customer companies' use of industrial products*. This definition of industrial service that has also been used by Tekes – the Finnish Funding Agency for Innovation (2010), and that is presented in article I of this dissertation, combines Mathieu's (2001) idea that industrial service can support either products or clients and Grönroos' (2000, p.46) definition of service as "a process consisting of a series of more or less intangible activities that normally, but not necessarily always, take place in interactions between the customer and service employees and/or systems of the service provider, which are provided as solutions to customer problems." In line with the definition of "industry" by Merriam-Webster (2016), industrial value creation refers to value creation in the context of large scale production by using machinery and factories. Although Grönroos' definition of service used for explaining industrial service innovation does not exclude tangible solutions, it emphasizes intangible activities and interactions. Therefore, when physical products carry a major role in the innovation, it is necessary to use the concept of industrial innovation that includes both industrial service innovations and industrial product innovations and their combinations.

### 2.4.1 Quantitative indicators of industrial servitization

The role of manufacturing has traditionally been seen as producing tangible goods. National wealth has been understood to derive from the production and export of goods. Innovation was seen as technological development and services as unproductive (Gallouj 2002a). Yet the phenomenon of servitization has steadily grown the share of services in industry, as well as in the economy as a whole. Servitization can be measured either as the share of service offerings of the sales of all offerings, or as the share of service occupations of all occupations. The sales of product-related services is growing and their share of revenue in durable-goods sector is reported to have risen from 12% in 1995 to 22% in 2004 while the share of product sales has diminished proportionally (Auguste et al. 2006). Deloitte's survey came up with a little higher number: according to it service revenues represent on average more than 25% of total manufacturing business and in many manufacturing companies more than 50% of revenue (Koudal 2006). A somewhat lower figure of 16% has been reported by Lay et al. (2010) based on the European Manufacturing Survey 2006 data. Also Gebauer et al. (2005) report a lower level that is roughly in line with that of Lay et al. (2010). However, Gebauer et al. (2005) report their survey data as a histogram, so it cannot be directly compared with the averages from the other surveys.

According to McKinsey, in the advanced economies the share of service-like occupations varies in different manufacturing segments between 30-55% of manufacturing's total employment (Manyika et al. 2012). Also, based on European data, the share of service-like occupations in manufacturing has been reported to be on average around 40% ranging from more than 50% in countries like UK, France, Luxembourg and Netherlands to below 30% in countries such as Slovakia and Portugal (Veugelers 2013). According to the same statistics, in Finland the share of service-like occupations in manufacturing is somewhat above EU average and has risen from around 40% to around 45% between 2008 and 2012 (Veugelers 2013). Although services have always been vital for manufacturing, the overall message is very clear: the division between manufacturing and service sector can be seen as outdated, artificial and blurred (Miles 1993). Service is a megatrend in manufacturing and can no longer be ignored in industrial policy or in manufacturers' business strategies.

### 2.4.2 Industrial service innovation as strategy

Servitization varies in different countries and in different sectors of manufacturing. Lay (2014) suggests that advanced servitization strategies are driven by radical innovation in physical products, oligopolistic customer structure, manufacturers' superior application knowledge, and large installed base. Service innovation first became important for industry in 1980's and 1990's as industrial companies realized that with services they could widen their offering and increase sales, support their products and strengthen their customer relationships. This has been especially important for capital goods manufacturers in the B2B sector, who as manufacturers of machines and equipment or suppliers

of modules and components sell their goods to a limited number of customer companies (Fischer et al. 2012). It is rare for such manufacturers to be able to compete on technological product innovation alone (Matthyssens & Vandenbempt 2008; Vandenbosch & Dawar 2002). Also, the profitability of product related R&D investments seems to be diminishing in many industries. The trend has progressed so far that it is common for manufacturers' profit margins to come from installed base services whereas the selling price of goods may be very close to manufacturing costs. Installed base refers to capital goods that are currently used by customers. New services can be offered to support these goods or the customer using the goods (Mathieu 2001; Brax 2005; Gebauer & Fleisch 2007; Jacob & Ulaga 2008). Overall, it has been suggested that the commoditization of product innovations is accelerating and that therefore service innovation based on deep understanding on customer needs is particularly advantageous for companies (Chesbrough 2011; Bettencourt et al. 2013; Anderson et al. 1997).

The nature of knowledge as an inexhaustible resource that can leverage other resources is an important driver of industrial service innovation. Servitization of industry is closely related to the learning economy (c.f. Lundvall & Johnson 1994) and to the phenomenon that the whole economy is becoming more knowledge intensified (Miles et al. 1995). As part of this process there are more and more specialized service companies called KIBS – knowledge intensive business services – in the economy (Miles et al. 1995; Gallouj 2002c). However, as part of the same process also many industrial companies have started to innovate service offerings that are knowledge intensive. This is often referred to as kibsification of industry, kibsification being a term originally used by Hales (2001). The knowledge intensity of these services implies more than mere information storage and transfer. Knowledge in this context is about learning and requires creation of joint understanding and more interaction between the participants than information transfer (Miles et al. 1995). Such service involves the production of knowledge from knowledge – knowledge being both the input and the output of the process (Gallouj 2002c). This means that industrial companies not only innovate in physical products and production processes. They innovate in the knowledge that they can offer their customers as service. They offer their customers their capabilities of processing information and knowledge (Gallouj 2002c). It is in many cases beneficial for customers to buy such service from their suppliers as opposed to innovating themselves. As specialized KIBS or kibsified industrial companies aggregate similar work over many customers, they accumulate knowledge and learn continuously. This makes them much better at innovating solutions for customers' problems than the customer companies as single companies (Wolpert 2002; Zhang & Li 2010). When customers cooperate with and outsource to such expert service providers, the nature of collaboration is not just replacement outsourcing or cost reduction. Instead, the main reason for collaboration with these service providers is the upgrading of services – the increased knowledge and skill (Strambach 2001; Kox 2002).

### 2.4.3 Technological development and servitization of industry

As service innovation research has come a long way from the assimilation and technologist perspectives it is clear that there is more to service innovation than mere technology development. Yet, technological development is an important aspect of a large part of service innovation. Servitization of industry has been highly affected by the development of IT. As information technology developed rapidly in the 1980's, IT and consultancy services as an important form of KIBS had an important role in the development, diffusion and adoption of new IT innovations, and they also supported business, production and innovation processes (Chang et al. 2014). In the 1990's IT also aided manufacturing companies to increase outsourcing of their production to other companies. This could often improve the quality of operations as the new suppliers could offer similar type production services for multiple customers and enjoy the learning curve effect – i.e. the increase of learning with experience. However, the aim of outsourcing was not always to upgrade the nature of activities the way that was seen in the kibsification of industry. The aim could also be e.g. closeness of end market or cost reduction. Yet, even when similar production activities were bought locally from other companies as opposed to doing them in-house, they were considered service activities. This increased the amount of services in the economy much as a matter of book keeping.

Further, IT aided globalization. A large part of the outsourced production activities were transferred from developed countries to low cost countries (Baldwin & Evenett 2015). The resulting hard cost competition pushed industrial companies to specialize and focus on their core competencies, defined by (Prahalad & Hamel 1990, p.4) as "the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies". The increased specialization and focus on core competencies basically based on companies' innovative learning potential further accelerated both local and offshore outsourcing. As opposed to local or domestic outsourcing, the offshore outsourcing had a major impact on employment at the level of nations (Baldwin 2006). As products are more scalable and easier to imitate and export than services, the offshore outsourcing caused by the intertwined dynamics of cost, scale and learning especially affected employment in the manufacturing-type occupations. Its effect on the more services-like occupations was lesser, which further grew the share of services-like occupations in the developed countries, not only in the service sector but also in the manufacturing sector of these countries (Pajarinen et al. 2013).

As IT has aided globalization and outsourcing of production, economies of scale and wage differences have lowered the cost of outsourced production, especially in the case of offshore outsourcing. Also exchange rates have on their part increased the attractiveness of offshore outsourcing. As the cost impact leveraged by scale and learning has been bigger on the easily outsourced products than on services, the prices of products have fallen relatively much more than the prices of services and competition on production has become

extremely hard. The overall development has led to what is commonly known as "the smiling curve" and depicted in Figure 1. The intangible value creation in the beginning and end part of the manufacturing value chain in functions such as RDI (research, development and innovation), pre- and aftersales service, and branding, is more difficult to copy and outsource. It has grown in importance while the tangible value creation related to the physical production in the middle of the value chain has diminished in importance. This has led manufacturers especially in developed countries with high labor costs to focus their innovation strategies to servitization and technological advancement. The advancement of ICT will have an important effect also in the continuation of industrial servitization (Miles et al. 2014). ICT will enable innovation of new kinds of services that allow for a deepening of the value creation relationship (Kindström & Brege 2008; Kowalkowski, Kindström, et al. 2013).

Services are often seen as inefficient – yet their share in economy seems to have risen as value chains have been restructured in quest for efficiency. It can be argued that the impact of ICT on the restructuring of value chains has only begun. Many services can be digitized which will make them more scalable and tradable and therefore more efficient and also more vulnerable to competition (Pajarinen et al. 2013). Zysman (2006) describes how the algorithmic decomposition of service processes blurs the thin line between products and services even further changing how activities are carried out and value is created. He calls the algorithmic transformation the fourth service transformation. Rust (2004) goes as far as claiming that they are the flip sides of the same coin. Also many others view servitization and digitalization inseparably intertwined with each other (Löbler & Lusch 2014; Rai & Sambamurthy 2006; Sheehan 2006). The role of ICT for service innovation is essential as it facilitates both the creation and the delivery of innovative service offerings (Lusch & Nambisan 2015). As ICT is becoming a commodity, it may however become too easy to copy and insufficient for building a competitive strategy (Carr 2003; Barney 1991). In other words, despite its significant importance ICT alone is not strong enough a foundation for industrial service innovation. Instead, a unique and valuable position rooted in complex systems of different kinds of activities, processes and other elements is more suitable a strategy (Porter 1996). Service elements such as new services or deepening of customer relationships can be coupled with other elements for such strategy (Kowalkowski, Kindström, et al. 2013).

Digitalization together with commoditization of technology is highlighting the discussion on service innovation and competition at higher systems levels. The discussion on competition based on business model innovation is transferring to discussion on ecosystems competition (Moore 1996; Iansiti & Levien 2004; Adner et al. 2013; Rong & Shi 2015) and competing platforms (c.f. Gawer & Cusumano 2002; Kenney & Zysman 2015). The systems level technological development enabled by key enabling technologies (Butter et al. 2015) and Internet of Things (Gershenfeld et al. 2004; COM 2009) will change the nature of work (Brynjolfsson & Mcafee 2014; Frey & Osborne 2013) and accelerate servitization (Zysman 2006; Zysman et al. 2011; Kagermann et al. 2013)

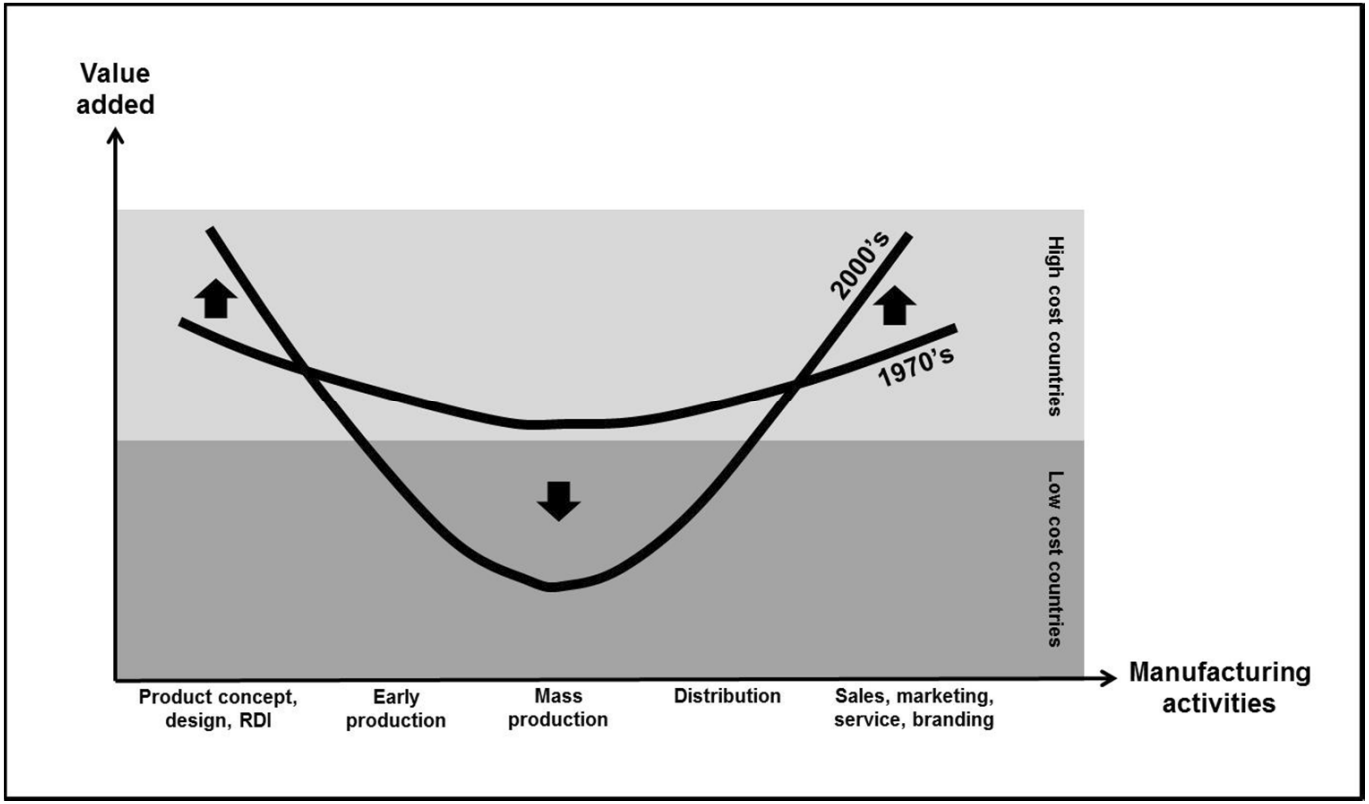


**Figure 1.** The smiling curve (adapted from Veugelers 2013, p.27; Baldwin & Evenett 2015, p.35; Pajarinen et al. 2013, p.3).

and competition between ecosystems and platforms (Moore 2006; Gawer & Cusumano 2008). However, the resulting impact of such technological development may be very different than the impact of earlier development. It has even been suggested that manufacturing activities might be returning to developed countries, although much transformed from before (Foresight 2013).

The transformation that is taking place will also have major implications on how work is done. Järvenpää & Immonen (2011) point out how small a fraction of research on ICT tools integrates the relations between technology, work and worker well-being. Impact of technology on work and well-being is rapidly accelerating though. It has been estimated that almost half of US employment is in high risk category since a major part of tasks including many service tasks can be automated (Frey & Osborne 2013). In Finland the corresponding figure is one third of employment (Pajarinen & Rouvinen 2014). The figures probably are more suited to describe the massive changes in the nature of work rather than massive unemployment. However, the impact is essential, it affects the service-type occupations as well as the manufacturing-type occupations, it affects customers' employees as well as suppliers' employees and it does not stop at the office or factory door. It will affect all aspects of people's lives. Automation opens up new possibilities for increasing service performance unless automation itself is perceived as eroding the quality of service; therefore finding a balance between automation and human interaction is important for future service innovation (Kowalkowski & Brehmer 2008).

### 2.4.4 Towards more systemic views on industrial service innovations

Although the general discussion on industrial innovation traditionally emphasizes technology, products and production, there is also discussion on the nature of industrial innovations emphasizing service innovations. Yet, the academic discussion no longer emphasizes the difference between products and services. Instead, the focus is on customer value that is created through combinations or systems of products and services (Anderson & Narus 1995; Davies 2004; Hobday et al. 2005; Brady, Davies & D. M. Gann 2005; Ulaga & Reinartz 2011). The idea that the value of products and services could be something else than the product itself has originated from the marketing context and was present in Levitt's (1969; 1980; 1981) augmented product model. The model described the product as a layer of benefits satisfying customer needs, the innermost layer being the core benefit, the second layer being the expected product, the third layer or augmented product exceeding customer expectations, and the final layer or potential product including also future transformations and augmentations of the product (Levitt 1980; 1981). Later, a model of augmented service offering (ASO) was also created (Storey & Easingwood 1998).

The discussion on industrial service innovation has also been greatly influenced by the thoughts around relationship marketing. The role of relationship marketing that carried the idea of the long extending valuable customer relationships has been especially significant in the investment goods industry where there are relatively few customers but the deals are big, and therefore

the value of each customer relationship is emphasized. In line with the ideas of relationship marketing, Mathieu (2001) made a clear point that industrial services should support customers as opposed to supporting products. Also, as outsourcing grew, a school of thought called IMP (Industrial Marketing and Purchasing) focused especially on B2B business emerged based on the idea that relationships extend in networks. The network approach would view relationships as connected in such ways that changes in one would affect the others (Håkansson & Ford 2002; Håkansson & Snehota 2006). Normann who was a great influencer of the IMP school and inspired by the resource based view (Wernerfelt 1984; 1995; Barney 1991; Penrose 1959) linked the idea of resource integration with the network perspective. According to Normann & Ramirez (1993) "the goal is not to create value for customers but to mobilize customers to create their own value from the company's various offerings." Grönroos (2000) as a prominent thinker in relationship and service marketing also has had great influence on industrial service innovation, emphasizing especially service as support for customers' business processes. Grönroos & Helle (2010) describe how matching of practices and alignment of supplier and customer processes, resources and competencies allows suppliers to support their customers' business.

More recently the understanding that innovation efforts should focus on customer value and that goods and services innovations are not necessarily that different from each other has further grown in the context of industry. Both goods and services may be seen as rendering service, which has had a great impact on manufacturers' business models, some famous examples being Rolls-Royce's Power by the Hour concept (Koudal 2006; Baines et al. 2007; Ng et al. 2009) and Kone's People Flow concept (Salonen 2011; Storbacka & Pennanen 2014). The focus is on use value as perceived by the customer and on solutions business. In solutions business typically products and services are integrated and there is a close relationship between the service provider and the customer (Davies & Brady 2000; Windahl et al. 2004; Ceci & Prencipe 2008; Nordin & Kowalkowski 2010). Integration of systemic solutions is emphasized in industrial deliveries that are complex products and systems, in which the number of customized components is large, broad knowledge is needed and the level of novelty is high. Not only the technical aspect but also the relationship aspect is highlighted in such deliveries. Therefore, in addition to technical integration, social integration is essential (Kirsilä et al. 2007).

Also, it is thought today that companies innovate business models – combinations of different resources and processes in formulas of value creation and capture (Teece 2010; Johnson et al. 2008; Osterwalder & Pigneur 2010; Zott et al. 2011; Chesbrough & Rosenbloom 2002). In other words, successful business is not seen as based on innovation of great products or services alone, but on innovation of systemic solutions that are offered to customers as value propositions. When taking such a view, the differences of products and services start to disappear. Further, business models as describing the systemic value creation and capture can be seen to span and exist on multiple levels such as e.g. projects, firms and networks (Wikström et al. 2010). Therefore, in

addition to the offering level of products and services, the servitization of manufacturing companies can be seen at the level of these companies' business models that become service based (Kastalli et al. 2013). The transformation from product based to service based business models is often seen as challenging for traditional manufacturing companies (Gebauer et al. 2005) and it is suggested that successful transformation requires integrated development of the different areas of the service business model (Kindström 2010).

The product-service system (PSS) discussion presenting one more systemic view of industrial service innovation originates in the Netherlands and Scandinavia and joins together the ideas of servitization of industry and ecological sustainability (Baines et al. 2007). According to the first formal definition of such a system given by Goedkoop et al. (1999, p.18) "A Product Service system (PS system) is a marketable set of products and services capable of jointly fulfilling a user's need. The PS system is provided by either a single company or by an alliance of companies. It can enclose products (or just one) plus additional services. It can enclose a service plus an additional product. And product and service can be equally important for the function fulfilment. The researcher's need and aim determine the level of hierarchy, system boundaries and the system element's relations." As described by Baines et al. (2007), the logic of PSS is to decrease material and other costs as an input to a system while simultaneously increasing value as an output of the system – i.e. to increase the resource and functional efficiency of the system.

The PSS logic of efficiency increase is based on the idea that the customer is mainly interested in the functional use value of the product, not in its ownership (Baines et al. 2007). The problem has been that customers especially in developed countries often have not been keen in the idea of ownerless consumption (Baines et al. 2007) or as Mont (2002, p.244) puts it "Customers' demands and purchasing behavior appears to be potentially more complicated than expected. The assumptions that the customer is more interested in use rather than the ownership (Braungart & Engelfried 1993) or is looking for the use rather than the product itself does not represent current reality." It may be that customers also have other "uses" for products than their functional use. On the other hand it has sometimes been claimed that customers' attitude will change due to changing values or simply due to increasing prices as resources become rare and regulatory policies take effect.

As described above, customer value, customer relationships, customers' processes and the systemic nature of customer solutions have been in the focus of many marketing and strategy professionals. Yet, the argumentation by Vargo & Lusch (2004; 2008) about the necessity of a new service-dominant logic has been able to evoke new kind of crosscutting interest on the central position of customers in value creation and novel understanding on service innovation. SDL brings forward one more different perspective to the nature of industrial service innovation as service in SDL means the application of specialized competencies, especially knowledge and skills, for the benefit of others or oneself (Vargo & Lusch 2004). The term service is in singular as it refers to this beneficial activity, and it is different from the plural term services which would im-

ply units of output that are different from goods. SDL is based on the idea that value is revealed in the use context when the customer and the provider integrate resources in direct and indirect ways. Both the customer and the provider carry out this research integration for their own part, i.e. service is exchanged for service. Also, in SDL the provider cannot create value for the customer. Instead, it can offer value propositions and if the customer accepts the proposition, exchange is made and both parties carry out resource integration for themselves in the process of value co-creation. Customers make their purchase decisions based on the value propositions, which makes their formulation important (Maglio & Spohrer 2013). The value revealed in the use context is experiential and phenomenological (Vargo & Lusch 2008). As the use involves integration of resources, where the service exchanged is only one resource, the situation becomes nested in networks of networks (Vargo & Lusch 2011).

SDL highlights the concept of ecosystems since the concept of networks is easily understood as somewhat static. Service ecosystems are "relatively self-contained, self adjusting system[s] of resource integrating actors connected by shared institutional logics and mutual value creation through service exchange" (Lusch & Vargo 2014, p.161). These nested networks continually enact the joint practices of value co-creation. Practices are rather stable and institutionalized as joint practices. However, through the process of value proposition, acceptance and value co-creation, new practices can be formed. This way the nested networks continually reproduce themselves through the enactment and re-enactment of practices. Service ecosystems are not trying to reach an optimum. Instead they adapt, evolve and survive. They are further nested structures, there are ecosystems of ecosystems, and the most important service provider is the natural ecosystem itself. (Lusch & Vargo 2014)

Although rarely clearly stated, an issue underlying much of the importance of PSS, solutions, business models, ecosystems etc. is the idea of systemic value creation. The essence of products, services or any type of offerings is no longer seen to be in the offering per se but in the customer value created. Further, value is not seen as an inherent property of goods and services, but as being created when customers use them as resources, combining them together with other resources for creating value. "The service provided (directly or through a good) is only input into the value-creating activities of the customer. Before value can be realized, that input must be integrated with other resources" (Vargo 2009, p.374). The idea of both PSS and solutions is that products are combined together with services in order to solve customers' problems or create value. The idea of business models is that processes, technologies, equipment, people, channels, partnerships etc. are combined together in a formula of value creation. As different resources are combined together, self-organization emerges and nested systems of value creation are formed. *Systemic value creation* means that value creation takes place in such context of nested systems. SDL uses the concept of value co-creation, which emphasizes that "the context of value creation is networks of networks" and that "value creation is interactional" (Vargo 2009, p.375).

It is important to understand that there is circularity in the nested patterns of value creation. Vargo (2009, p.375) also describes delay in value creation – how value creation is not a discrete production-consumption event but value emerges and unfolds over time. In systems, there are often many circular loops of flows, often these interconnections operate through the flow of information, and there is always delay in systems (Meadows 2008). It is the system structure with feedback loops that causes system behavior, but system behavior is often observed as events taking place (Meadows 2008). "The *behavior of a system* is its performance over time – its growth, stagnation, decline, oscillation, randomness or evolution" (Meadows 2008, p.88).

### 2.4.5 Organizing for industrial service innovations

Servitization of industrial companies is typically seen as a rather slow and incremental process (Kowalkowski et al. 2012; Gebauer & Fleisch 2007). It is often suggested that building the capabilities needed for solutions business can take many years. The challenges seem to stem from the manufacturing-oriented way of doing business (Brax 2005). Transforming the organizational culture has been identified by many as a major challenge of industrial servitization (Martinez et al. 2010; Brady, Davies & D. Gann 2005). The problem is partly attitudinal and it may take a long time before manufacturers are able to change their perception of services as unnecessary and unprofitable (Wise & Baumgartner 1999; Gebauer & Friedli 2005; Gebauer et al. 2006). The transformation from a traditional manufacturer to a service provider is typically viewed as taking place as different kinds of shifts. Some of the aspects of organizational change identified by different authors are e.g. a shift from transaction based business to relationship based business, a shift in the value proposition from product efficacy to product effectiveness and efficiency in customer's use context (Oliva & Kallenberg 2003), a shift from a focus on standardization to a focus on customer responsiveness, a shift in the amount of customer contacts (Bowen et al. 1989). Although not all, a large portion of such shifts that are associated with manufacturers turning service providers, are also associated with customer orientation.

The different shifts can also be seen as steps and different authors such as Oliva & Kallenberg (2003), Penttinen & Palmer (2007) and Matthyssens & Vandenbempt (2008) have described the transformation of a manufacturing company into a servitized company through stepwise paths. The typical view is that the transformation proceeds from the simple to the more complex starting from services related to the product. This view of there being specific paths of servitization is rarely questioned. However, Kowalkowski et al. (2012) argue that the process is not that deterministic and that it is more explorative and ambiguous. Turunen (2011) points out that servitization can take place even in reverse order starting from the consultancy-type services. She suggests that manufacturers' ability to apply such advanced service strategies right from the start depends on the level of their customer orientation and especially on the way they interact with customers. In particular she argues that successful innovation of new industrial service is dependent on organizing to foster contin-

uous interaction with customers in such a way as to secure the interaction and the continuous flow of customer information (Turunen 2013). This view is in line with what has been described above about the importance of customer interactions for the learning taking place in KIBS.

## 2.5 Synthesis of theory

Customer orientation is a business approach that emphasizes customer value and satisfaction of customers' needs. Drucker (1954), who was the first to introduce the philosophical grounds of customer orientation, in particular highlighted that the only valid purpose of a business is to create a customer and that for doing that a business has only two basic functions, innovation and marketing which need to be united. He emphasized the role that customers have in determining the fate of innovations and businesses. Innovation research however contrasted the ideas of demand pull and technology push for decades. The present situation is that mainstream innovation practice is focused on technological innovation and product development by manufacturers. The roots of this thinking probably lie in Smith's (1776) view of national wealth deriving from the production and export of goods and Schumpeter's (1934; 1939; 1942) emphasis of producers like entrepreneurs or large firms driving innovation and economic growth. Although it is acknowledged that demand has a role in innovation, manufacturing companies manage innovation primarily as a process of product and technology development where customer demand is only checked at certain points in the process.

There are innovation studies that take a perspective very different from this mainstream or "normal" innovation practice by putting more emphasis on the role of customers in innovation. They form separate branches of research with names describing their distinct perspective. Of particular importance are von Hippel's (1988; 2005) work on user driven innovation and the work on open innovation popularized by Chesbrough (2003). Scholars on UDI challenge the view of innovation being driven by manufacturers' technology development and replace it with the idea that it is often users themselves who innovate and even call for "democratizing" of innovation (von Hippel 2005). Such a view highlights the importance of customer orientation and points towards the need to renew innovation processes especially related to understanding and interacting with customers. OI that is much influenced by these thoughts builds on the idea that innovative ideas often have their origins outside firm boundaries. The locus of innovation however is seen to be at the network as whole (Chesbrough et al. 2011). However, although it has been suggested that OI is developing towards more iterative and interactive probe-and-learn processes (Gassmann et al. 2010), there are critical views stating that the way OI is currently applied is just an extension of the stage-gate model and in essence a linear approach focusing on technological advancement without feedback mechanisms (Trott & Hartmann 2009).

Service innovation research is a further research stream that differs from the mainstream of innovation practice focused on producer companies' technology development. Service innovation research can be seen as divided in roughly three approaches: the technologist or assimilation approach, the service-oriented or demarcation approach, and the integrative or synthesis approach (Gallouj 1994; Coombs & Miles 2000). While the assimilation approach considers services innovation similar to product innovation and driven by technology development, the demarcation approach stresses the difference of ser-

vices innovation from product and technology innovation. The synthesis perspective brings together these manufacturing and service views of innovation. Two prominent examples of provision in the synthesis perspective are the characteristics based approach by Gallouj & Weinstein (1997) and the service-dominant logic by Vargo & Lusch (2004; 2008).

The concept of service is used in two ways which are both important for the study of industrial service innovation. The concept of service can be used to categorize offerings to goods and services (i.e. non-goods). It has been suggested especially by proponents of the demarcation approach that services as different from goods have innovation processes that are different from those of goods. For example, services innovations often emerge within the process of service provision without the participation of dedicated R&D resources (Sundbo 1997) and they are improved in use after official launching, a phenomenon called after-innovation (Sundbo 2008). Plenty of definitions and characterizations of services as non-goods have been suggested. They have aided in the development of knowledge on the non-goods type of service innovation and they are important for classification such as for the International Standard Industrial Classification of All Economic Activities (ISIC 2008).

The academic discussion on service however no longer emphasizes the difference between goods and services as different types of offerings. For instance, the Nordic school of service marketing does not find it important to focus on the division between goods and services (Gummesson & Grönroos 2012). The other way in which the concept of service is used by such scholars is to emphasize value creation. Service is used in the meaning of serving, i.e. of acting in the benefit of someone, of supporting someone's value creation, of creating value for someone or of providing solutions to problems and needs. The service-dominant logic brings to the light the two different ways of using the service concept in its different definitions for service (singular) and services (plural). In SDL services are a category of non-goods offerings whereas service means the process of an actor using its resources for the benefit of another party or itself (Vargo & Lusch 2008, pp.2, 6). It can be argued that if the essence of service is a focus on customer value then also the service innovation process should be focused on customer value. Further, as customer orientation is a business approach emphasizing customer value and satisfaction of customer needs, the use of service concept to accentuate value creation can be seen as another way to express customer orientation. As Vargo & Lusch (2006) describe, SDL is a restatement of customer orientation. However, contrasting services with goods also brings to the fore issues related to customer orientation. Service characteristics that emphasize customer orientation are e.g. the experiential nature of services (Carù & Cova 2015) and the way that services processes are often intertwined with customers' own processes and the customer participating to some extent in the service production (Grönroos 2000).

The growth of services as a category of non-goods is clearly visible in the quantitative indicators of industrial servitization. In the industrial context, both the share of services of the sales of all offerings and the share of service occupations (jobs in the provision of services type offerings) of all occupations

have risen (Auguste et al. 2006; Koudal 2006; Veugelers 2013). Service in the sense that emphasizes value creation is also important for industry. This can be seen e.g. in the way that industrial service can be seen as *supporting customers*, in addition to supporting goods (Mathieu 2001). While service business has proven to be a very lucrative strategy for some industrial companies (Koudal 2006) there is great variance in the performance of industrial service innovations (Ettlie & Rosenthal 2012). Many manufacturers have difficulties in getting their customers to adopt their industrial service innovations. The transformation of manufacturing organizations to servitized organizations is most often seen as a slow and difficult process (Gebauer & Fleisch 2007) the challenges stemming from the manufacturing-oriented way of doing business (Brax 2005) and an important part of the transformation process being the development of customer orientation within the company (Oliva & Kallenberg 2003; Bowen et al. 1989; Penttinen & Palmer 2007; Matthyssens & Vandenbempt 2008). However, some manufacturers with a high level of customer orientation seem to be able to apply the most advanced service strategies right from the start (Turunen 2011) which suggests that customer orientation may have a very important role possibly being a critical factor of manufacturers' success in service business (Turunen 2013). However, although there are studies of the organizational transformation processes of manufacturing companies transforming to service providers, there is little previous research on industrial services as innovations and the role of customer orientation in them.

# 3. Research questions and process

Grounding on the theoretical background and the aim of the research to better understand customer orientation in the context of industrial service innovation, this chapter presents the dissertation's four research questions and research process.

Innovation in manufacturing companies has been mostly focused on product and technology development. Service innovation research on the other hand has developed as a research stream of its own differentiated from the mainstream innovation practice usually applied in manufacturing industry. However, in the service economy, also manufacturing industries have witnessed how services have started to dominate other offerings and how the share of service-type occupations has grown (Manyika et al. 2012; Veugelers 2013). The significance of services is further emphasized in the profits of manufacturing companies. This has generated the need to better understand innovation in the context of industrial service.

There is reason to believe that customer orientation may be an important factor contributing to industrial service innovation success. Not only is customer orientation widely accepted as essential for innovation and marketing in general; it also seems to be linked to manufacturers' ability to apply advanced service strategies (Turunen 2013). Customer orientation is also accentuated in recent innovation research such as user driven innovation, open innovation and service innovation. The discussion on the interpretation of customer orientation however has not settled down yet – one of the most recent restatements of customer orientation being the service-dominant logic of marketing. There is a need to better understand customer orientation in the context of industrial service and this is the research gap this dissertation aims to cover.

## 3.1 Research questions

This dissertation focuses on customer orientation in industrial service innovation by posing four research questions. Although some very successful examples of servitized manufacturers make industrial service business look very tempting, manufacturers often have difficulties in getting their customers to adopt and buy the new industrial service innovations. This puzzled me. Therefore, it was natural to ask where these difficulties stemmed from. The studies in this dissertation revealed that many companies had a narrow view of business customers whereas the customer context is actually networked. The studies also gave me an understanding that customers' needs change as customers interact with their stakeholders. As customer orientation lies in the core of the marketing philosophy highlighting that companies should strive to satisfy customer needs, wants and aspirations better than competitors, these observations on customers and their needs led to further research questions. It was necessary to take a deeper look at customer needs and their change processes. Also, these observations made evident the need to study the interaction process where companies developing industrial service innovations in practice involve their customers in innovation. The studies further grew my understanding of the customer context and customers' role in the innovation process as networked and interactive. As my research progressed, it also became more and more clear to me that the new evolving theory on service-dominant logic was providing theoretical analyses that made it possible for me to use it for describing the phenomena that I was observing. The fourth research question addresses the issue of applying this new systemic value co-creation view to advance industrial innovation in practice.

The four specific research questions (RQ) of the dissertation (corresponding to the research questions of the four original articles in more dense form) are:

i. What kinds of difficulties do companies have in getting business customers to adopt industrial service innovations and where do these difficulties stem from?

   This first research question focuses on industrial service innovation and originates from the observation that many industrial companies trying to innovate new industrial services in a customer oriented manner still have difficulties in the customer acceptance of these innovations. This research question is studied by taking an industrial service innovation perspective to innovation diffusion, which has originally been developed mainly in the context of product and technological innovations.

ii. How could the concept of need be understood in a business-to-business context and how could a need of a business customer be answered through the co-creation of value?

This second research question originates from the central position that responding to customer needs holds in the approach of customer orientation, and from the necessity of a deeper view on customers and their needs in the customer context where industrial service innovations take place – i.e. the B2B context. Although there are plenty of studies on human needs, the concept of need has not previously been properly investigated in the B2B context. The varying perspectives on the nature of organizations lead to very different and even contradictory views on what it is that business customers actually need (c.f. Scott 2003). Without a good understanding of customer needs it is very difficult to follow the approach of customer orientation. Therefore, in order to better understand customer orientation in the B2B context of industrial service innovation, it was necessary to study how the concept of need can be used in networked contexts where the focus is not on humans as single individuals but on humans acting together such as in relationships within and between business companies.

iii. How and why do companies involve business customers in industrial service innovation?

This third research question focuses on industrial service innovation and stems from the view that customer needs are not stable, waiting to be found, but they change in interaction, which brings to the fore new benefit mechanisms of customer involvement. This research question is approached by bringing together theory of open innovation with service innovation theory and using the service-dominant logic (SDL) to leverage the discussion.

iv. How can the service-dominant view of value be applied to widen the perspective on industrial innovation?

This fourth research question takes the view developed through studying the earlier research questions and applies it to the practice of industrial service innovation. However, the concept of industrial innovation is used in the research question. This is a concept wider than industrial service innovation, encompassing innovation in general. Differing from the earlier research questions this research question adopts a synthesis approach in order to study how the view of service, not as a category distinct from goods but as a perspective on value as co-created, can be applied to understand innovation in general in the context of a servitizing manufacturing company. The service-dominant view of value is that value is co-created. The co-creation of value is the most important core idea of the service-dominant logic and it is also essential for customer orientation. As customer orientation underlines satisfaction of customers' needs and creation of customer value, the new view of value as co-created leads to a new interpretation of cus-

tomer orientation. The theory used for studying this research question is SDL – not just as a lever of other innovation theories, but as an innovation theory in itself.

Table 1 summarizes the contribution of each article to the research questions of the study. Each article primarily focuses on one of the research questions of the dissertation. However, the earlier articles create pre-understanding for the research questions in the subsequent articles. Also, the subsequent articles continue deepening and strengthening the view that has been developed in the earlier articles. The size of the cross in Table 1 represents the contribution of each article to the different research questions.

**Table 1.** Contribution of the articles to the research questions of the study.

| Research question | Article I | Article II | Article III | Article IV |
|---|---|---|---|---|
| RQ i: What kinds of difficulties do companies have in getting business customers to adopt industrial service innovations and where do these difficulties stem from? | **X** | x | x | x |
| RQ ii: How could the concept of need be understood in a business-to-business context and how could a need of a business customer be answered through the co-creation of value? | x | **X** | x | x |
| RQ iii: How and why do companies involve business customers in industrial service innovation? | x | x | **X** | **X** |
| RQ iv: How can the service-dominant view of value be applied to widen the perspective on industrial innovation? | x | x | x | **X** |

The process through which the research questions are produced includes some emergence in the sense that the answer to one research question leads to the formulation of subsequent research questions, which is good to briefly discuss here. The emergence is characteristic of the abductive research approach used in the dissertation. The abductive process involves an evolving framework that is both the input and the output of the abductive operation which leads the research to being redirected (Dubois & Gadde 2002; 2014). Different researchers with different preunderstanding or theoretical background may end up in different conclusions, which is not uncommon in qualitative research in general. Having these qualities abduction is still seen as an essential part of

present day reasoning (Niiniluoto 1999) and its significance for producing good theory is often emphasized (Weick 2005; Van Maanen et al. 2007; Van de Ven 2007; Alvesson & Sköldberg 2009). The validity and generalizability of abduction is in particular based on the dialog between theory and empiria (Paavola 2012). Abduction as a logic for reasoning and the abductive process of knowledge creation utilized in this dissertation are further elaborated in the methodology section.

## 3.2 Research process

The research was conducted over multiple successive research projects. My role in developing the project ideas and in the management and coordination of most of the projects has made it possible to create a line of research building on top of earlier work. The research process, presented in Figure 2, consists of four phases which are not the same as the four research articles. Phase 1 corresponds to Article I and research question i, phase 2 corresponds to Articles II and III and research questions ii and iii, phase 3 corresponds to Article IV and research question iv, and phase 4 is an aggregating phase bringing together the work done in the earlier phases and corresponding to the writing of this summary part of the dissertation.

The first research phase was the starting phase, where I had realized that manufacturing companies have challenges in the customer acceptance of their industrial service innovations even though they try to be customer oriented. Already before starting the dissertation I had been involved in several research projects on industrial service business. I knew personally many company representatives that developed new industrial services, they told me about their service ideas, how they did their service development, and how their customers responded. From these discussions I got the feeling that they were very sincere in their attempt to create customer value and come up with new benefits for customers. However, customers were not always that interested in the new industrial services. At the same time there were several excellent examples of industrial companies that were making extraordinary profit on service business. This made my contacts wonder how to fare better. Therefore the research project C-Understanding (Customer understanding in strategic industrial services) was set up to study industrial companies' "customer understanding", i.e. customer orientation when developing services. The project was carried out during years 2008 – 2010 in collaboration with Turku School of Economics.

The first research question "What kinds of difficulties do companies have in getting business customers to adopt industrial service innovations and where do these difficulties stem from?" was mainly studied in this first phase of research that resulted the first article. The first article uses innovation diffusion as theoretical background for studying adoption of industrial service innovations. The empiria comes from the manufacturing industry, from cases of nine providers of industrial service innovations and their thirteen customer companies.

The article leads to the insight that there needs to be a fit between the industrial service innovation and the need of the customer. However, the business customer as an innovation adopter is not unified. Instead business companies as customers can be viewed as nested networks of individual adopters and therefore "customer need" is often ambivalent. It changes from person to person, in different contexts and in time as these people interact with their environment. Also, business customers are not completely rational; instead individuals' emotions have an important impact on the innovation adoption. The study gave a much more complex view of business customers and their needs

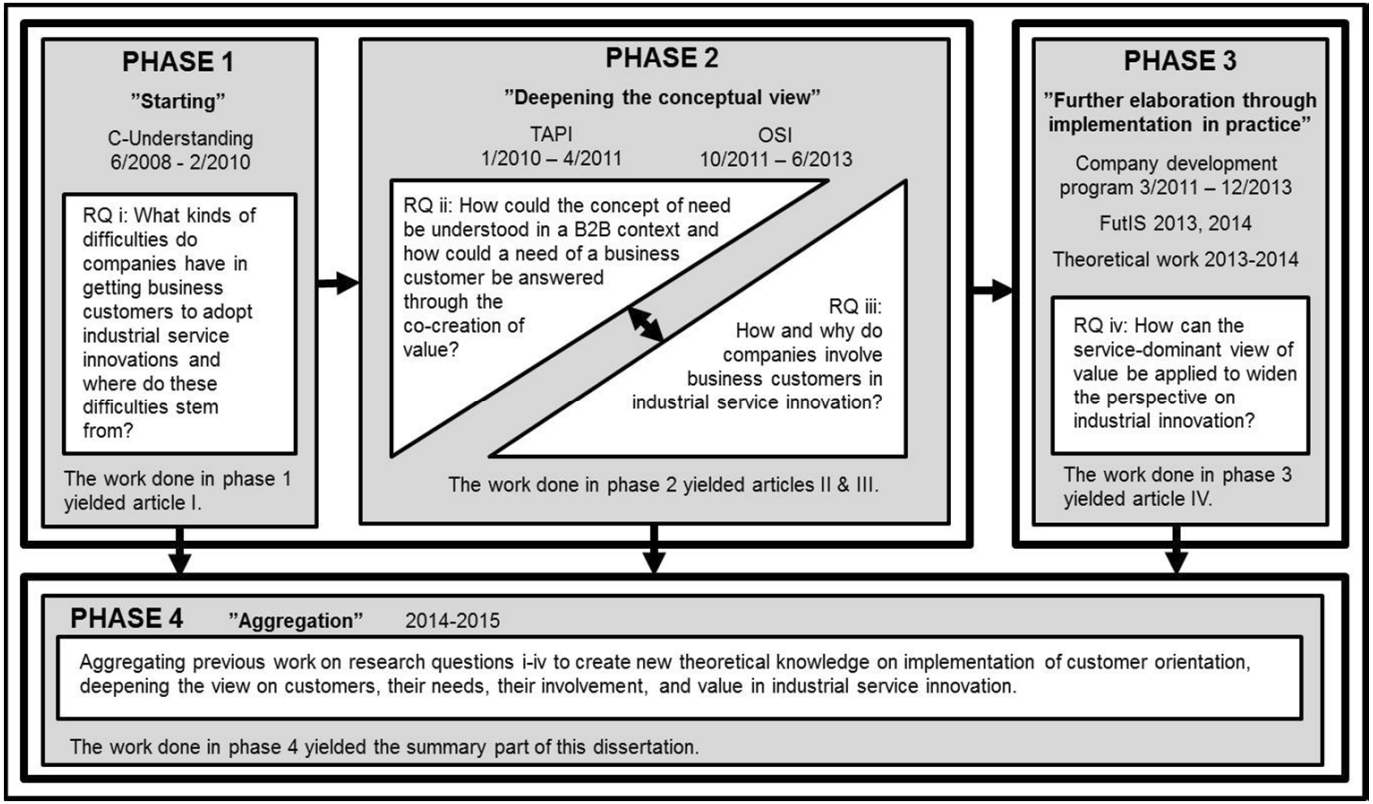


**Figure 2.** Research process of this study: phases, research questions and projects.

than what is often considered when developing industrial services. This can lead to non-fit between the industrial service innovation and customer need and further innovation resistance. My understanding of the complexity of business customers and their needs and therefore my understanding of business customers' innovation adoption grew also in the later phases of the research.

The second research phase included two research projects and two research questions, and it led to two articles. The reason why these two projects, research questions and articles are combined in one research phase is the considerable overlap in the timeframe and thought processes. I also combine empirical data from the two projects in one of the articles.

In the second research phase I already had gained better understanding about the complexity of the world of the customer that was not always mirrored in service providers' customer orientation. It is quite usual to consider business customers and their needs very different from consumers and consumer needs. I had realized in the first research phase that on one hand business customers' needs are more influenced by human experience than what is usually considered and on the other hand they are much more complex than what is usually considered and that they change in interaction. The pre-understanding had been developed in the first research phase and the first article. However, I had not looked deep enough at these aspects in the first phase. I needed to take a closer look at business customers' needs and companies' interaction with their business customers and that is what I did in the second research phase.

In collaboration with Aalto University and University of Helsinki we first set up the research project TAPI (Business-to-business service innovation based on customer needs). The carrying idea of the project was that understanding business customers' needs could lead to more successful innovation. TAPI was carried out during years 2010 – 2011. As TAPI project ended I continued the collaboration with Aalto University and we set up a new project. Based on our deepened understanding on the phenomenon, we further emphasized the idea of interaction and mutual influencing of the customers and the suppliers on each other. The project was called OSI (Open service innovation – practices and outcomes) and the context was business-to-business (B2B) manufacturing and technology companies. OSI was carried out during years 2011 – 2013.

I started to dig deeper to the second research question "How could the concept of need be understood in a business-to-business context and how could a need of a business customer be answered through the co-creation of value?" in TAPI research project and I finalized the article in OSI research project. This second article was a literature study utilizing SDL. It can be seen as a theoretical discussion of the need concept in the nested and co-created B2B context.

When studying the third research question "How and why do companies involve business customers in industrial service innovation?" I added a new theoretical angle by looking at open innovation theories. The third research question had its roots in the TAPI research project and the empirical data for one of the six company cases comes from TAPI project. However, most of the re-

search to this specific question has been carried out in the OSI research project and the empirical data for five of the six company cases comes from OSI project.

The second research phase led to deepened insight about the interactive process between industrial service providers and their customers both within the provider-customer dyad and on a wider network level. It further strengthened my view of business customers that had been developed in the first research phase. It especially deepened my understanding on needs in B2B context and the involvement of business customers in industrial service innovation. This understanding of needs in B2B context (RQ ii) and involvement of business customers (RQ iii) had its roots in the earlier articles and it was further strengthened in the fourth research article.

The first and the second research phases and their projects form a continuum, building understanding on a more general level and then going deep to specific phenomena of interest. The idea of the third phase of research was to elaborate the view even further and take it to a very practical level in a different kind of setting. The empirical data in the third research phase comes from a consultancy -type case, i.e. industrial service business development with one company. The issue of the researcher influencing the results to some extent cannot be avoided in such a context and it will be discussed in the methodology section. The development program of the company took place in 2011-2013. The company gave me permission to do scientific research on the development program and publish the results. This way I have been able to further deepen my perspective by reflecting on the work done in the company to answer the fourth research question "How can the service-dominant view of value be applied to widen the perspective on industrial innovation?" The finalization of the academic article was then carried out in 2013-2014 in a research project – namely the FutIS Programme (Future Industrial Services) of Fimecc (Finnish Metals and Engineering Competence Cluster). Even though there were other research organizations participating in the company's development program and in the FutIS Programme, these organizations did not participate in the conduction of my research study. The third phase of my research clarifies SDL as a perspective on customer orientation and as an innovation theory and simultaneously deepens the theoretical basis for industrial innovation in general.

The fourth and last research phase is basically the writing of this summary part of the dissertation during 2014-2015. In the fourth phase I have aggregated the work I have done in the three earlier research phases answering the four research questions that deepen the understanding on customer orientation in industrial service innovation.

# 4. Methodology

The research approach applied in this dissertation is a form of constructionism. Abductive case study is used as research method. This section first describes in more detail the chosen approach and methodology and then discusses validity, reliability and generalizability of the research based on the chosen approach.

## 4.1 Research approach

The choice of research approach and the assessment of research quality rely on ontological and epistemological considerations. As a simplification, there are two main opposing views to the ontological question about the nature of reality: one objective universal reality and multiple subjective local realities (Guba & Lincoln 1994). If one believes in one objective reality that exists independent of being perceived (realism), claims about that reality are either true or false and one can try to validate or falsify them. If one believes in multiple subjective realities, truth is always relative to a frame of reference (relativism). Therefore, the view to the epistemological question of the relationship between the knower and the known depends on the ontological view (Guba & Lincoln 1994). Continuing the simplification, the two main epistemological views that correspond to the main ontological views are empiricism and constructivism. According to empiricism, knowledge about reality is found out through empirical observation (Hjørland 2005). Positivism is today a typical form of empiricism (Hjørland 2005). According to constructivism, knowledge is a human and social construction (Järvensivu & Törnroos 2010). This chapter describes the research approach taken in this dissertation, explaining first constructivism, then social constructionism as the specific type of constructivism applied and then the location of the dissertation in the moderate end of the constructivist paradigm.

### 4.1.1 Constructivism

Constructivism refuses the modern notion of 19th and early 20th century that knowledge is a mirror image of reality. Albeit not necessarily a postmodern approach per se, it reflects the knowledge concept of the recent postmodern era which Lyotard (1984) characterizes by skepticism towards universal systems of thought (Kvale 1996). Stated otherwise, at the heart of postmodernism lies "the *doubt* that any method or theory, any discourse or genre, or any tradition or novelty has a universal and general claim as the 'right' or privileged form of authoritative knowledge" (Richardson & St. Pierre 2005, p.961 italics added). Constructivism accentuates the creation rather than the discovery of knowledge. Social constructionism as a form of constructivism has further accentuated that knowledge is socially constructed.

### 4.1.2 Social constructionism

According to social constructionism knowledge about the world is interpreted, negotiated and maintained by social interactions (Berger & Luckmann 1966). It becomes embedded in the institutional fabric of society and further transferred to future generations affecting their interpretation of reality (Berger & Luckmann 1966). From this perspective scientific knowledge is constructed by the scientific community and transferred to new members of that community. It is at least partly the product of negotiation (Longino 2002). Therefore, scientists' views of reality result from group dynamics and they shift in "para-

digms" (Kuhn 1962). The scientific communities can either try to somehow address this issue that scientific inquiry is in fact affected by the social setting in a possibly biasing manner – or they can treat sociality as a fundamental aspect of knowledge and as constitutive of rationality (Longino 2015).

Social constructionism as a research approach fits well with the aims and the issues in this dissertation. The usefulness and benefit of customer orientation is already quite well accepted among businesses, the aim of the dissertation is not to prove that this is the reality. Instead the dissertation aims to reveal something novel about customer orientation in the context of industrial service innovation. Therefore the aim is more in the realm of creating novel knowledge than in the realm of discovering knowledge already existing there and waiting to be found. Also, this dissertation studies abstract social phenomena, such as innovation, strategic orientation, value creation and service. Knowledge on these phenomena is by nature more tacit and more in the sphere of social construction than knowledge on some more concrete and physically measurable variables in management research such as e.g. inventory levels or delivery times of logistics chains. The dissertation also utilizes theory that is at least partly quite new and evolving rapidly – scholars on SDL are proposing a fundamental shift in the logic of how value creation is understood in the society. That is, they are proposing that we as a society change our perspective to reality. These aspects make it very natural to choose constructionism as a research approach for the dissertation.

The constructionist research approach is often associated with qualitative case studies, which are used in this dissertation, and high level of interpretation. The positivist research approach on the other hand is often associated with quantitative methodologies, measuring and statistical analysis. From the positivist stance such a methodological choice increases the quality of the research. Many constructs of social sciences, including the constructs in this dissertation, are difficult to measure directly and therefore surveys are a widely used tool for data gathering and quantification when a positivist research approach is adopted. From the constructionist stance quantification and statistical analysis reduce the context specific information content or the "richness" of data. Surveys are seen to offer very limited information and also to be prone to misinterpretation. Instead, in-depth qualitative case studies with "rich" data and researcher's thorough understanding of context are preferred. (See Patton 2015 for a discussion on Quants versus Quals.) There has been an ongoing debate within social sciences and management research about which main approach is better – sometimes even called a paradigm war (Guba & Lincoln 1994; Kavanagh 1994; Ragin 1997; Rod 2009; Kwan & Tsang 2001; Alvesson & Sköldberg 2009). The paradigm wars have already calmed down (Rubin & Rubin 2012) and this dissertation does not take a stance in the debate which approach in general is better. However, to be able to gain access to high quality case data and to study the research subject very close and for a long time period is a great opportunity. That opportunity was available for this dissertation and it was exploited and the research approach was chosen accordingly.

Interpretation is essential for all science and all research approaches (Gummesson 2003; Stake 1995). The purpose of science is not to make statistical observations about reality (one or multiple, objective or subjective realities) but to reveal something beyond the immediately observed that is seen as valuable (Alvesson & Sköldberg 2009). This can be achieved with both quantitative and qualitative research methodologies and positivist and constructionist approaches. Novel perspective can often be taken by changing the approach. There exists a vast mass of quantitative studies on customer orientation. In order to reveal a perspective that is interesting and novel enough to bring substantial new value to the abundant previous research, a perspective different from the earlier more positivist quantitative research needed to be taken. Therefore, the decision was made to construct knowledge from rich qualitative case studies.

### 4.1.3 Moderate constructionism

There is much variance within social constructionism (Alvesson & Sköldberg 2009). The wide constructivist paradigm also has many names including naturalistic (Lincoln 2007), interpretive, and hermeneutic (Guba & Lincoln 1989). As one source of variety, there are differing views whether material objects exist independent of our experience of them or whether everything is dependent on the mind. In this dissertation *a moderate, more realist approach to constructionism* is taken, as the world is not supposed to be just a construction of mind (c.f. Järvensivu & Törnroos 2010). The assumption is that there are things that cannot be changed by just thinking differently. The moderate approach allows for a pluralistic view of reality: there are subjective realities, socially constructed realities, and an objective reality. Each person studied in this dissertation has a subjective view of how customer orientation has been implemented in his or her company and how it has worked. The epistemological view taken is that knowledge of reality can only be derived through subjective experience. The subjective realities can never be truly shared but when there is enough similarity between people they can understand each other's subjective realities to certain extent through their own experience. This way they can through interaction construct a social reality that is filtered through subjective experience. Also, the objective reality can never be truly known, it can only be believed in through subjective and social construction of reality.

The phenomena discussed in this work represent reality for many companies and people (especially those that have been studied), but not all companies and people have so far taken a similar perspective on them. Assessment of truth is always relative. However, not just any subjective assessment of truth can be accepted as science. Kvale (1996, p.60) characterizes science as "methodological production of new, systematic knowledge". Science is about the social construction of knowledge in a scientific community following guidelines accepted by that community. That is the perspective taken in this dissertation.

Moderate forms of social constructionism such as the research approach adopted in this dissertation have some ontological and especially epistemological overlap with critical realism (Järvensivu & Törnroos 2010). Critical real-

ism as developed by Bhaskar (1975; 1979) has been claimed to offer an alternative to both positivism and constructivism (Alvesson & Sköldberg 2009). It joins ontological realism with epistemological relativism by viewing reality through different levels of depth. However, the influence of critical realism has remained limited outside of Great Britain whereas social constructionism is more widely spread (Alvesson & Sköldberg 2009). Despite certain similarities with critical realism the research approach of this dissertation is better described as moderate constructionism as seen in Figure 3 adapted from Järvensivu & Törnroos (2010). (See also Guba & Lincoln 1994 for a reminiscent comparison.)

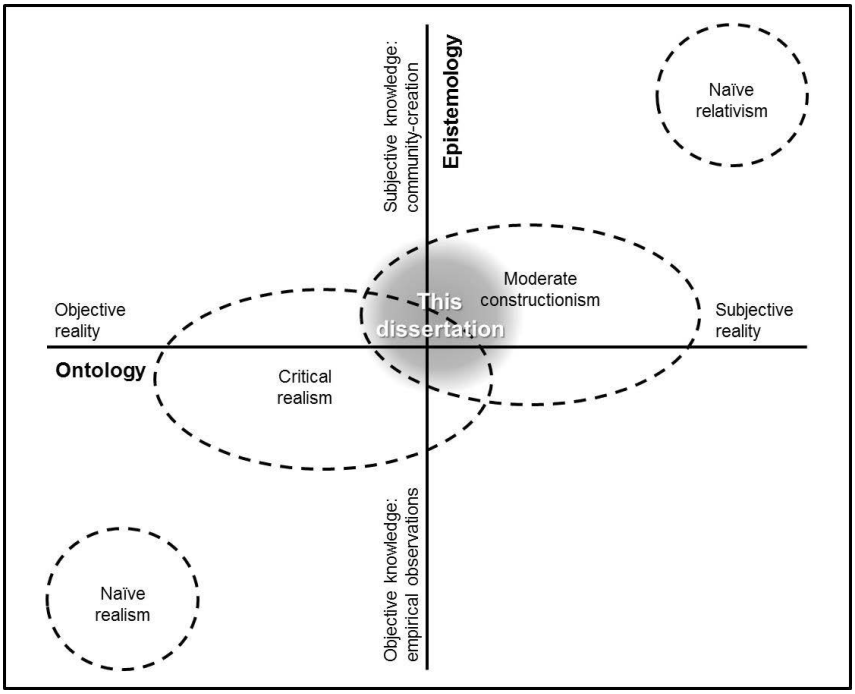


**Figure 3.** Ontological and epistemological worldviews and the location of this dissertation within moderate constructionism (adapted from Järvensivu & Törnroos 2010).

Although critical realism and moderate constructionism are both pluralistic views they also have important philosophical differences that have led to the choice of moderate constructionism in this work. Järvensivu & Törnroos (2010) describe the difference between critical realism and moderate constructionism through the process of gathering data. Critical realism focuses on search and discovery of information that is ready residing inside informants' minds whereas moderate constructionism focuses on the social construction of knowledge within the interview process (Järvensivu & Törnroos 2010). The guideline taken in this dissertation has been Kvale's (1996) metaphor of the interviewer as a miner or as a traveler. For the critical realist, like the miner, knowledge is buried valuable metal waiting to be uncovered, and it remains constant throughout the process from the oral stage to the written form (Kvale 1996). The moderate constructionist, like a traveler, wanders around, seeking

specific sites following a method, asking questions, having conversations and listening to stories, making interpretations, and returning home with new stories to be told (Kvale 1996).

## 4.2 Abductive case research

This chapter describes the abductive case study research applied in the dissertation. First abduction is explained as a logic for case study research. Then the abductive knowledge creation process is described. Finally the more specific multiple and single case study research is described.

### 4.2.1 Abduction as a logic for case study research

The empirical part of this research has been carried out as case study. Case study has been characterized e.g. as "an empirical inquiry that investigates a contemporary phenomenon within a real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin 2003, p.13), as "a research study which focuses on understanding the dynamics present within single settings" (Eisenhardt 1989, p.534), and as "the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (Stake 1995, p.xi). Several of these real-life settings or cases are often also studied together as multiple case studies but they can also be studied alone as single cases. Two significant authorities in business case studies are Eisenhardt (1989) and Yin (2003). Both of them can be seen as representing a relatively positivist approach to case studies (Dubois & Araujo 2007; Easton 2010; Piekkari et al. 2010) although Yin has also acknowledged the value of the interpretive approach (Brown 2008). They rely on inductive reasoning based on repeated observations and strongly emphasize certain research practices such as having multiple cases, selecting the cases very carefully based on theory gaps and doing extensive triangulation (Dubois & Gadde 2014). Stake (1994; 1995; 2000) on the other hand is an interpreter or constructionist (Brown 2008). When taking the constructionist view instead of the positivist view, it is possible to utilize abductive logic (Dubois & Gibbert 2010). Also, the advantages of single case studies are unveiled and both single and multiple case studies are seen as valuable and accepted when taking the constructionist view.

The type of reasoning utilized in this dissertation is abductive reasoning. Abduction can be utilized in many qualitative research methods, such as e.g. collaborative research (c.f. Hinkin et al. 2007; Müller et al. 2012; Harris 2007; Mathiassen 2002) and clinical inquiry (c.f. Schein 1995; 2006; Coghlan 2000; 2009). This is why they often have common elements with abductive case study and may somewhat resemble it. The concept of abduction was introduced to modern logic in the 1860's by Charles Sanders Peirce (Paavola 2012). He brought forward that induction and deduction were not sufficient for describing reasoning and added the concept of abduction which he also referred to as retroduction (Niiniluoto 2011; Gold et al. 2011). Today abduction can be defended as an essential part of reasoning that is inherent even in standard statistical testing of significance (Niiniluoto 1999). Many, including scholars such as Van Maanen et al. (2007), Weick (2005), Alvesson & Sköldberg (2009) and Van de Ven (2007) have emphasized its significance in producing good theory. According to Weick (2005, p.433) in abduction "clues give rise to spec-

ulations, conjectures, and assessments of plausibility rather than to a search among known rules to see which one might best fit the facts." Van de Ven (2007, p.101) expresses the same thing as "abduction is an inferential procedure in which we create a conjecture that, if it were correct, would make the surprising anomaly part of our normal understanding of the world."

Together with induction, abduction can be characterized as ampliative reasoning that helps in acquiring new knowledge and in searching new ideas and hypotheses (Paavola 2012). It is exactly this kind of new knowledge creation that is sought after in this dissertation. Customer orientation is a much researched topic, yet the conventional approaches have not been able to solve it sufficiently. Induction is a linear process that starts from observations and proceeds to conclusions based on how many times particular observations are repeated in a sample. As Locke et al. (2004) put it, induction helps to identify patterns in data but it does not yield understanding of the relevance of those patterns the way that abduction does. When induction focuses more onesidedly on data, abduction puts more emphasis on theory and focuses on the interplay of theory and data throughout the research process (Paavola 2012). However, abduction is even more distant from pure deduction than from induction. Whereas deduction is a linear process that starts from theoretical rules and proceeds to conclusions through the application of these rules; abduction is a nonlinear process that starts from observations but it also uses theory and moves back and forth between observations and theory (Paavola 2012). This back and forth movement does not however mean that abduction would be a combination of induction and deduction (Alvesson & Sköldberg 2009; Van de Ven 2007). Instead, the back and forth movement expands the researcher's understanding of both empiria and theory because neither of them can be understood without the other (Dubois & Gadde 2002). The back and forth movement also makes abduction an especially suitable logic for this dissertation because the dissertation utilizes relatively new theory that is developing rapidly. Abduction aids in the adoption and elaboration of the theory.

Dubois & Gadde (2002; 2014) describe the evolving framework that guides the search of conclusions during the interplay of theory and empiria. To begin with, the framework may consist of nothing more than articulated preconceptions; and over time the framework is developed as more discoveries are made in the empirical fieldwork, analysis and interpretation. They emphasize that the role of a framework is different in abduction than in induction or deduction. It is something that is assumed to be important and that the researcher can use as a guiding principle that helps to focus his or her research attention. Typically it is vaguer in the beginning and becomes clearer as the research advances. It is not the kind of rigid framework that is used for confirmation of theories. Instead, the evolving framework is both the input and the output of the abductive operation and therefore it can change many times during the course of the research based on new knowledge created within the interplay. This leads to research being redirected and often both the theories used and the collection of data are affected. (Dubois & Gadde 2002; 2014)

Abductive case research can be seen as a process of creating understanding of the meanings of the experienced reality through discursive interpretation. It leads to different conclusions when different frameworks are used (Dubois & Gadde 2002) or when researchers have different preunderstanding (Gummesson 2000; Kvale 1996). Therefore the process does not necessarily lead to a correct conclusion in the same sense as deduction does, but it is a very powerful tool for creating narratives from qualitative data for social construction of knowledge. Because of its great strength in knowledge construction abduction was seen to be exceptionally well suited for the analysis of the qualitative case data in this dissertation. As Stake (1994, pp.239–240) phrases it, "We cannot be sure that a case telling its own story will tell all or tell well, but the ethnographic ethos of *interpretive* study, seeking out emic meanings held by the people within the case, is strong."

The ontological view of multiple subjective and socially constructed realities and the epistemological view of socially constructed knowledge are essential for abductive logic. Abduction is grounded on the idea that subjective experience is unquestionable (Locke et al. 2008). As the framework has a great impact on the conclusions and as it is influenced by the researcher's interpretation and early assumptions, it is important that the researcher knows the subject well and has also practical experience on the subject (Gummesson 2000). It is the researcher who through his or her interpretation decides what is necessary for understanding the meaning of the case, what is included in it and what is left out (Stake 1995; Levin-Rozalis 2000). It is the researcher who in the first hand compares the case to cases already known, distils the essence of the case and turns it into a description for others to find insight as they compare it to cases they already know (Stake 1994). It is through the discourse that the subjective experience of the researcher can be generalized to shared intersubjective experience (Kvale 1996).

### 4.2.2 Abductive knowledge creation in this dissertation

The abductive knowledge creation in this dissertation can be seen in Figure 4. The loops represent the dialog fitting together the theory shown in the upper parts of the loops and the empiria shown in the lower parts of the loops. The dialog takes place in every step of the research process circling empiria and theory, the research questions, the important themes and frameworks, and the research problem as a whole. Although the abductive process of this dissertation includes multiple phases of analysis, the process of abduction does not confine the interpretation of meaning to these specific phases alone. Instead, the interpretive discourse is a continuous process that is seen on multiple levels throughout the process (Van Maanen et al. 2007). At the heart of the abductive process utilized in this dissertation lies the creation of understanding through interpretation and generation of meaning through dialog. Understanding differs from explanation in its psychological ring as it includes the characteristic of empathy or researcher's mental recreation of the atmosphere,

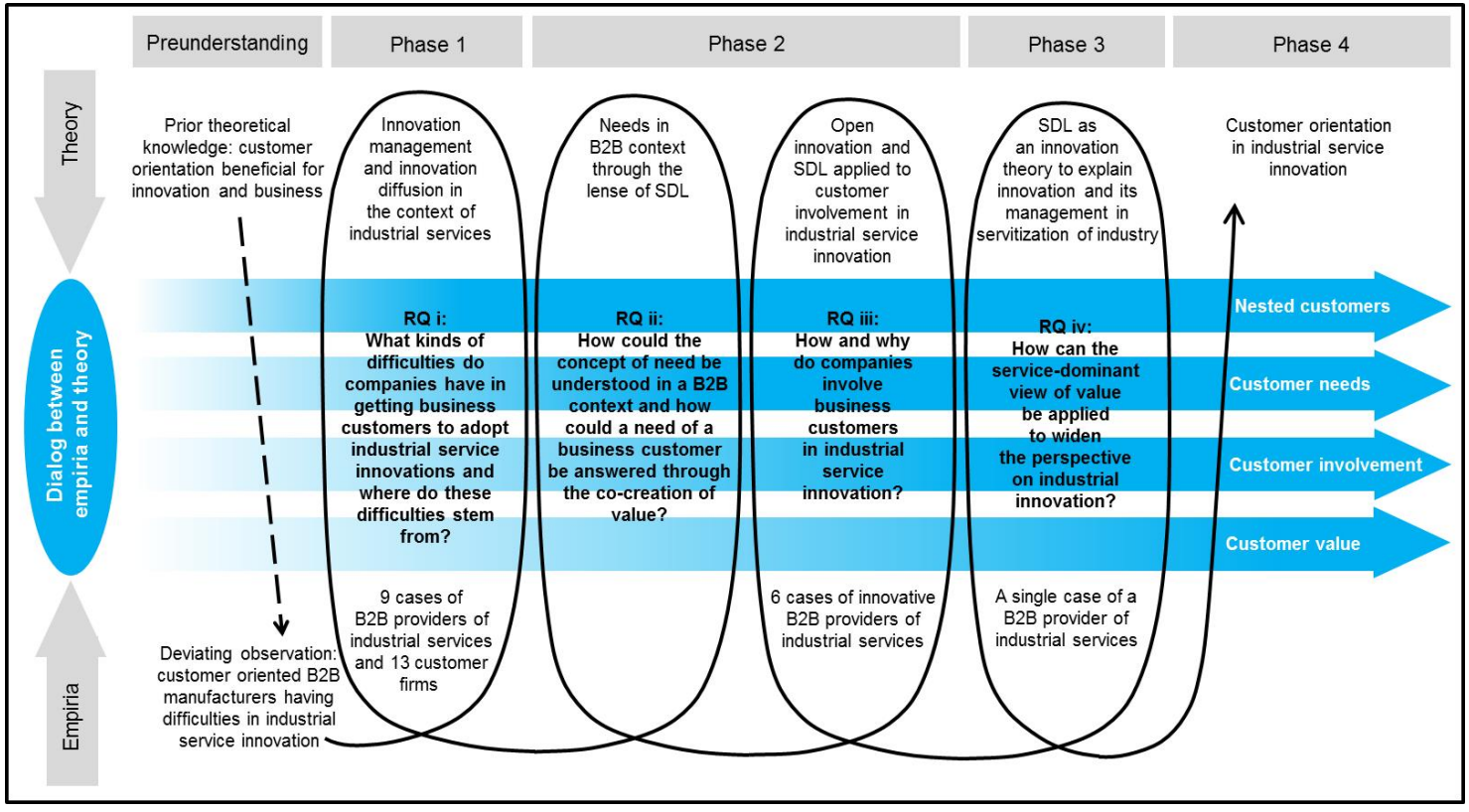


**Figure 4.** Abductive knowledge creation within this study as dialog between empiria and theory.

thoughts, feelings and motivations of the objects of study and as it is connected with intentionality, understanding the aims and purposes, meanings of signs and symbols, and significance of social institutions (von Wright 1971 in Stake 2000). The progression of the abductive dialog of this dissertation leads to the deepening of the understanding on nested customers, customer needs, customer involvement and customer value that is represented by the gradually strengthened blue arrows in Figure 4.

The generalizability and validity of abduction is based on the dialog between empiria and theory. The kick start for this dialog and the abductive process is often some sort of tension between them. Locke et al. (2008, p.908) say that "doubt is the engine of abduction" and explain how doubt as an experience of not knowing is necessary for motivating and energizing inquiry. "Abduction begins by recognizing an anomaly or breakdown in our understanding of the world, and proceeds to create a hypothetical inference that dissolves the anomaly by providing a coherent resolution to the problem" (Van de Ven 2007, p.98). The doubt or anomaly that motivated the start of this dissertation was the notice that many manufacturers experience difficulties in industrial service innovation despite their genuine efforts for being customer oriented and despite the theoretical work on customer orientation being beneficial for innovation success. This preunderstanding also gave rise to the original form of the evolving framework.

*In the first research phase* the original framework was that good innovation management principles would lead to more successful innovation, but that it would be necessary to focus on better understanding of customer behavior in order to explain innovation adoption and rejection. The theoretical basis in the development of the framework was innovation management and Rogers' (2003) innovation diffusion theory on innovation adoption and rejection. Nine B2B providers of industrial services and their 13 customer firms were studied as empiria. First the cases were discussed together with the company representatives to understand reasons why customers are or are not willing to buy industrial services. Theories on organizational buying behavior were also read, but they did not seem to aid in solving the puzzle and mostly the understanding was developed in dialog with the practitioners. This understanding was used together with Rogers' (2003) theory to explain innovation adoption and rejection.

It also became obvious that normal adoption and diffusion theory did not seem to be able to describe the complexity of business customers' context, the way business customers are actually comprised of nested networks of different actors and the way that these actors' needs and willingness for innovation adoption change in interaction with other actors, suppliers and the environment. After the data had been originally analyzed to find examples of innovation adoption and rejection, it was still difficult to express the findings as they were in the form of many heterogeneous examples that had no clear structure. What was needed was a very wide categorization that would carry the message but that would not distort the image by forcing the data to a form in which it would not naturally fit. The categorization was based on the combined views of

Rogers (2003), Tidd (2010), Gatignon & Robertson (1985), and Wejnert (2002) and this categorization was used in telling the story. The categorization was not the result of the study, neither was it used for finding the results, but it was a necessary part of the analysis for presenting the findings in a structured manner so that their meaning could be expressed.

*In the second research phase* the new understanding on the complexity of customers' context and on their involvement in innovation led to a refinement of the evolving framework. The focus was now put on needs and the interaction, the involvement of customers in the innovation process. SDL was chosen to leverage other discussions due to its inherent customer centricity, due to its focus on value in use, in context and in experience, and due to its focus on value as co-created in nested structures of actor-to-actor interaction. Based on the results of the first research phase, it was felt that these were the kind of characteristics that would be needed from the theory. Investigating needs and customer involvement this way especially brought to the fore the nature of innovation as generative activity. It seemed that innovation is not just means to an end but that it has intrinsic value in itself and that it is able to generate new value.

In the start of the second research phase there was an understanding that the way customer needs were approached in many companies' innovation efforts did not reflect the complexity of the situation and there seemed to be a lack of good theoretical understanding of what the concept of 'customer need' actually means in the B2B context. This was found problematic. Therefore, the construct of needs was studied as nested and co-created utilizing SDL as a theoretical perspective to leverage earlier discussions on organizations and needs. In this theoretical work it was also felt important that the conception of organization would not be narrowed down too much by the choice of a specific organizational theory. Therefore Scott's (2003) wide categorization of different organizational theories was utilized. The comparison between mechanistic and organic organizations by Burns & Stalker (1994) was a good second runner up, but not as fitting as Scott's (2003) categorization. A new framework of needs in B2B context was developed that better fit the understanding gained from earlier empiria although empirical data as such were not used in the theoretical analysis leading to the framework.

Also in the second research phase, involvement of business customers in industrial service innovation was studied through six cases of innovative B2B providers of industrial services, as the first research phase had led to the developing understanding that customer needs change and that it might be possible for suppliers to get closer to that change, to tap into it. The theories utilized here were OI and SDL applied to customer involvement in innovation. OI was chosen in this phase as an innovation theory due to its interactive network perspective and due to its understanding of users as an important locus of innovation. OI theory and especially the contrasting of openness and closeness were used to generate discussion with the company practitioners. In the project management group meetings together with some of the Finnish company practitioners also theoretical issues of OI and SDL, their intersection and ver-

sions of the evolving framework were discussed. The data was analyzed as to what are the ways of involving customers, and what are the reasons for this involvement. The findings on ways of involving customers were categorized and reported based on a typology that much resembled earlier typologies in OI theory. As for findings on new reasons for involvement that had not been clearly discussed in earlier theory, new characterizations of the reasons were needed. The characterizations of the novel reasons and the way they were interpreted, was influenced by SDL theory. This way SDL gave novel perspective to earlier discussions on OI.

In this second research phase SDL was utilized in both articles to leverage other discussion, not as an innovation theory in itself. SDL can be seen as an innovation theory since many researchers aim to develop it towards explaining innovation and since it represents a novel approach in the wide array of innovation theories (see Edvardsson & Tronvoll 2013 and Lusch & Nambisan 2015 as examples of development of SDL towards an innovation theory). Vargo & Lusch (2014, p.245) claim that marketing and innovation are essentially the same phenomenon because marketing is about "the creating, increasing and recreating of markets". However, SDL is not always used as an innovation theory. Lusch & Vargo (2006a) refer to it as a foundation for general marketing theory and many researchers utilize it in a wide range of contexts, like Flint & Mentzer (2006) in supply and value chain management, Akaka et al. (2013) in international marketing, and Merz et al. (2009) in branding.

*In the third phase of research* the framework was further refined. The change of perspective originated in the previous phase that brought to spotlight the nature of innovation as generative activity and the interpretation that innovation is not just means to an end but that it has intrinsic value in itself. Also the way the general discussion focused on different silos of innovation, especially services innovation and product innovation, but also business model innovation, process innovation, market innovation etc. seemed disturbing. The focus was now on innovation itself, innovation as entrepreneurial co-development with other actors in nested systems and innovations as social structures of nested value co-creation practices. SDL was utilized as theory, but this time not for leveraging other theories on innovation but as an innovation theory itself. Earlier literature on utilizing SDL in this manner as an innovation theory was still very scant but emerging. Empiria came from a single case of a B2B provider of industrial services. The use of a single empirical case, combining it with the emerging theory, supported the understanding on how to use SDL as an innovation theory in itself. This research phase also further deepened the view on customer value.

*In the fourth research phase* or the aggregation phase, an overarching interpretation has been made of the research to create an understanding of the research results as a whole. According to that interpretation the abductive process has especially led to the deepening of understanding on nested customers, customer needs, customer involvement, and customer value, which are seen as blue arrows in Figure 4. As the framework has evolved throughout the research, the theories have become more systemic and dynamic, more open and

interactive, and more focused on intrinsic and contextual value. From these grounds, during the fourth and last phase of research, a synthesis on customer orientation in industrial service innovation was drawn. What originated from quite a simple idea that industrial service innovation success is improved if one is customer oriented and some disturbing empirical observations motivating research on the issue, has led to a deeper and much more multisided understanding of the phenomenon of industrial service innovation and the customer orientation in it.

The above description of the abductive research process describes the main paths that were eventually chosen. In real life there was a lot of cyclicity and a lot of trial and error in the process. Many tried paths turned out to be dead ends. Also, the author's involvement in other research projects on industrial service innovation must have had to some extent an effect on the interpretations and choices made.

Abductive reasoning is used in all the empirical cases of this dissertation. Three of the articles in this dissertation apply case research: two of them are multiple case studies (Articles I and III) and one is a single case study (Article IV). Article II is a literature study in which the dialog takes place between different theories. In the following I will explain how multiple and single case study research has been applied in the different articles.

### 4.2.3 Multiple case study research in Articles I and III

In the case study research, it is commendable to combine different data sources for evidence. Each case in a multiple case study serves as such an individual data source but there may also be several different data sources within each case. The use of multiple methods and sources of information is called triangulation (Van de Ven 2007, p.284). Triangulation is often seen as a way to verify the accuracy of the different evidence by showing that they converge or yield essentially the same results, but it is a misconception to view triangulation only this way (Patton 2015). Especially among the constructionists, convergence is not the issue that is emphasized. The stronger the stance on constructionism as opposed to positivism, the more the emphasis of triangulation tends to lie in the search for additional diverging interpretations as opposed to aiming at convergence of interpretation (Stake 1995). In abductive case studies in particular, the idea of triangulation is not on checking the accuracy of data, but on discovering new dimensions of the research problem (Dubois & Gadde 2002). The differing observations found in triangulation should not be simply viewed as error, outliers or noise but more as describing different aspects of the phenomenon studied (Van de Ven 2007, p.68). When using abductive logic, this reason for combining evidence becomes important (Dubois & Gadde 2002). Unfitting data lead to the development of the framework and to the modification of theoretical ideas. In other words, it is the surprise and the reconciliation of unanticipated observations and refined theory that leads to discovery and increased knowledge. It is an idea quite different from statistical sampling and convergence – instead the idea is that the more there are cases or perspectives the more there are different contexts, which leads to richer

data and more chances for discovery. The richness of phenomena and information strengthens abductive inference (Paavola 2004, p.270).

The multiplicity of views on triangulation have led some scholars to use new vocabulary such as crystallization (c.f. Richardson & St. Pierre 2005; Ellingson 2009; Järvensivu & Törnroos 2010; Denzin 2012). However, some of the traditional, wide conceptions of triangulation such as use of multiple forms of qualitative research methods (Denzin 1970 in Denzin 2012) or using multiple techniques to collect and interpret data within a given method (Jick 1979; Denzin 1978) or the conception including both the use of multiple methods and the use of multiple data sources (Van de Ven 2007) cover the different logics and uses of triangulation (Van de Ven 2007; Denzin 2012) and that is the view taken in this dissertation. Also the different forms of triangulation such as data triangulation, investigator triangulation, theory triangulation and methodological triangulation (Denzin 1978) can be used in different logics. Triangulation is widely seen as beneficial in qualitative research and case studies. It cannot be used excessively though since it uses a lot of resources (Stake 1995; Patton 2015).

The data triangulation of this research is especially based on data coming from multiple case companies. Investigator triangulation has been used in Articles I and III where the research has been conducted in close cooperation with other researchers. As theory triangulation multiple theories have been extensively used in the different phases of the abductive process where theory has been fitted together with empiria. As methodological triangulation different types of case study have been used. Articles I and III are based on multiple case studies, Article IV is based on a single case study in the context of a consultative development project.

The case study research in this dissertation can be characterized as instrumental rather than intrinsic (c.f. Stake 1994). In other words, the research interest is not in each case for its own sake, but in customer orientation. Consequently, each case is studied and chosen for the purpose of gaining understanding about customer orientation. Each case has been selected so that it represents some typicality for the concern, but on the other hand cases need to be chosen so that they provide novel understanding, and for this purpose certain amount of atypicality has been sought for (c.f. Stake 1994). The evolving framework is very important for case sampling in abductive case research and therefore changes in it have affected the choice of cases in this dissertation. The case sampling can be described as theoretical or information oriented rather than random or stratified (c.f. Flyvbjerg 2006; Eisenhardt & Graebner 2007). Access to high quality data also plays a large role in the selection of cases in this dissertation. Case sampling in the articles is a compromise between research access and theoretical or information oriented sampling. After all, selection of the best theoretical sample is useless if access to data is poor.

Articles I and III are two separate multiple case studies. In addition, the dissertation as a whole, including also the single case study in Article IV, can be seen as a multiple case study. It is possible to choose the units of analysis – the cases or the single settings whose particularity and dynamics are studied (c.f.

Stake 1995; Eisenhardt 1989) – in many different ways. In this research there are two very natural possibilities for the choice of level of unit of analysis, a company and a representative of a company, as they are rather concrete and easy to understand units. Although customer orientation can sometimes also be seen as a characteristic of an individual, a company was chosen as the level of unit of analysis as customer orientation is implemented at the level of companies. It is also a common scholarly convention within qualitative studies in industrial management to talk about *case companies*. This makes it easy to present the results in an understandable manner both to other researchers as well as to practitioners who are especially interested in the results in the context of their own companies and their customer companies.

There were both *supplier* cases and *customer* cases in the research. Not all kinds of data was collected about the companies in a holistic manner, but the focus of data collection and analysis shifted during the research as the framework in the study of customer orientation developed. Further, the data was not collected extensively from a large number of people in different parts of the companies, but the view to the companies was gained mainly through specific company representatives, both in a more formal and structured manner through semi-structured interviews and in a more informal manner in project meetings, workshops and discussions. Further, the cases in the various articles are very different from each other. Some of them are studied deeper than others, and in this context "a case" does not necessarily refer to very large amounts of data triangulated from multiple sources within the company. Instead, the depth of understanding about each specific case context derives from the high quality of the interviews. Further, the depth of knowledge comes from the research as a whole and from studying multiple cases. Data triangulation can be seen as taking place across cases.

The companies in the research can be seen in Table 2 on next page. First 29 of these 31 companies represent "cases"; they have been at the focus of research as single settings. The last two companies have only been interviewed as customers for the sake of studying the single supplier case company #29.

Article I includes a lot of case companies in both supplier and customer roles (# 1-22 in Table 2). There have been extensive interviews and collaboration with the supplier case companies and also high quality interviews with the customer case companies in the study for Article I. Article III introduces six case companies in the supplier role that have been interviewed at the level of top management (# 23-28 in Table 2). The interaction and collaboration with the Finnish case companies has been closer than with the case companies from US in the study for Article III. No customer companies were studied for Article III. Article IV presents a single case study of a supplier company including practical development work with the company (# 29 in Table 2). Its two customers that have been interviewed for Article IV should not be seen as cases (# 30-31 in Table 2). Instead, these customer interviews should be seen as supplementary data for the study of the supplier company as this has been the focus of the interviews and the analysis.

**Table 2.** The companies in the research: detailed data and summary according to the role and size of the companies.

| # | Supplier or Customer Role | Industry / Line of Business | Employees | Interviewees | Typical Positions | Article |
|---|---|---|---|---|---|---|
| 1 | Supplier | Machine building | 10 000 - 50 000 | 3 | | I |
| 2 | Supplier | Machine building | 10 000 - 50 000 | 4 | | I |
| 3 | Supplier | Mining | 1 000 - 5000 | 3 | | I |
| 4 | Supplier | Material handling and logistics | 10 000 - 50 000 | 3 | *Service Director, Service Manager,* | I |
| 5 | Supplier | Automation | 100 - 500 | 4 | *Sales and Marketing Director, Sales* | I |
| 6 | Supplier | Electrical | < 100 | 2 | *Manager, and Customer Manager* | I |
| 7 | Supplier | Technical trade | < 100 | 2 | | I |
| 8 | Supplier | Environmental management | 5 000 - 10 000 | 4 | | I |
| 9 | Supplier | Shipping | 500 - 1 000 | 3 | | I |
| 10 | Customer | Mining | 10 000 - 50 000 | 1 | | I |
| 11 | Customer | Metal | 1 000 - 5000 | 1 | | I |
| 12 | Customer | Energy | 10 000 - 50 000 | 1 | | I |
| 13 | Customer | Chemical | 5 000 - 10 000 | 1 | | I |
| 14 | Customer | Petroleum | 5 000 - 10 000 | 1 | | I |
| 15 | Customer | Real estate | < 100 | 1 | | I |
| 16 | Customer | Forest | 10 000 - 50 000 | 3 | *Sourcing Director, Sourcing Manager,* | I |
| 17 | Customer | Forest | 100 - 500 | 1 | *and Production Manager* | I |
| 18 | Customer | Material handling and logistics | 10 000 - 50 000 | 1 | | I |
| 19 | Customer | Transportation equipment | 1 000 - 5000 | 1 | | I |
| 20 | Customer | Machine building | 10 000 - 50 000 | 1 | | I |
| 21 | Customer | Medical | 1 000 - 5000 | 1 | | I |
| 22 | Customer | Medical | 1 000 - 5000 | 2 | | I |
| 23 | Supplier | 3D design software | 5 000 - 10 000 | 1 | | III |
| 24 | Supplier | Modular carpet | 1 000 - 5000 | 1 | | III |
| 25 | Supplier | Mobile phones | > 50 000 | 3 | *Executive, Managerial and Expert* | III |
| 26 | Supplier | Mobile solutions | 1 000 - 5000 | 2 | *positions in Strategy, Sales and* | III |
| 27 | Supplier | Environmental and industrial measurement | 1 000 - 5000 | 2 | *Marketing, and Customer Service* | III |
| 28 | Supplier | Network access and telecommunication services | 10 000 - 50 000 | 8 | | III |
| 29 | Supplier | Arc welding equipment | 500 - 1 000 | 3 | *Executive and Managerial positions in* | IV |
| 30 | Customer | Minerals and metals processing technology | 1 000 - 5000 | 1 | *General Management, Production* | IV |
| 31 | Customer | Machine building | < 100 | 1 | *Development and Business Area* | IV |
| | | | | 66 | | |

| Roles and Sizes of Companies in All Articles I-IV | |
|---|---|
| Total number of supplier companies | 16 |
| Total number of customer companies | 15 |
| Total number of small and medium companies ( < 500 employees) | 6 |
| Total number of large companies ( 500 - 10 000 employees ) | 15 |
| Total number of very large companies ( > 10 000 employees) | 10 |

Altogether 66 company representatives have been interviewed for the research; collaboration with many of them (especially supplier representatives) has been close and continuous lasting several years. 31 companies have been interviewed: 16 of them in the role of a supplier company and 15 of them in the role of a customer company. Six of the interviewed companies are small and medium companies, 15 are large companies, and 10 are very large companies

*Article I* is used for answering the research question "What kinds of difficulties do companies have in getting business customers to adopt industrial service innovations and where do these difficulties stem from?" It is based on a multiple case study and the main data collection method is interviews. The interviews were carried out in Finnish industrial companies: nine supplier companies and 13 of their customer companies (# 1-22 in Table 2). The main purpose of multiple cases in this study is not statistical validation but an increase in different aspects covered by the data which leads to more opportunities for novel understanding.

First, the nine supplier companies were chosen for the study. They had developed industrial services and they had a keen interest in the issues of customer behavior and customers' acceptance or non-acceptance of new industrial services. It was also important to choose these companies in such a way that they were not directly competing with each other because workshops were arranged between the companies and I wanted to induce conversation and mutual knowledge creation between them. There was a lot of variability between the companies in order to create lots of different viewpoints. The companies came from different industrial fields, their sizes ranged from small companies operating mostly in domestic markets to large global corporations. The maturity of the companies as service providers also varied from highly advanced to beginners.

The supplier representatives to be interviewed were chosen based on their role and interest in the subject as this was assumed to lead to the selection of knowledgeable informants. The interviewees in the supplier companies held different positions such as *Service Director, Service Manager, Sales and Marketing Director, Sales Manager, and Customer Manager*. It was not the official position though that guided the selection of company representatives. We sought for the kind of people who had a deep interest in the issue and who were willing to put a significant amount of personal effort in the research e.g. in the joint workshops for which they were also asked to prepare material in advance. 28 supplier representatives were interviewed and each interview typically lasted between an hour and two hours. Four researchers conducted the interviews that were recorded and also notes were taken in them. The interviews were carried out as semi-structured interviews in order to cover the areas that were assumed to be important and in order to simultaneously allow the interviewees to explain the phenomena under study with their own words and from their own point of view.

Not just any customer companies or representatives were chosen. Before the selection of customer representatives, there was a lot of discussion between the researchers and the supplier representatives of how to choose the kind of

customer companies and representatives that could provide interesting knowledge. Then a snowballing technique was used for sampling the customer cases. The suppliers were asked to name customers representing varying situations in regard to adoption of industrial service innovations– i.e. small and large customers; customers that were known to be progressive and customers that were more reserved; customers that had adopted the new industrial service innovation, customers that had refused to adopt the new industrial service innovation, and customers for whom the industrial service innovation had not been even offered yet. It was the supplier companies who contacted the customer companies and asked them to participate in the study. Some customers declined the request to be interviewed and eventually 16 representatives of 13 customer companies were interviewed. The customer interviews usually lasted between an hour and two hours. In most cases the supplier companies knew based on their business relationships whom to contact in the customer companies and this guided the selection of people to contact. The interviewed customer representatives typically held positions such as *Sourcing Director, Sourcing Manager, and Production Manager*. In order to enhance understanding of the customer cases each customer interview was conducted by the same researchers that had interviewed the supplier of that specific customer. The customer interviews were recorded and notes were taken during them.

All the interviews both at the suppliers and at the customers focused on customer organizations' buying behavior in the context of industrial services. The data collection and the interview guide for Article I were planned in a way that enabled cross-case analysis and actually encouraged the interviewees themselves to make different kinds of analytical comparisons already in the interview situation. The suppliers were interviewed about the buying behavior of their different customers and to compare them against each other. Then they were interviewed in more detail about the buying behavior of specific customers and asked to compare these customers' behavior to their other customers' behavior. These same specific customers were also interviewed about their buying behavior in general with different suppliers and in the relationship with this specific supplier. The same kind of discussion was carried out also concerning services. The suppliers were asked to tell about these customers' buying behavior related to their offering in general and related to specific services. The customers were also asked to tell about their buying behavior related to these specific services and related to industrial services in general.

Cross-case analysis was also carried out after the interviews trying to find similarities and differences but it was difficult to express the aggregate interpretation of the findings as the findings were still in the form of lots of examples without the kind of structure that a good categorization can give. A categorization was needed to carry the message in the results. The categorization was built by combining earlier innovation research by Rogers (2003), Tidd (2010), Gatignon & Robertson (1985), and Wejnert (2002) as none of these earlier categorizations was alone able to fit the data. The categorization, although very simple, can be seen as a further aggregative cross-case analysis that was necessary for expressing the findings in a way that could be under-

stood by others. However, the categorization is not used for showing convergence or divergence. It is rather a tool that allows the presentation of wide contextual variety.

The researchers participating in the data collection had regular internal meetings to discuss the findings. Also, a series of five conversational round table workshops that brought together representatives of the supplier companies and the researchers was arranged. The joint understanding about the phenomenon under study grew as the suppliers and researchers discussed together about their practical experiences and theoretical perspectives on customers' buying behavior and industrial service innovation. Notes were taken in these discussions. Also, company specific results workshops were arranged for the personnel of each supplier company so that they could discuss and comment the findings. These workshops typically had a wide participation from the supplier companies, including especially people working in the customer front line and in the service development. This way the findings could be validated, corrected and expanded on.

*Article III* that is used for answering the research question "How and why do companies involve business customers in industrial service innovation?" is also based on a multiple case study and the main data collection method is interviews. In order to increase opportunities for gaining new insight, case sampling aimed at choosing supplier companies presupposed to have advanced knowledge about involving business customers in industrial service innovation. The main company representatives had a personal interest in the topic of the research. Choosing interviewees both from Finland and US was also assumed to increase opportunities for novel understanding. The chosen case companies are globally operating, stock listed manufacturing and technology companies known for their innovativeness and they have developed service-oriented business (# 23-28 in Table 2 above). Those case companies that were not manufacturers themselves, had manufacturer customers. The companies were all supplier companies, no customers were studied for Article III. Two of the six case companies are headquartered in US, three in Finland and one in Sweden. The US companies were interviewed in Silicon Valley, California and the Finnish and Swedish companies were interviewed in Finland. The interviewees worked in *high executive, managerial or expert positions in areas like strategy, sales and marketing, and customer service*.

For Article III the Finnish and Swedish headquartered companies were interviewed in more depth than the US companies. Although only one person was interviewed in each of the US companies, these interviewees had been very carefully selected based on their high and knowledgeable positions. Eight Finnish interviewees were contacted in the company that is headquartered in Sweden; and two or three interviewees were contacted in each of the three companies headquartered in Finland. The four companies that were interviewed in Finland named some of their key people for interviews based on their expertise. Their main representatives were also actively involved in the advisory boards of research projects. Therefore there was also material available from the research meetings and the company representatives actively

commented on the research throughout the process. All interviews were recorded and transcribed for analysis. Also notes were written. The interviews typically lasted around two hours. As all the case companies are large well-known companies, there is a lot of public information available on them and this was also used as supplementary data.

The case companies were interviewed for Article III about their open innovation practices emphasizing customer collaboration. In this study the interview guide was designed in such a way as to encourage the interviewees to contrast openness with closeness, to describe the different varieties of openness and closeness, and to discuss its strategic relevance. As investigator triangulation, the initial analysis was conducted by the two authors of the article individually before they compared and combined their findings. The initial analysis was done by looking for things that could be seen as a practice or an aim, a positive or negative outcome of open or closed innovation or customer involvement and by underlining such issues in the transcribed interviews. Issues that seemed especially important, interesting or novel were also noticed. Then the two researchers utilized the same contrasting of openness and closeness that was used in the interviews to create categories for the found practices. The practices were collected in a table based on the case company and the level of openness of the practice for the purpose of cross-case analysis. Then the two researchers discussed together how they interpreted the strategic reasons for the companies to utilize openness and closeness in the light of S-D logic. A new categorization was created based on this joint interpretation, it was iterated several times, and a similar type of table was made based on this categorization for cross-case analysis and further discussion. During the research process, the preliminary findings were frequently discussed with other research colleagues and the Finnish company representatives. The US companies were also asked for feedback before finalizing the analysis.

### 4.2.4 Single case study research in Article IV

Although many case studies are ultimately interested in phenomena occurring in populations of cases, the defining factor of case studies is the study of individual cases – concentrating in one case at a time (Stake 1994; see also Eisenhardt 1989 about case populations and their theoretical sampling). Therefore, even multiple case studies are formed of several single case studies that can be analytically studied together using either inductive or abductive logic. Within single case studies, instead of adding the number of cases, it is possible to increase the richness of data by taking a more in-depth look at a single case. As Easton (1995, p.382) puts it “Reaching greater number of cases, with the same resources, means more breath, but less depth”.

The study in *Article IV* is a single case study. As a single case, the case has been used for illustrating and concretizing new theory – the service-dominant logic. In addition to this, the single case in Article IV (# 29 in Table 2 above) is used in the overall abductive dissertation research that as a whole is a multiple case study. Illustrative single case studies are well justified for explaining theory since pure conceptual arguments are difficult to grasp and apply in empiri-

cal settings; and as the illustrative ability in particular is one of the key advantages of case studies in comparison to large-sample empirical work (Siggelkow 2007). Such qualitative studies can offer "holistic depictions of realities that cannot be reduced to a few variables" (Rynes & Gephart Jr 2004, p.455). They have the advantage of being vivid, concrete and rich, making them persuasive and credible – consequently the use of qualitative case research for illustrating abstract ideas is becoming increasingly widespread (Graebner et al. 2012).

The case company in Article IV is an internationally operating Nordic manufacturing and technology company that went through an extensive development program in order to turn from a traditional equipment provider to a more customer and service oriented company, and in order to improve its innovative capability (#29 in Table 2 above). The case company itself is studied in the supplier role, but also two of its customers have been interviewed. The two customer companies interviewed (# 30-31 in Table 2 above) should not however be considered cases since they themselves have not been the focus of the interviews and the analysis. In the case company, three company representatives in *high management positions* have been interviewed, and in the two customer companies, one *management* representative in each has been interviewed. The representatives of the case company were chosen to be interviewed based on their deep knowledge of the development program and the company's aims and customer relationships and also for their knowledge on the industrial service innovation presented in the study. The customers interviewed were chosen because they had adopted the industrial service innovation. However, interview has not been the only or even the main research method. Instead of extensive interviews, the depth and richness of the case study is a result of the author together with a larger research group taking part as experts in the three year development program of the company. This time period has included a lot of observation and meetings and also data sources such as slide presentations, memos, process descriptions, conceptual descriptions, and web pages have been utilized. Being the main responsible person for collecting material and writing a thorough report on the progress of the whole program every half a year, the author has had a very wide perspective to the development taking place in the company.

Although the author's influence in the course of the development program has been very limited, it is necessary to discuss here also the often raised issue that a researcher having a dual role as a consultant might influence the process under study. Gummesson (2000) points out that it is impossible for a researcher following an interpretative research approach such as the approach of this dissertation to be completely objective and to totally distance oneself from the research subject; and that instead personal experience is considered a scientific merit. He further emphasizes the role of a consultant and the role of an employee as alternatives to the role of a traditional objective academic researcher in gaining access to companies and conducting research (Gummesson 2000). Consultants and employees usually get a closer access to the researched phenomena than outside observers, and this often allows them to make better

quality interpretations. As described above in the chapter about research approach, the guideline taken in this dissertation is Kvale´s (1996) metaphor of a researcher as a traveler that interprets one's experiences and returns home with new stories to be told. The traveler is an active participator that to some extent influences what happens on his or her journeys, which differs from being just an outside observer.

The researcher having a dual role as a consultant affects what type of conclusions can be logically drawn from the study. Although the author was closely involved in the case of Article IV and experiencing it in first person, her influence on the company and the change that took place in it was very small. In her own institution the author was part of a larger group of people participating in the project. The author did not herself develop the offering that is observed as empiria in the article. Concerning development of the company's strategy, it was more the company and the author's colleagues and institution than the author herself that guided the change. This was a very large strategic development program carefully thought out and steered by the company itself. In addition to the author's own research institution, the company employed in a deliberate manner many other consulting companies and universities which all influenced the change process. However, the strongest vision and the biggest influence came from inside the company itself. The program involved a lot of the company's own personnel on several managerial levels as well as on operative level. Therefore, the process that took place was influenced by a large group of actors and most of all by the company representatives themselves.

Also, the research for Article IV, including the setting of the research question and the analysis of the empirical material, took place after the offering had been developed and after the company had decided on its strategy. It was only close to the end of the development program that it was suggested to the author that she could utilize the rich development material for academic research, as it was also in the company's interest to get a more analytical view of what had been done. So, due to temporal sequence it is impossible that the results of the analysis would have affected the development program. The author was also given time and freedom to do the analysis and write the article separately from the practical development work. The results were then discussed with the company to make sure that they corresponded with the company's view of what had happened in the development program.

The position of the author in the development program prior to the analysis and writing period has given her an outstanding access and understanding of the case. This kind of rich information is excellent to use for clarifying the change and theories related to the change if the researcher is open about his or her own role in the process. Further, such illustration can be used in the abductive process. When there is experience from a wider context that similar type of development work is taking place in a lot of companies, an in depth description of the phenomenon in a single company can be very illuminating. The single case in Article IV has been used in this way as illustration and concretization of otherwise abstract theories, phenomena and concepts.

## 4.3 Validity, reliability and generalizability

This chapter discusses the quality of this dissertation. First the use of concepts is discussed. Then the quality is evaluated using the concepts of validity, reliability, and generalizability.

### 4.3.1 Using the concepts of validity, reliability and generalizability for evaluating qualitative research

Validity, reliability and generalizability have established a firm position as the hallmark of high quality and trustworthy research (Kvale 1995). Some qualitative researchers apply the traditional scientific quality criteria as well as they can, some have developed new meanings for these concepts, while some have developed completely new concepts claiming that qualitative research requires completely different terminology than quantitative research (Eskola & Suoranta 1998, p.212). The terminology and criteria developed by Guba (1981) has been used in Article III of this dissertation (c.f. Guba 1981; Lincoln & Guba 1986; Guba & Lincoln 1989). Guba (1981) contrasted the rationalistic and naturalistic paradigms and developed his criteria for naturalistic inquiries (credibility, transferability, dependability, and confirmability) as an alternative to the traditional scientific criteria, but he still grounded the discussion on the traditional scientific concepts. After Guba many others have followed and developed quality criteria based on different approaches to qualitative inquiry (Patton 2015). There is no consensus on the 'right' set of criteria though and there can be no general set of criteria for qualitative research because qualitative research is not monolithic (Patton 2015). A qualitative researcher faces the difficult question of which quality criteria and concepts to choose. In this dissertation the decision was made to discuss the meaning of the concepts based on the research approach chosen but to use the general quality concepts of scientific research: validity, reliability, and generalizability. This chapter discusses the quality of the research based on these concepts and how they have been interpreted in this dissertation that uses moderate constructionism and abductive case research.

In simple terms validity means truth (Kvale 1994; 1996). From the modern perspective valid knowledge reveals the objective truth about the one objective universal reality. The modern ideal criticized by Rorty (1979) is a perfect match between the reality and our knowledge of it – the correspondence theory of truth (Kvale 1994). Although direct testing of this match is impossible without prior knowledge about the true nature of reality (Guba 1981), validity in social sciences normally relates to the quest of approaching this match and means whether a method investigates that aspect of reality that it is meant to investigate (Kvale 1995). The modern perspective also accentuates objectivity as a prerequisite for validity whereas the recent postmodern view has contributed to the understanding that there are no objective observations and that truth is constructed. Assessing validity from the modern stance is challenging for social constructionism that allows for multiple ways of knowing and multiple local, personal and community forms of truths (Kvale 1996). Yet, we can-

not accept just any opinions or ideas as scientific knowledge. Validity – the truth value of findings – depends on the philosophical question of what truth is and whose truth it is (Kvale 1995). Therefore, the concept of validity needs to be reconsidered in constructivist research based on its own epistemology and ontology. The concept of reliability, i.e. the ability of measurement or investigation methods to produce stable and consisting results about reality, is an important precondition of validity and it also needs to be similarly reviewed. The same applies to statistical generalizability of results to wider context.

### 4.3.2 Validity of the research

*Validity* or truth has a different meaning in different research approaches. Many social scientists, (Stake 1995; Kvale 1995; Gummesson 2000; Denzin 1989) have chosen to focus on the interpretation and negotiation of meaning in the search for true knowledge. The search for interpretation is the approach adopted in this dissertation as well (interpretive research). Kvale (1996) points out that there are different communities of validation: the interviewees, the general public, and the theoretical community. It is the community of knowers that socially constructs in discourse what is accepted as true knowledge in that community. Therefore, scientific knowledge becomes validated as science when the discourse about it is persuasive to the community of researchers (Kvale 1995). Scientific knowledge is at least partly the product of negotiation (Longino 2002). In addition to the scientific community it is necessary to discuss the research results with the companies to validate that the results are in line with the concrete world as experienced by the community of company representatives or practitioners.

The findings of this dissertation have been discussed with academic colleagues in conferences as well as in numerous informal situations. This is an essential part of the academic validation of the research. Also, the dissertation takes part in the discourse of the scientific community through the abductive dialog between theory and empiria. Further, all the four articles of this dissertation have been accepted through peer review by the scientific community and thereafter published as scientific articles. From this point of view the research not only takes part in the scientific discourse, but it has passed in the peer review the threshold of being persuasive enough in the eyes of scholars. Therefore, it clearly has a certain level of validity. Taking this stance, there are different degrees of validity depending on how widely the scientific community finds the research persuasive. This is why it is important to gain visibility for the research and to generate discussion in the community.

As for validation with the community of practitioners (Kvale 1996), the research results in the articles of this dissertation have been sent for comments and have been discussed with the interviewed case company representatives before publication. The ideas and results have also been discussed with representatives of many other companies that the author has been in contact with. In addition to receiving feedback from single individuals, the results have been presented and feedback collected in numerous practitioner seminars and company workshops where the discussion has taken place within groups acting as

together and leading to joint understanding. The different kinds of feedback have led to further understanding which has affected the final versions of the articles and subsequent phases of research. In other words, the hermeneutic interpretation and negotiation of meaning has taken place in a communal context and in both directions, not just unidirectionally.

The question, whether the findings of this dissertation are valid in the classic realist or statistical sense, is incompatible with the epistemological stance taken. Instead, the validity of this dissertation derives from social discourse and the persuasiveness of the abductive dialog. Consequently, validation in constructivism is not a distinct research step taken after a distinct step of analysis but it is formed throughout the research process starting from the researcher as a person (Kvale 1996) and is therefore also related to the question of reliability.

### 4.3.3 Reliability of the research

*Reliability* or ability of investigation methods to produce stable and consisting results is difficult to achieve in interpretative research such as this dissertation where the persona of the researcher herself is an essential part of the method. An approach typically taken in qualitative case study is explained by Yin (Yin 2003, p.37) as follows: "the objective is to be sure that if a later investigator followed the same procedures as described by an earlier investigator and conducted the same case study all over again, the later investigator should arrive at the same findings and conclusions". Measures have been taken in this dissertation to approach this ideal as explained below. Yet, it is essential in the approach taken that the researcher uses his or her subjective experience for making interpretations and guiding the process. However, the way the researcher's pre-understanding and intentions affect the abductive process is a double-edged sword and can be seen as a weakness in the approach taken. The approach cannot be seen as objective in the traditional sense, the findings ultimately represent the interpretation of the researcher and different researchers can come to different conclusions based on the same data. A claim can be made that the results of a more qualified researcher are more valid than those of a less qualified researcher even when the research procedure is the same (Stake 1995).

Concerning the researcher's experience, the author had already prior to starting the dissertation a long experience doing research and consulting work in close collaboration with industry. She had prior theoretical knowledge on the themes of the dissertation due to her involvement in research projects on industrial service business and innovation. Due to her prior research experience she also had good knowledge of the methods needed, she was practiced in doing semi-structured interviews, and also her academic writing skills were well developed due to previous scientific writing and publishing. As the author works for a research institute that has organizational processes and practices for conducting research, there has been professional supervision, advice and peer exposure present throughout the research process, which diminishes the

effect of possible deficiencies in pre-understanding that otherwise might lead the research to an unsuccessful course.

Since the person of the researcher is so crucial for the analysis, it is also necessary to ensure that the results are to a sufficient extent based on the empiria of the practitioners' experience, and not on the personal presumptions, bias or motivations of the researcher. One way of ensuring this is the way the interviews have been semi-structured. There have been interview themes and questions that have been prepared in advance based on the evolving framework, but the interviewees have been able to formulate their own views in a free and open ended manner, and to bring up new ideas into the conversation. However, the interviews have always been brought back to the structure after the interviewees have expressed their thoughts about a particular issue. Care has been taken that the interviewees have been knowledgeable on the themes studied and that the author has concentrated in listening and understanding the meaning of their views, which has allowed her to gain new understanding in each interview. Strong new ideas, e.g. those that come up in a lot of interviews or that seem to explain the phenomena exceptionally well, have further affected the evolving framework.

The work has also been done within larger research projects which exposes the logic of the researcher to the scrutiny of peers and practitioners. Other researchers have participated in the data collection in many of the interviews. Investigator triangulation has been conducted by having multiple interviewers and testing one's interpretations against those of the other interviewers. In addition to the researcher making her own notes, the interviews have also been recorded on tape which allows a researcher to go back to the moment of the interview to better understand the interviewee. The gained understanding has also been checked and rechecked in each interview, between different informants, in various workshops with the case companies, and by asking the company representatives to comment the analysis and writing.

Effort has also been put into making visible the real life empirical cases and the abductive logic through which the findings have been generated so as to make it possible for the reader or a later investigator to see how the results are derived from the dialog between empiria and theory and to come up as close as possible with the same conclusions. All of these are ways of ensuring that the investigation method steadily produces results as high quality as possible even if the researcher were to be changed, and that the reader is able to assess the quality of the interpretation. However, reliability in its usual statistical sense cannot be reached in this kind of interpretative research.

### 4.3.4 Generalizability of the research

*Generalizability* refers to the question whether the results are valid also in a wider context than the cases studied. The generalizability of the findings in the traditional statistical sense may be questioned since the logic used in this dissertation is not statistical induction. Glaser & Strauss (1967) make a distinction between statistical generalization and analytical generalization suggesting that analytical generalization grows in circles ultimately leading to generaliza-

tion in broader populations. There are different forms of assertational logic upon which analytical generalizations can be made but analytical generalization involves reasoned judgement and when the reasoning is made explicit, readers are able to assess the soundness of the generalization (Kvale 1996). Statistical induction can also be viewed as a special form of assertational logic that leads to a special form of analytical generalization, i.e. statistical generalization. However, this tight form of generalization can only be based on proper statistical sampling and therefore it is not applicable for this research. In comparison, analytical generalizations of broader form can be made based on both single and multiple case studies (Yin 2003). Although it may seem paradoxical at first hand, analytical generalization based on a few intensive case studies is advised when the aim is to obtain broad general knowledge (Kvale 1994). An important form of analytical generalization often used in case studies is analytical induction. In it, as described by Yin (2003), the researcher attempts to generalize the results to a broader theory by testing the theory in a small number of cases that function as experiments.

Moderate constructionism situated between realism and relativism such as the approach of this dissertation allows for analytical generalization based on different types of assertational logics (Kvale 1996), and the research done especially applies abductive logic. Each study and case in this dissertation can be characterized as an experiment or an opportunity for gaining new knowledge in the abductive dialog between empiria and theory. The abductive logic has been made explicit for the audience to evaluate. Further, the multiple case studies in Articles I and III in particular include analysis and discussion of the similarities and differences in the cases to induce generalizations.

However, as an interpretative approach the moderate constructionism of this dissertation also uses naturalistic generalization. Stake & Trumbull (1982) make a distinction between naturalistic generalizations that develop for a person through tacit personal or vicarious experience and propositional generalizations (often called assertions) that are based on formal explication (see also Stake 1978; 1994; 1995; Kvale 1996). Yet, the main characteristic differentiating naturalistic generalizations from propositional generalizations is not whether they are verbalized or not, but their embeddedness in experience which is their *natural* habitat (Stake 1995; see also citation of Stake 1980 in Lincoln & Guba 2000).

The analytical generalization used in this dissertation and described above has the nature of propositional generalization as it involves explicit analytical reasoning. In addition to such propositional generalization, this dissertation utilizes naturalistic generalization. It is quite ordinary for qualitative case studies to use both naturalistic and propositional generalization side by side in this manner although different studies put different emphasis on each approach (Stake 1995). In addition to propositional (analytical) generalization, the abductive process used involves naturalistic generalization. The naturalistic generalization is present in the process of abduction as the researcher interprets the theories and the empiria as well as when the audience interprets the research as presented by the researcher (Locke et al. 2004). The research-

er's explicit assertions as well as thick description both provide input that is interpreted by the audience. This approach that both the researcher and the readers make naturalistic generalizations is also quite normal (Kvale 1996).

How can the generalizability of the case findings to other companies, to other industries or to other types of innovations be assessed? In line with the epistemological view taken, scientific knowledge is seen as socially constructed. Therefore, the findings need to be exposed to the scrutiny of the communities of knowers in question when transferring them to new contexts. When suggesting generalizability of the findings of this dissertation to wider contexts, the researcher draws from her own experience as a knower in those communities. It is obvious that the author has a wider experience of contexts than what can be included in the focus and description of this dissertation. However, only suggestions or weak claims of generalizability can be made on such premises. The readers also draw from their wider experience to assess the results and this may or may not lead to more support for their generalizability. In order to make strong claims of generalizability, it would be necessary to expose the findings to much wider scrutiny of the relevant knowers. Therefore, a wider audience is needed for assessing strong claims of generalizability.

When assessing the interpretations that can actually be made based on the data, it also needs to be taken into account that the view about the case companies is necessarily limited to that of the representatives – the collected views are views of the interviewees, not the companies. Especially in large organizations, it is typical that there are also different or even conflicting viewpoints. The perspective taken is always local and contextual.

Lincoln & Guba (2000) stress the point originally made by Cronbach (1975, pp.124–125) that "when we give proper weight to local conditions, any generalization is a working hypothesis, not a conclusion" and that there is no real difference in this respect between the different types of generalizations. In the end, the other knowers or the users of the findings always need to test these working hypotheses, i.e. interpret the findings presented to them based on their own subjective experience. However, the whole burden of interpretation is not left to the audience of knowers. It is the researcher's role to suggest interpretations and describe them in a way that aids understanding. Here Lincoln & Guba (2000) emphasize the importance of thick description, as introduced by Geerzt (1973). Thick description refers to the author describing everything that the reader needs to know to understand the findings, but it does not mean describing the entire empiria, selectivity and parsimony is also needed to make the description more understandable (Geertz 1973; Dubois & Gadde 2014; Eisenhardt 1989). Such a writing style has been sought for in this dissertation. Through my research I have aimed to reveal insight about the underlying phenomena of customer orientation and industrial service innovation in such a way that my audiences can assess the generalizability for their own contexts and apply the insight in ways that they find useful.

# 5. Results

This section presents the findings of the articles in terms of the research questions of the dissertation, first as a summary of the main contributions of the articles and then each research question and article in turn.

## 5.1 Summary of results in Articles I-IV

The contribution of Article I answering the research question: "What kinds of difficulties do companies have in getting business customers to adopt industrial service innovations and where do these difficulties stem from?" is to show that many companies innovating industrial services have not paid enough attention to the issue that a business customer as an innovation adopter is actually a network of individuals and groups of people that have different needs, experience the innovation differently and can gate or advance the process towards adoption. This is a different kind of perception of *customers*, than what is representative of industrial product and services development. Also, not enough attention has been paid to the issue that customers' *needs* change over time, depending on the context, and that in addition to financial needs, business customers also have important emotional needs.

Article II contributes by further deepening the discussion on the nature of customers' *needs* in B2B context and thereby answering the research question: "How could the concept of need be understood in a business-to-business context and how could a need of a business customer be answered through the co-creation of value?" It takes a view on organizations as nested human systems facilitating value co-creation and puts forward a new framework of needs in B2B context. This framework connects needs in B2B context to individual human needs and needs at higher systemic levels and presents needs as changing and co-created in social interaction rather than as static and impersonal. Based on the theoretical work a new definition of needs in B2B context as bridging meso level needs that mediate between the needs of different actors is put forward.

The main contribution of Article III answering the research question: "How and why do companies involve business customers in industrial service innovation?" is to deepen the understanding on the *involvement* of customers in industrial service innovation by introducing important new aims for customer involvement. Customer involvement not only brings more information about existing needs and more development resources. Involvement has a highly important role through the co-creation of needs themselves. New aims for customer involvement in innovation are described as shaping the context of value co-creation, fostering network effects, living with contingency, and engaging in business with meaning. It is suggested that different open and closed innovation practices can be combined for reaching these aims.

The main contribution of Article IV answering the research question: "How can the service-dominant view of value be applied to widen the perspective on industrial innovation?" is to describe the wider perspective on innovation that is based on the new insight on systemic *value* that includes the view about customers, their needs and their involvement in the innovation process that has been developed in the earlier articles. The article presents innovation outcomes as new practices of systemic value co-creation. Products, services and technologies are manifestations and essential enablers of these practices. As such, they are necessary also in the future. However, the final aim of development efforts needs to be on systemic value co-creation, not on products or ser-

vices as such. The article also presents how the central role of customers changes the nature of a company's innovation process. The process becomes a co-development process with multiple customers as well as other stakeholders. Therefore companies need new organizational capabilities of understanding customers' context and of co-developing value co-creation systems characterized by win-win-win situations (multi-actor mutual benefit).

## 5.2 Difficulties in getting business customers to adopt industrial service innovations

This chapter concerns Article I and the first research question "What kinds of difficulties do companies have in getting business customers to adopt industrial service innovations and where do these difficulties stem from?" The chapter first summarizes the results, what kind of data the results are based on and how the results were categorized. Then the empirical results based on the views of the studied companies are presented in four subchapters based on the categorization as 1) influence of customers' business environment, 2) influence of customers, 3) influence of suppliers, 4) influence of characteristics of industrial service innovations (c.f. Rogers 2003; Tidd 2010; Gatignon & Robertson 1985; Wejnert 2002).

### 5.2.1 Summary of difficulties in getting business customers to adopt industrial service innovations

Drawing on empirical data from a multiple case study of nine Finnish industrial service suppliers and their thirteen customer companies, Article I studies the difficulties in getting business customers to adopt industrial service innovations. 28 supplier representatives in positions such as Service Director, Service Manager, Sales and Marketing Director, Sales Manager, and Customer Manager and 16 customer representatives in positions such as Sourcing Director, Sourcing Manager, and Production Manager were interviewed. In addition to the interviews, the data comes from workshops and meetings arranged with the supplier companies. The empirical evidence has been organized in categories developed based on earlier innovation diffusion research. Rogers (2003) and Tidd (2010) especially stress characteristics of the innovation, since at least half (49 to 87 per cent) of the variance in the rate of innovation adoption is explained by five specific characteristics of innovation. This was chosen as the basis of one category. However, the empirical evidence did not fit into this category alone and three more categories were used. Earlier theory also says that in addition to factors related to the innovation itself, also factors related to the innovator, to the adopter, and to the environment or context need to be accounted for (Gatignon & Robertson 1985; Wejnert 2002; Tidd 2010). A categorization was used in which factors related to the environment or context became "influence of customers' business environment", factors related to the adopter became "influence of customers", factors related to the innovator became "influence of suppliers", and factors related to the innovation itself became "influence of characteristics of industrial service innovations". This wide categorization was able to fit the data and it was used for describing the empirical evidence.

Both customers and suppliers told in the interviews that customers' decision to buy is to a great extent dependent on the perceived utility and cost. They explained that professional buyers seek for industrial services that enhance their companies' performance. They aim for high return on capital, high profits and low expenses. They resist to paying and would prefer free services on

the side of the physical product. Taken the degree of resistance that some customers in the interviews seemed to have towards paying, it is logical to assume that supplier companies often have a wrong or inadequate initial perception about the needs of their customers or about how their customers view the costs related to the industrial service innovation. This problem at least diminishes the possibilities for innovation success and may even lead to strong innovation opposition.

Based on an analysis of the interview data from the suppliers and their customers, the wrong or inadequate perception seems to a substantial part to originate from an overly *narrow perspective on customers*. The study views it necessary to deepen the perspective on customers from organizations as single actors to organizations as networks of individuals and teams having different needs and different possibilities to influence innovation adoption. The analysis also revealed that some of the suppliers developed their industrial service offering to only cater for the technically inclined and risk taking customers. In many cases customers are rather price sensitive and risk averse. Often suppliers are so occupied with the most sophisticated customers and the high quality features of their services that they do not realize that the service fails to meet the needs of the vast majority of customers.

The supplier companies seemed to have a rather *static and simplified view of customer needs*. The customer representatives told stories of how their organizations' needs had evolved in time, sometimes very abruptly and drastically and they presented examples in which their needs were ambivalent and where there was an important personal and emotional characteristic to their needs. The needs seemed to involve complex issues such as business models and strategies as well as a more general fit between the industrial service and the needs of many different individuals and groups of people within the customer organizations.

In order for innovation adoption to occur, there is a need for a fit between the benefits, expenses and risks of services. These were however seen differently by different customers and the more specific empirical findings are described in the next four subchapters based on a categorization of characters related to 1) the customers' business environment, 2) the customer companies themselves, 3) the suppliers and 4) the industrial service innovations.

### 5.2.2 Influence of customers' business environment

It was right in the middle of a great downturn preceded by a market boom that the interviews took place. Therefore it was easy to make observations about the effect of the economic situation on industrial service innovation adoption. The full order logs of the boom had caused extremely long delivery times and forced customers to outsource production to service suppliers and to look for solutions that would keep them in the pace of the growth market. Both the customers and the suppliers told how this created demand for both simple and more sophisticated industrial services. The recession closed capital flows which simultaneously advanced and hindered service adoption changing the type of industrial services that were adopted. Maintenance and modernization

services replaced investments in new equipment. As final customer orders further dropped, slow and ineffective production as well as process interruptions became acceptable. Therefore repair services replaced maintenance services and even they were used sparingly. Resource freeing services, so critical during the boom, were no longer acquired. As much work as possible was done in-house, so that own employees could have some work to do. Possibilities to downscale industrial services already bought were also sought after. This example makes it clear that customer needs can change very abruptly when there are large environmental changes. During that time cash management became much more important than long term or even short term profitability. Also the emotional issues of social pressure raised their head: people expressed fears that they would be seen as professionally incompetent had they suggested any investments, even quite profitable ones.

Based on the empirical data, also competitive pressure seems to be able to work in two opposite ways, both advancing and hindering innovation adoption. When in need for better competitive advantage, companies sought for new solutions. In some cases these solutions were of the upscaling type. Yet, there were also examples where hard competition increased interest for solutions to immediate problems while simultaneously lowering interest for solutions that were not seen as acutely needed. In other words, both upscaling and downscaling services were possible. As an opposite of tough competition, some customers working on exceptionally lucrative markets did not really feel the urge to strive for new innovative solutions with their suppliers, which was readily admitted by these customers in the interviews.

### 5.2.3 Influence of customers

Based on their different strategies some customers opted for opposite types of industrial service solutions. There was great variation in how some very similar customers competing in the same markets described their needs due to the deeper structure of their business model, core competencies, outsourcing and purchasing strategies, and the way they planned to compete and make profit.

Some suppliers had developed their industrial services more or less accidentally too close to customer's core business. They might have just ignored the importance of the issue or sometimes they were just not aware of the confines of the customer's core business. This is understandable as some customers explained that they wanted to keep the core idea of their business secret. Customers were not willing to hand their own business to their suppliers, not even if suppliers had been able to do it better. The suppliers told that the customers guarded their business. Even defensive attacks were seen as possible in difficult situations.

The different decision making practices of the customers also led to differences in industrial service adoption. Some customers had a strong centralized sourcing organization whereas in some others it was the production units that did the purchasing. There were cases where these parties had very different views on whether services were needed, and what types of services were needed. This is an example of how today adoption of industrial service innovations

typically requires the involvement of multiple decision makers. The industrial service innovation somehow needs to be acceptable to them all. Therefore the adoption decision process often is gradual and iterative. The companies described service negotiations as often lengthy and complex. Strong sourcing organizations were also described as good clients for industrial service suppliers, if they are progressive ones and favor innovation.

Based on the interviews a lot of service resistance seems to go down to the individual people working in organizations. When the customers described their service experiences they sometimes used emotional expressions and these expressions often had to do with their roles and tasks in the organization and their professional identity. Their stories led to an understanding of how people in different roles and tasks experience the industrial service innovation differently and how a service innovation may be seen as beneficial in one part of an organization and as causing problems and resistance in another part of an organization. The suppliers told that strong opposition for innovation can be caused e.g. when it changes the division, content, demand, or image of work. Individuals also found both positive and negative aspects in services simultaneously. Also, non-resistance is not sufficient for industrial service adoption. The service suppliers told how it is necessary to find champions for the industrial service innovations within customer organizations but many of the customer representatives told that they were very busy and just not very interested personally. They described how it is just not worth the effort as things are well enough as they are. It was especially difficult for suppliers to find support for their industrial service innovations in cases where the person experiencing the benefits of the innovation was different than the one that was needed to put the effort in it.

Many industrial companies view their customers as single actors that make decisions based on mainly financial criteria. However, customer organizations consist of multiple people having different views about the industrial service innovation and different influencing possibilities in the innovation-decision process. In most cases the innovation adoption decision is the result of some collective sense-making and decision making process. Therefore, organizational sentiment towards an innovation is often ambivalent and changes over time. It is quite usual that during the adoption negotiation process the industrial service innovation needs to be changed, specified and tailored several times anew to better fit the different expectations in the different parts of the customer organization. Also it was seen as normal that not every aspect of the industrial service innovation was ready defined at the time of agreement between the supplier and the customer. Industrial services are shaped and molded throughout service relationships.

### 5.2.4 Influence of suppliers

It is also the industrial service supplier itself, how compatible it is with customers and how customers perceive it that influences the adoption of new industrial service innovations. Customers viewed some suppliers as more suitable or fitting for them than others and also the credibility of suppliers in the

eyes of the customers varied. Most customers wanted to minimize the number of service suppliers to work with, yet they did not want to be dependent on single sources. This makes the sales of novel industrial services easier for those service suppliers that already have a relationship with the customer and can cater a wide range of the customer's needs. Both customers and suppliers explained how credibility through references or long term relationships is essential and eases the sales of novel solutions. According to the interviews, credibility of the service supplier is related to knowing the service suppliers' personnel, having well working human relations with them, the service supplier getting things done, the financial situation of the service supplier, references, and past experiences about the supplier.

### 5.2.5 Influence of characteristics of industrial service innovations

Industrial service innovations are often paradigmatic or systemic innovations – i.e. they not only involve change in some single concept or component such as e.g. production process, but they simultaneously involve changes in multiple concepts or components such as e.g. products, user practices, infrastructure and core technologies and also in their linkages (c.f. Abernathy & Clark 1985; Henderson & Clark 1990; Geels 2005). Although industrial service innovations are meant to be easy to use, it was an often raised issue how very difficult it is to assess their actual consequences for the customer, which raises the threshold for adoption. Many of the supplier representatives described how difficult it is for their own sales people to understand the advantages of the industrial service innovations they are supposed to sell: they did not understand their own sales brochures. Industrial service innovations are often also tacit or intangible in their nature further making them harder to accept. One of the customer representatives was very strong on the point that he is not interested in buying air, by which he meant services. It was also seen as problematic in many discussions that in order to benefit from the industrial service innovation, customers would need to change the way they operate themselves, which further elevates the threshold for adoption. When such organizational changes have been made, recalling adoption decisions becomes very difficult and expensive. This reduces the level of trialability increasing risks related to service adoption. The risk was seen as smaller in long term relationships where the service develops gradually and suppliers and customers learn to work together and trust each other.

It was important for service suppliers to be able to use the service relationships as references for further sales but observability of industrial service innovations and their effect is limited by the confidentiality of service relationships. Evaluation of the performance improvement or decrease was also seen as problematic as it often is impossible to separate the effect of the industrial service innovation from the effect of all the other factors in customer's business due to the intertwinedness of service with the everyday actions of customers.

Consequently, the relative advantage of adopting an industrial service innovation, the degree to which the industrial service innovation is seen as better

than the competing modes of operation or the mode of operation it supersedes, differs depending on the customer and its context. This does not implicate a need to tailor the whole service separately for each and every customer. However, it does stress the importance of relative advantage – the service being better fitting for the customer than the competing solutions. The interviewees felt it necessary when assessing the relative advantage of an industrial service innovation to pay attention to issues outside the financial utility and costs. Emotional issues related to the service experience of customer representatives were seen as important aspects of industrial service.

Changes in organizational practices and personal habits, often necessitated by the adoption of new industrial service innovations and affecting customer representatives' professional identity and reputation, are often experienced as heavy and unpleasant possibly causing innovation resistance. Doing business with someone one likes and trusts and who does not cause one trouble can have a great effect on service experience. The interviewees described that slaving for perfection does not pay on the personal level. Therefore customers often preferred operating at a good enough level as opposed to striving for ever more improvements. Many customer representatives and supplier representatives viewed as important the personal service experience. The utility of an industrial service innovation was in many cases described as resulting from releasing some sort of mental pressure in the work situation leading to the decrease of discomfort. How risky the adoption is seen, both on a personal level and on an organizational level, was seen to affect resistance towards the industrial service innovation. It is often the criticality of risk, not just the likelihood of it that matters. Different customers had very different overall tolerance to risks and the type of risks they tolerated depended on contextual factors like the general business situation. When the risk is seen as substantial or when only limited improvements are offered, it may be wise for customers to resist the novel industrial service innovations.

In the end it is compatibility that matters. As industrial service innovations penetrate the everyday lives and operations of customers in a manner very different from products, compatibility no longer is just a characteristic of the industrial service innovation itself as one of the five innovation characteristics (c.f. Rogers 2003; Tidd 2010). Instead it is manifested in numerous ways: in compatibility of the industrial service innovation to customer's organization, customer's business, customer's needs and the supplier. It is also compatibility of customer and supplier with each other. Resistance often results from lack of true compatibility.

## 5.3 Needs in business-to-business context as co-created and nested

This chapter first summarizes the results of Article II concerning the second research question "How could the concept of need be understood in a business-to-business context and how could a need of a business customer be answered through the co-creation of value?" and then goes deeper into the details of results in Article II. This study takes the stand that needs in a B2B context are different from human needs but that there is a relationship between them. The article is a literature study presenting a theoretical analysis that deepens the discussion on business customers and their needs. In order to do this it utilizes theories on organizations and human needs that supplement the theory section of this dissertation. They are introduced in the article and in this chapter for carrying out the theoretical dialog.

### 5.3.1 Summary of needs in business-to-business context as co-created and nested

The concept of need is essential for innovation as well as for the organizational functions of marketing and new product and service development. The fulfillment of needs can be seen as the very purpose of innovation and the whole economic system. The concept is used in multiple contextual levels. Consumer needs and human needs have been widely discussed, which lays theoretical background for product and service development in consumer markets. It is a wide practice that needs of business customers are addressed differently from human needs, e.g. marketing is seen as very different in consumer markets and business markets due to the different kinds of needs in these markets. Yet the concept of need is not well understood in the B2B context or at other higher systemic levels such as business ecosystemic or societal level. Academics have not been able to resolve the issue of business customers' needs yet (Hadjikhani & LaPlaca 2013). A better understanding of the mutating and emerging needs of organizations and of the changing organizational buying behavior is called for (Wiersema 2013).

In order to understand the relationship between needs in B2B context and human needs, Article II uses the concept of nested human systems. *Nested human systems* refer here to the self-organizing of humans into systems of mutual value co-creation such as families, groups, organizations, industries, ecosystems, communities, and societies. These could also be referred to as social systems or as organizations (in a wide meaning of the concept), but the term *human* was chosen as an understanding on needs in B2B context based on human needs was sought for, and as self-organization of nested systems proceeds from the lowest level, i.e. from the human up (c.f. Meadows 2008). The concept of nested human systems has been used earlier by Eisen (1995) and Tannenbaum et al. (1985) in organization development to stress the importance of both lower and upper systemic levels.

The novelty of Article II is in creating *a framework of needs in business-to-business context* that builds on the view of organizations as nested human sys-

tems of value co-creation. The framework is based on a theoretical discussion introducing ideas from theories of human needs as well as organizations and looking at them through the lens of service-dominant logic as described in the subchapters below. The framework utilizes the systemic view for connecting needs in B2B context and higher systemic level needs to human needs. It is further emphasized that *needs in business-to-business context are not static but changing and co-created in nested human systems*. Needs emerge in B2B context as people engage in joint organizing for value co-creation in order to increase the efficiency of resource allocation and balance their conflicting needs. Needs can be seen as nested since they are visible and embedded at multiple levels of nested human systems. Based on the theoretical work a new definition of needs in B2B context is put forward: *Needs in business-to-business context are bridging meso level needs that mediate between the needs of different actors*. The following four subchapters describe in more detail the discussion in Article II leading to its results, the framework and the new definition.

### 5.3.2 Human needs

When analyzing theories of human needs it can be seen that the various authors have emphasized different aspects of needs in their theories. The early needs theorists (Murray 1938; Hull 1943; Maslow 1954; McClelland 1961; Alderfer 1969) have taken a more or less deterministic view to human behavior and put emphasis on how needs drive behavior. The more recent needs theorists (Deci & Ryan 1985; 2000; Max-Neef 1991; Doyal & Gough 1991) have more strongly brought up the role of autonomy, freedom and choice in human behavior, emphasizing the importance of needs satisfaction in human flourishing and well-being. Since the turn of the century, the emphasis of psychological discussion on flourishing and generative action toward a better future for individuals and organizations has further grown (c.f. Fredrickson 1998; 2003; Fredrickson & Joiner 2002; Seligman et al. 2005; Bushe 2007; Robertson & Cooper 2010). Drawing from the various different views, needs can be seen as factors explicating goal-directed behavior or they can be viewed as fundamental essentials of well-being.

Based on the discussion above, a first research proposition is outlined:

P1. Needs can be understood either as fundamental essentials of actors' well-being or as factors explicating goal-directed behavior.

The different theories also have different emphasis in whether they stress the innate and rather stable nature of needs (c.f. Hull 1943; Maslow 1954; Alderfer 1969; Deci & Ryan 1985; 2000) or the acquired and changing nature of needs (c.f. Murray 1938; McClelland 1961; Max-Neef 1991; Doyal & Gough 1991). The discussion reveals though that even when needs are considered stable, some aspects related to needs, such as specific manifestations of needs or satisfiers of needs, are still understood as changing over time and across cultures. Needs

and their satisfaction are seen as characterized by simultaneity, complementarity, and trade-offs. When people interact with other people, needs change (Doyal & Gough 1991).

Based on the discussion above, a second research proposition is outlined:

P2: The specific manifestations and satisfiers of needs change in social processes through interaction.

### 5.3.3 Organizations as rational, natural and open systems

In order to better understand needs of business customers, it is necessary to discuss the nature of organizations. The way the nature of organizations is viewed in theory affects also the perspective on the nature of their needs. Therefore, instead of a specific organizational theory, a general categorization of different organizational theories by Scott (2003) is utilized. He illuminates that the perspectives of different organizational theories differ, and that the different theories view organizations as three *different types of (human) systems*: organizations as rational systems, organizations as natural systems and organizations as open systems. It is the view taken in this dissertation that all these perspectives reveal relevant aspects on business customers' needs when analyzed against the first two research propositions. These aspects are summarized in Table 3 on next page.

Based on the description by Scott (2003), from the rational systems perspective, the need of a business customer can be seen as to fulfill the basic purpose of the organization, which in most cases of private companies is to optimize net financial value. This need is stable. From this perspective organizations also can be seen to have a need for survival and it is top management who based on their formal role decide what organizations need and how they behave. (Scott 2003)

Also based on the description by Scott (2003), from the natural systems perspective, the need of business customers for survival is based on their nature as social groups and their behavior results from the informal organizational structure. It is individuals and coalitions who choose organizational goals through negotiations, and organizations rely on their employees' willingness to make contributions to the mutual goals. (Scott 2003)

Further based on the description by Scott (2003), from the open systems perspective, organizations are dependent on their environment. Therefore the environment has a strong influence on organizational behavior. Behavior also emerges from loosely coupled semi-autonomous parts like teams. The change of business customers' needs is influenced by these parts and stakeholders outside organizations as the interaction allows organizations to learn. (Scott 2003)

**Table 3.** Aspects of business customers' needs in different organizational perspectives (c.f. Scott 2003).

| | Organizations as rational systems | Organizations as natural systems | Organizations as open systems |
|---|---|---|---|
| **Needs as fundamental essentials of well-being** | Organizations need to survive. Other goals are expressed in formal representations such as key figures and strategy. | Organizations have the need to survive as a social group. They rely on employees' willingness to make contributions. | Organizations are dependent on flows of personnel, resources, and information from the outside. |
| **Needs as factors explicating goal-directed behavior** | The behavior of organizations is aimed at accomplishing their goals in an optimizing way. Behavior emerges from formal decision processes. | Behavior is guided by the informal organizational structure. It emerges from the multiple motives, values, feelings and sentiments of employees. There are both common and individual agendas. | Behavior emerges from loosely coupled semi-autonomous parts such as teams, departments etc. |
| **Change dynamics of needs** | Goals are predetermined. | Individuals and coalitions choose organizational goals through negotiations and the interests of some parties are often favored over those of others. | Organizations are capable of double-loop learning and self-maintenance. The setting of goals is also influenced by stakeholders outside the organization. |

Based on the above discussion and noting that the difference between rational and natural perspectives is a different view of the underlying causes of human systems behavior, and that the difference between closed and open perspective is a different view of the complexity and nestedness of human systems, a third research proposition is outlined:

P3. The formation of the manifestations and satisfiers of actors' needs turns from a linear mechanistic process based on actors' formal roles to a non-linear recursive activity based on human nature, as the perspective on systems behavior changes from rational to natural and as systems complexity and nestedness increases.

### 5.3.4 Contribution of SDL to the deepening of the systemic view on needs

In order to build a framework of needs in B2B context as co-created and nested in human systems it is necessary to look at the theories of human needs and organizations through the lens of SDL (c.f. Vargo & Lusch 2004; 2008). SDL is particularly suitable for this purpose as it is a nested systems view of value co-

creation (Akaka et al. 2012) and as it also can be seen as an open natural systems view of dynamic organizing of economic and social exchange. It is an open systems view since it views markets as complex adaptive systems (Lusch & Vargo 2006b) and since this emphasis on openness has lately only grown. It can be seen as a natural systems view by making a parallel between the goods-dominant logic and rational organizations focusing on units of outputs as their predetermined goals and another parallel between the service-dominant logic and people in natural organizations making coalitions and negotiating in order to carry out different agendas with the help of others.

From the theoretical perspective of SDL, markets are formed as institutionalized solutions of how to apply resources to solve human problems or needs (c.f. Vargo 2009). These institutions are formed on multiple nested systemic levels such as dyads, organizations, ecosystems, industries and societies (Chandler & Vargo 2011; Akaka et al. 2012). Therefore, also needs are represented at all systemic levels.

Based on the discussion above, a fourth research proposal is outlined:

P4. Satisfaction of needs of different systemic levels takes place through the application of resources in nested value co-creation.

Recent views also emphasize that value co-creation takes place through interaction and creation of social structures (Edvardsson & Tronvoll 2013) and that the assessment of resources for value co-creation depends on the social context (Edvardsson et al. 2011). Based on the previous discussion on human needs, this participation in social value co-creation is seen as fundamental to being human and it is seen to give rise to emergence of needs.

Based on the discussion above, a fifth research proposal is outlined:

P5. Manifestations and satisfiers of needs emerge from the context of actors participating in value co-creation.

### 5.3.5 A new framework: needs in business-to-business context as co-created in nested human systems

Building on the previous discussion and the outlined research proposals, a novel framework of needs in B2B context as co-created in nested human systems can be put forward. A summary of the framework is presented in Table 4. The framework covers individual, B2B, and ecosystemic (or higher) levels of human needs summarizing essentials of well-being, behavior and the change dynamics of needs. It also discusses meta level understanding of needs. According to the study needs in B2B context emerge in nested human systems at the meso level that bridges the needs of different actors participating in value co-creation. The co-creation of needs refers to the emergence of needs in human systems of participating actors. Needs are nested in the sense that they are visible and embedded at multiple levels.

**Table 4.** Framework of needs in business-to-business context as co-created in nested human systems.

| | **Individual needs**<br>**Micro level** | **Needs in B2B context**<br>**Meso level** | **Ecosystemic needs**<br>**Macro level** |
|---|---|---|---|
| **Needs as fundamental essentials of well-being** | An individual's well-being is dependent on the capability, freedom and autonomy to integrate resources in ways that one values or needs if one so wishes.<br>Therefore individuals' well-being is also dependent on the willingness and capability of the other individuals and higher level systemic actors to provide them access to resources. | Organizing allows actors access to each other's resources.<br>Organizations as actors are dependent on the willingness and capability of their members and of the stakeholders in their ecosystem to provide them access to resources.<br>The well-being of an organization, its members, the stakeholders in its ecosystem and its ecosystem as a whole are mutually dependent. | An ecosystem is a system of actors dependent on each other through value co-creation.<br>The well-being of an ecosystem is dependent on the efficiency and sustainability of actor-to-actor value co-creation.<br>Actors' interdependencies caused by mutual value co-creation form feed-back loops leading to network effects. These feed-back loops have important effects on the well-being of the ecosystem and the actors within it |
| **Needs as factors explicating goal-directed behavior** | Humans participate in the social life of their choice through the process of co-creation in which they integrate available resources in ways that they value. | The behavior of an organization emerges partly from its formal structure, but it is also affected by the agency of different level actors within and outside the organization. | The behavior of an ecosystem emerges from the behaviors of the actors within the ecosystem and is affected by feed-back loops. |
| **Change dynamics of needs** | Manifestations and satisfiers of needs emerge from the individual's context of value co-creation. They change as the context changes as a result of actor-to-actor interaction. | Manifestations and satisfiers of needs emerge from the organization's context of value co-creation with its members and stakeholders. They change as the context changes as a result of actor-to-actor interaction. Larger coalitions can have a bigger impact than individual people. | Manifestations and satisfiers of an ecosystem's needs are based on the manifestations and satisfiers of the needs of the actors within the ecosystem.<br>Feed-back loops and network effects of value co-creation have an important impact on change dynamics. They can create stability or accelerate change substantially. |
| | **Meta level** | | |
| | Needs in B2B context are bridging meso level needs that mediate between the needs of different actors both at same level (e.g. individual-individual) and at different levels (e.g. micro-macro).<br>Human needs are nested in organizational structures.<br>Needs are co-created across different system levels.<br>The well-being of human systems is dependent on their capability to facilitate the efficiency and sustainability of actor-to-actor value co-creation. | | |

The framework also clarifies the fundamental nature of organizations as a means for satisfying the needs of individuals and societies as well as other organizations. Resources are scarce and organizing is needed for allocating them in ways that are efficient and that balance the conflicting needs of different parties. This organizing for value co-creation leads to the formation of needs in B2B context. When the outcome of organizing is not optimal and balanced, a kind of poverty of neediness is resulted leading to a reduction of contribution to societal value co-creation by poor people. Needs in B2B context, like needs in general, change over time in open-ended ways. The assessment of the framework further reveals that human well-being at all systemic levels is dependent on the efficiency and sustainability of the systems' ability to facilitate actor-to-actor value co-creation. Based on the theoretical work done, a new definition of needs in B2B context can be put forward: *Needs in business-to-business context are bridging meso level needs that mediate between the needs of different actors.*

## 5.4 Involving business customers in industrial service innovation

This chapter concerns Article III and the third research question "How and why do companies involve business customers in industrial service innovation?" The chapter first summarizes the results, what kind of data the results were based on and their analysis. Then the empirical results are presented in more detail, first the types of customer involvement, and then the reasons for customer involvement. Article III is based on suppliers' views only; no customers were interviewed for the study.

### 5.4.1 Summary of involving business customers in industrial service innovation

Recently there has been a shift of interest from innovation processes confined within firm boundaries to management of interaction with parties external to the firm such as users, suppliers, research institutions, partners, investors and even competitors. Chesbrough (2003) has popularized this logic of open innovation (OI) stressing knowledge flows both in and out of the firm. Customers and other users are seen as a particularly important stakeholder group in OI since they directly benefit from innovation and possess the richest information about needs (von Hippel 2005). Since service processes are inherently intertwined with customers' own processes, involvement of customers in service innovation is seen as particularly important (Kindström & Kowalkowski 2009; Edvardsson et al. 2012). Further, service innovations often emerge within the process of service provision without the participation of dedicated R&D resources (Sundbo 1997), which emphasizes the role of open boundaries in service innovation (Chesbrough 2011). The discussion on the rationale and practice of OI so far has to a large extent concentrated on knowledge flows necessary for innovation and on the motivation of users as primary beneficiaries to innovate. It has accentuated access to and efficient utilization of needs information and technological information. Also, it has concentrated on involvement of individual users or communities of devoted users, whereas customer involvement in the networked B2B service context has received less attention.

User involvement is seen to aid service providers in obtaining information, ideas and development partners. It benefits them through better served customers but it can also speed up the innovation process (Toivonen 2010) and increase the adoption of service (Sundbo & Toivonen 2011). The open interaction also has potential to induce changes in how the actors view the systemic business environment and their role in it giving rise to joint generative action towards new systemic constellations, but the practices of open innovation may differ in such activity from those in more incremental development (c.f. Lane & Maxfield 1996; Swan & Scarbrough 2005; Hopkins et al. 2011; Remneland-Wikhamn et al. 2011; Hsieh & Tidd 2012; Tidd & Brem 2012).

A service innovation can be characterized as a new service that is novel both in the developer's context and in a broader context; that results in benefit for developer which usually derives from added customer value; that has generalizability such as repeatability; and that is adopted in practice (Toivonen &

Tuominen 2009). Article III builds on this view and further adopts the concept of service from service-dominant logic by Vargo & Lusch (2004; 2008). They view service as application of resources for the benefit of another which is a concept distinct from the concept of services (in plural). This transformation allows for a shift in the emphasis of inspection more towards generative action in the emergence of systems of value co-creation as opposed to linear development of discrete services. Innovating becomes an activity offering significant new freedoms of choice although it still is bound by constraints in the interests of different stakeholders and in access to resources. It is possible to simultaneously innovate the application of resources (the offering) and the benefit of another (the beneficiary and the need to be fulfilled).

Building on theoretical discussion from OI and SDL, Article III studies empirical data from a multiple case study of six globally operating, stock exchange-listed and innovative manufacturing and technology companies that have developed service-oriented business. The companies were all supplier companies, no customers were studied. The company representatives held high executive, managerial or expert positions in areas like strategy, sales and marketing, and customer service. The company representatives were interviewed for their open and closed innovation practices with customers. The data was first analyzed utilizing a categorization resembling but not identical to those of Kaulio (1998), Desouza et al. (2008), and Westerlund & Leminen (2011). The empirical findings of this analysis describe how the case companies involve business customers in industrial service innovation as *in-house development and supplier co-operation*, *development based on customer insight*, *co-development with customers*, and *development by customers*. It is the combining of these open and closed practices in purposeful ways that is seen as important, not the following of certain practices per se. Further analyzing the cases, the article recognizes rationales for customer involvement that can be seen as adding to and complementing the previous literature on why companies involve customers in innovation. The case companies are seen to involve business customers in industrial service innovation for *shaping the context of value co-creation*, *fostering network effects*, *living with contingency*, and *engaging in business with meaning*. It is suggested in Article III that engaging in business with meaning may be where the secret to customer involvement lies: the joint activity of innovative interaction may be able to generate new meaning, new perspective to the world and what is valuable, and thus have the potential to commit customers at a deeper level. The more detailed empirical findings on different ways of involving customers and the different rationales for doing it are discussed in the two subchapters below.

### 5.4.2 Types of customer involvement

The first possible practice of customer involvement in industrial service innovation that was discussed in the interviews was not to involve customers. It is called here *in-house development and supplier co-operation*. The company representatives described that there were many situations when they chose to do development in-house and/or with suppliers because they found this type

of development particularly valuable. The representatives described that especially in specific areas where internal know-how and development capability was seen as a strategically important competitive edge, they concentrated their efforts on that instead of external collaboration. Protection of this strategic intellectual property was also seen as easier when the development was done in-house. Also, it was described as necessary to develop the 'base line' of service in-house since it is rare for customers to have the necessary resources to participate in development. It was also seen as natural to do certain parts of service development with customers while doing development of other parts in-house. Customers were typically involved in the development of those processes that were directly visible to them while company internal service processes were developed in-house. Even when doing in-house development, the case companies accentuated collaboration with functions in the customer interface. Also general companywide collaboration was seen as important.

Some of the company representatives described that they found the technical know-how and development capabilities of suppliers especially interesting and therefore decided to allocate collaborative resources in supplier innovation. The issue was brought up that innovations made by small suppliers can be much harder to detect than those made by large suppliers and therefore in order to notice small suppliers' innovations it is necessary to invest resources in finding them. The Silicon Valley based company representatives also raised up the issue that their companies as a mode of open innovation acquired innovative suppliers that they found particularly interesting.

*Development based on customer insight* refers to practices of intensified gathering of customer insight for industrial service innovation while customers still do not participate in the actual service development. Combining customer insight with in-house technology development was quite typical for the studied B2B manufacturing and technology companies. There were often good reasons for them to leave customer involvement at this level. The representatives described the great importance of each of their customer relationships for them. In comparison to consumer markets, in business markets customers are large and there are only few of them in the whole market. This makes each individual customer relationship inherently more important than in the consumer sector and the consequences of losing one customer are great. The interviewees explained that if customers are involved in the actual design phase they easily develop expectations above the level that the companies are willing to provide, what can lead to losing customers. Simultaneously they needed excellent customer insight in order to provide outstanding customer service and keep the customers. Development done in-house based on customer insight also enables them much better protection of intellectual property than development that is done together with customers or other stakeholders. For these reasons they found it justified to carry out actual development separate but in line with strong customer insight generation. It was described as a challenge with this type of operation that the effective utilization of customer knowledge inside the company requires a lot of resources. Especially large organizations need to

operationalize, document and share customer insight to make it easily available for different parts of the organization.

For B2B companies sales and customer interface is a very important source of customer information and the representatives of the case companies stressed open discussion with customers as essential for learning to better understand customers. For generating customer insight the companies also utilized systematic collection of customer feedback and surveys. Some of the company representatives also discussed using user communities for gathering customer insight, the point was not to ideate or design new offerings with the user communities. The company representatives described how they followed user discussion within the communities in order to better understand how customers actually use the offering, what it is that they would desire, and where the discussion is heading. It was also brought up that the discussion in user groups can be sparked by companies in directions that they find interesting.

*Co-development with customers* refers to development cooperation where both the supplier company and the customer company are actively involved. The outcomes and the process of co-development are influenced by both parties. The interviewees described that although there may be differences in the level of influence of the different parties in co-development, co-development leads to a shift of power. It was expressed very straight that each company wants to ensure continuing operation and profitable business and that this dictates what it wants to develop openly (with or by customers) and what it wants to develop in a more closed manner (in-house or based on customer insight). Openness was seen to be a matter of business model. What areas a company is able to develop openly depends on where its profits come from.

It was also stressed that co-development can be utilized for increasing the implementation of innovations and the speed of development. Radicalness of innovation did not need to be sought after. The goals of co-development were often tied to operative work and issues such as increasing sales and cutting costs. The interviewees also stressed the high resource intensity of co-development for both the customer and the supplier party, which emphasized the need to argue business customers' participation and resource commitment particularly well.

Several case company representatives also discussed reaching for a higher level of radicalness, getting into open discussion beyond normal role expectations, finding latent needs, imagining what is possible as well as methods such as "Imagine. Design. Create." or "Dream-Design-Deliver". They explained that when the customer is brought to participate in the dreaming and design it allows for more radical solutions and helps to find latent needs. At the same time the company brought in to the process its own ideas, design expertise and the guarantee that what was ideated together could actually also be accomplished. It was stressed that the overlapping of the phases increases innovation success and enables speeding up the process.

*Development by customers* denotes rather autonomous or independent development work that customers do for improving current solutions or develop-

ing new ones. The interviewees described that when customers are allowed to do this, the company is in fact shifting power to them and the developed solutions may quite well end up being harmful for the company. Therefore they needed to be well aware what it is that they allow customers to do and what it is that they expect to gain from this. Some also described using platforms and incentives to guide customers to conduct the desired kind of development work. Customers' efforts could be directed with such platforms to develop the company's own offering or a third party's offering that again supports the company through network effects. A personal interest of customers in the development work was seen to make them more willing to increase their efforts and take a more active role in the development.

Companies might expect crowdsourcing to lead to particularly innovative, good or radical ideas. Several interviewees described the original surprise when in practice finding out that this is not the way crowdsourcing works. They had tried this but nothing particularly special could be found through crowdsourcing. Instead it was described that the minority of great ideas is in most cases overrun by the crowd. Crowdsourcing events were described as not very motivating situations for innovative individuals who either would not be heard or would lose the ownership and power in the development of their ideas to others. It was argued very clearly that instead, large crowds lead to incrementalism – their good side is that they bring momentum, steadiness and robustness. These properties can be desired in certain situations and radicality in others. The interviewees told that they should be used skillfully mixing. An African proverb was used by one of the interviewees to explain this "If you want to go fast, go alone. If you want to go far, go together." It reflects the idea of first making great leaps with a small group of carefully chosen forerunners and then stabilizing the innovation with the brute force of the mass.

### 5.4.3 Reasons for customer involvement

The interviewees brought up a profound change that seems to be emerging in the innovation landscape and that reflects a new kind of aim for involving customers in industrial service innovation. It is here called *shaping the context of value co-creation*. Several interviewees had moved forward from viewing innovation as a rather linear process where technology is developed according to existing or projected customer needs. Instead, they discussed ways to bring different stakeholders together to imagine, to dream, to step further, to accomplish something novel and at the same time to ensure that it can actually be realized. This was also described as a dance where you need to be aware what kinds of steps the other party is willing and capable to take. The interviewees also told about the development of new design technology to support this activity. Referring to SDL, this kind of generative activity is here called shaping the context of value co-creation. The parties are not just optimizing value creation from the perspective of predetermined goals. Instead, the whole context is changing, what is seen as valuable and how this value is co-created. The needs are changing along the solutions. This kind of thinking implies that it is possible to tap into this change or even shape it. It was stressed in the in-

terviews that the influencing takes place in both directions: customers influence suppliers and suppliers influence customers – as in a dance. It was also described that this mutual influencing is not confined to specific customer-supplier relationships but that it takes place in multiple directions with different stakeholders.

Another reason for involving customers in innovation is *fostering network effects*. Several interviewees discussed the great power that network effects have in the evolution of their ecosystems. Network effects make an offering more valuable when more people use it (Katz & Shapiro 1985) and they can take place either directly as others use the same product, or indirectly as the effect of complementary products is mediated by the market (Katz & Shapiro 1994). Fostering favorable network effects that lead the evolution of the ecosystem to a desired path can be seen as an important aim for involving customers in industrial service innovation. This is the way that crowdsourcing, user communities and developer communities can really bring inertia to an innovation and its ecosystem by creating scale and momentum. From the point of ecosystemic network effects the interviewees also stressed the importance of making attractive value propositions to stakeholders other than direct customers. As theory suggests, it is not the value proposition of a single actor per se that leads to successful innovation; instead the actor needs to obtain support from other actors so as to co-create an attractive total value proposition (Arthur 1996; Tse 2002).

*Living with contingency* is also an aim for customer involvement that was found when analyzing the interview material. Although companies can shape systems of value co-creation through dreaming together with their stakeholders, making attractive value propositions on multiple fronts, and fostering favorable network effects, they still cannot control the formation of these systems, nor even forecast it well enough. Some of the interviewees explained that the market involves both positive and negative risks and that it is necessary for their companies to cope with this contingency. Gaining flexibility and resilience towards contingency can be seen as an important aim for involving customers in innovation.

One way that customer involvement aids in living with contingency according to the interviews is the reduction in innovation lead time. As lead times are cut decisions can be made on shorter notice, and this allows keeping up with the extreme pace of volatile markets. Another advantage is that customer involvement through e.g. user communities enables a better view to the changing market landscape, i.e. it brings more insightful foresight knowledge. A further way to cope with contingency was to transfer risk related to allocation of development resources closer to the customer end by letting third parties or customers themselves do the development work. It is in the customer end where the knowledge about the possible gains and risks related to the use of the innovation lies. It was also described that this kind of extension of development resources also makes it possible to get more offerings to the market very quickly and to increase the market in a situation in which the company's own resources are limited. Later, in many cases although not all, if the func-

tionality becomes successful, it is possible to acquire it and incorporate that capability to the product line.

*Engaging in business with meaning* is a further aim of involving customers in industrial service innovation that was found when analyzing the interview data and it is also suggested that this may be where the secret to customer involvement lies. It is the meaningful experiences that make something valuable for customers. Meaning motivates people and makes them willing to commit themselves at a deeper level to the service and to the innovation process. Many interviewees thought that customer involvement allows them to better understand what is truly meaningful for their customers. It is difficult for companies to push meaning such as greenness to customers. But the idea was suggested that if customers find the offering 'better' from their perspective, an interesting story attached to the offering may further strengthen customer loyalty.

The generative activity of shaping the context of value co-creation, imagining and dreaming together with customers allows customers to participate in creating a new 'better' world that is meaningful for them. It is suggested in Article III that new meaning, new perspective to the world and what is valuable, may be jointly created in the act of innovative interaction, and that thus involvement of customers and stakeholders in innovation may have the potential to commit them to new meaning.

## 5.5 Widening the perspective on industrial innovation

This chapter concerns Article IV and the fourth research question "How can the service-dominant view of value be applied to widen the perspective on industrial innovation?" The chapter first summarizes the results, what kind of data the results are based on, and their analysis. After the summary, the chapter moves to describe in more detail how innovation can be theoretically approached through SDL's view of value as co-created, and further to the real case example that concretizes the theory.

### 5.5.1 Summary of widening the perspective on industrial innovation

Competition and the structural evolution of the socio-economic system force companies to renew themselves through innovation. Throughout time also the concept of innovation itself has been renewed. Schumpeter (1934) had a wide view of innovation naming various different kinds of renewals: new products, new methods of production, new sources of supply, exploitation of new markets, and new methods of organizing business. Most innovation research has concentrated on product and process innovations, but there is a need for a broader notion of innovation (Tidd et al. 2005). A new notion is seen as particularly necessary as industrial companies in the near future will face large structural changes due to forces such as e.g. the knowledge society, the Internet of Things, robotics, additive manufacturing, shortage of resources, and the need for a more sustainable economy.

Through history, manufacturing has perceived innovation above all as a matter of technology but the view has gradually changed through the "servitization" (Vandermerwe & Rada 1988; Neely 2008; Baines, Lightfoot, Benedettini, et al. 2009) of industry. In the past, services were seen as an expense difficult to avoid. However, in the end of 1980's, manufacturers found it beneficial to add services to their offerings in order to improve and strengthen their relationships with customers. It is common for manufacturers to start this servitization by developing services to support existing products (Oliva & Kallenberg 2003). As the service business matures, manufacturers may turn from services supporting products to services supporting customers (Mathieu 2001). This customer centricity is often manifested in the provision of solutions, i.e. individualized offers that are interactively designed for complex customer problems (Evanschitzky et al. 2011). Solutions business integrates products and services, and deepens the relationship between the provider and the customer.

The way that servitization is implemented today does not alone seem to represent a panacea for manufacturing (Baines, Lightfoot, Benedettini, et al. 2009). Despite the customer focus of solutions business, servitization up until now has not changed the way that providers are seen to have a primary role in value creation. The view has been that value is created in production and then delivered from the provider to the customer (Michel et al. 2008). Only recently have Vargo and Lusch (2004; 2008) challenged this view with their service-dominant logic suggesting that the customer is in a central position in value

creation and that value is co-created. Their new logic is now rapidly gaining ground.

Article IV argues that the next logical step to widen the perspective on industrial innovation and continue the progress started by servitization is to view value as co-created as suggested by SDL. It first describes how this new logic takes a step further from solutions business and employs SDL as an innovation theory instead of using it to leverage other discussions on innovation. Then a single-case study is presented and one specific new offering of the case company is analyzed to illustrate innovation from the perspective of the new logic.

The empirical data for the study comes from a single case of a Nordic welding equipment company that went through a three year development program in order to turn from a traditional equipment provider to a more customer and service oriented company. The author together with her colleagues was involved in the development program in a consultative role gaining deep understanding about the change that was taking place in the company. A specific innovation developed during the program is analyzed in particular. The perspective gained during the development program was complemented by interviewing three representatives of the case company and two representatives of the company's customer companies that had adopted the new innovation. All interviewees held managerial positions in their companies. As the empirical data is based on a single case and gained in a consultative setting, it is not used to prove theory but to illustrate and concretize new developing theory and its relevance. The following two subchapters discuss first how the author has understood innovation in the light of the emerging theory of SDL and then the case as an illustration of analyzing innovation utilizing the theory.

### 5.5.2 Innovation in the light of service-dominant logic

SDL widens the scope of discussion about the ways that service innovation brings neglected aspects of innovation to the fore – a discussion suggested by the synthesis approach of services (c.f. Gallouj 1994; Coombs & Miles 2000). It extends the view from dyads of providers and customers to a nested network system of actors (Vargo & Lusch 2011). This kind of approach is uncommon in previous service innovation research (Carlborg et al. 2014). SDL further emphasizes the importance of "operant" resources such as knowledge and technology due to their capability of acting on other "operand" resources to contribute to value co-creation (Vargo & Lusch 2004). Also, it stresses that institutions are needed as resources in value co-creation as they both constrain and enable social behavior. It views markets as institutionalized solutions of resource application to human problems or needs and argues that this institutionalization of novel solutions is one of the most interesting issues in innovation. These views are aligned with the innovation studies emphasizing innovation as processes and practices (Gallouj 2002b; Lundvall 2007).

SDL views value co-creation as taking place through the enactment of practices in nested systems (Akaka et al. 2013). It further suggests that also technology should be understood broadly as an operant resource and as "a set of practices and processes, as well as symbols, that contribute to value creation or

fulfil a human need" (Akaka & Vargo 2014, p.13). The practices are stabilized as institutions in the markets. They start to change as actors make value propositions about new practices for value co-creation. However, it is not until the use phase when the new practices come to being through their enactment. Hence, resource integration for innovation takes place in two mutual phases: value proposition and value determination (Akaka & Vargo 2014). A parallel can be made to the idea behind the innovation-diffusion theory that for innovation to take place, both invention and its adoption are required (Rogers 2003). SDL further extends on this by introducing the insights that the phenomenon of innovation is not dyadic but involves multiple actors in nested systems (Vargo & Lusch 2011), and that value is contextual and phenomenological (Vargo & Lusch 2008).

Based on the discussion above, innovation is characterized as a path dependent and recursive process where multiple actors engage in the activity of mutual co-development. Further it can be described as mutual learning between actors and as the emergence of new value co-creation systems. As it is a complex process of mutual search and experimentation, it always involves uncertainty. Hence, co-development with committed stakeholders may be a more viable strategy than trying to predict inherently uncertain markets. Both co-development and co-creation are fundamental to being human but the two concepts are distinct. Value co-creation takes place through the reproduction of institutionalized practices. Co-development can be characterized as mutual interaction that aims to transform the systemic structure of value co-creation and that consists of proactive search for new actors, resources and configurations, making new value propositions and reciprocal assessment of other actors' value propositions. It can be appreciated both instrumentally and intrinsically. Instrumental appreciation takes place when actors value co-development through its aims or results. Intrinsic appreciation takes place when actors value participation in the social interaction of co-development per se.

When discussing novel innovative outcomes resulting from innovation activity, certain caution is needed since emphasis on distinct outcomes easily leads to goods-dominant logic. Yet, the resulting impacts of innovation are important and should not be ignored. Drawing from above discussion on innovation activity as mutual co-development aiming to transform the systemic structure of value co-creation, and from Giddens' (1984) structuration theory, and in line with the characterizations of Edvardsson & Tronvoll (2013), innovative outcomes can be characterized as *novel value co-creation practices embedded in social structure*. Their benefits may differ from those of the old practices and vary for different stakeholders. From the customer point of view their value can be related to the way they enable customers to attain something or the way they relieve customers from something (Michel et al. 2008). They may also embed operant resources such as knowledge and skills to make customers smarter.

All forms of innovative renewals proposed by Schumpeter (1934) can be explained with the characterization above. Goods and services, activities and

processes do not disappear (Ramaswamy 2011). Instead, concrete entities such as products, services and technologies can be seen as crystallizations of the novel practices. Humans are physical beings dependent on their bodies. It is only through their bodies that they can make sensual observations, act and participate in social interaction. Their view of reality is limited by their physical senses. Especially it is difficult for them to perceive the actions of others, the consequences of their own actions, and the actions of the system as a whole. The physical manifestations of products, services and technologies extend human senses and capability to act, working as a medium for human-to-human interaction for value co-creation. Yet, only experiences can be appreciated intrinsically (Holbrook 1999). Thereby products, services, and technologies are manifestations and enablers of nested practices that can be utilized for enhancing value co-creation taking place in social interaction; value cannot be seen as their inherent property.

### 5.5.3 Analysis of a systemic innovation in the industrial service context

A new systemic offering of the case company is now analyzed to illustrate innovation from the perspective of SDL. The main points of this analysis are presented in Figure 5 on next page. The offering is meant for managing quality and productivity of welding work. It consists of various compatible modules or sub-offerings that can be integrated together as a system and that work together and separately. The modules are complementary. They have the potential to become more valuable through network effects as more modules and actors are linked together. Some of the individual modules are physical products such as welding machines and barcode readers. Some of them are services such as training and consultation. However, the total offering is best understood as a systemic, multi-actor value proposition design that contains smart knowledge and connections capable of aiding customers in value creation since it makes them "smarter".

The elements of the value proposition are examined moving counterclockwise from lower left corner of Figure 5. On one hand *welding machines* as a basic product offering are physical manifestations of resource integration practices taking place in the company. On the other hand they can be integrated as resources in customers' welding processes. The systemic offering provides extra benefit compared to welding machines alone as welding data is collected in a *data server*, what allows it to be integrated with other data for quality and productivity improvements. A *barcode reader* makes it easier for *the welder* to input production parameters in the system, what facilitates adoption of new practices. The welder also gets immediate process feedback from the system. The data may further be used for production of *welding management services*. *The welding supervisor* also uses the information and the services as resources. *The owner* benefits from the better run welding process leading to higher quality, productivity and throughput as well as lower cost. *Customers* receive the same benefits but they can also further utilize the proof of quality and the possibility to track quality information when doing business with their own customers.

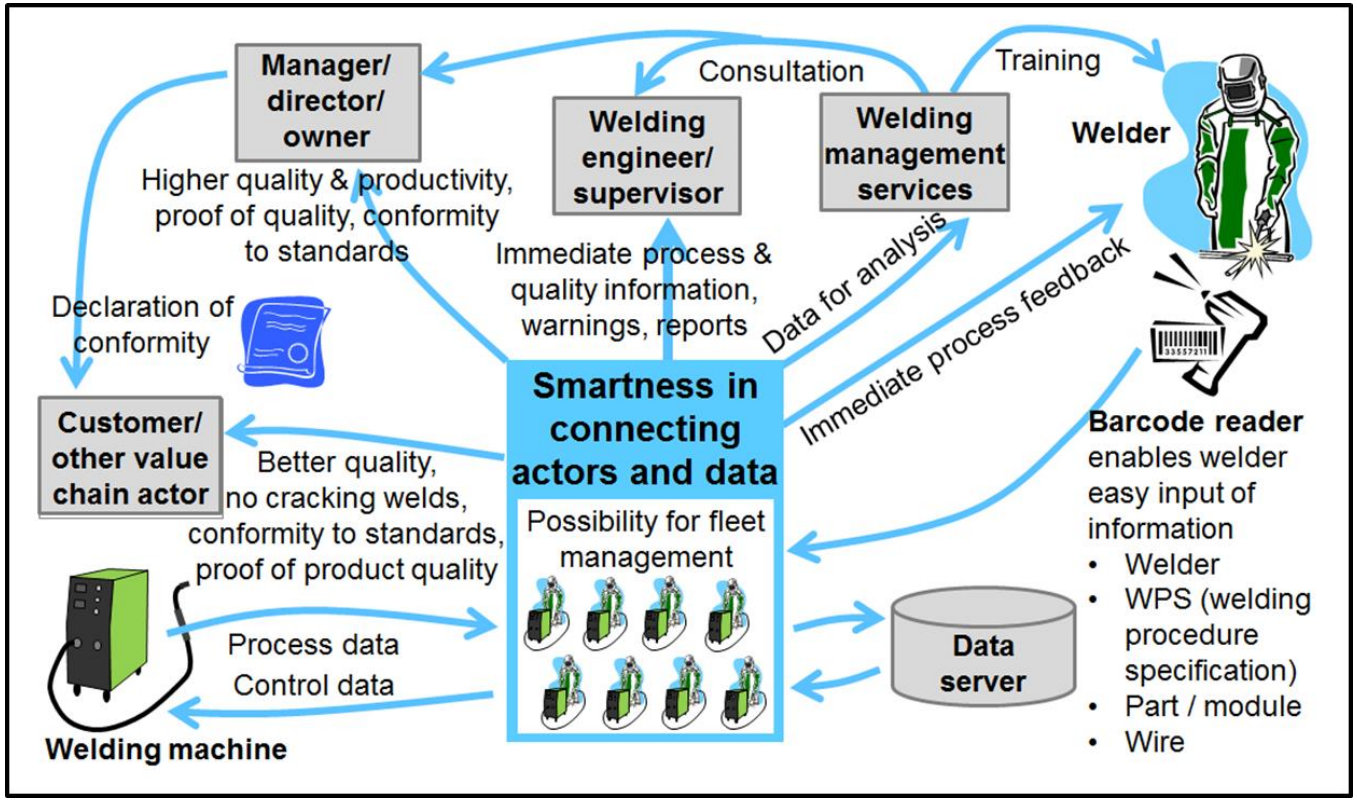


**Figure 5.** A systemic offering as an enabler of new value co-creation practices.

There are also important aspects of the offering that the figure is not able to visualize. The proposed practices utilize as resources other practices that have already been institutionalized. Some examples are arc welding technology, welding procedure specifications, quality management, information technology, barcodes, and servitization. Institutional inertia can hinder innovation, but in this case the offering gains momentum from a major institutional change: the rapid spread of quality management practices.

The offering is designed to support human value co-creation. Especially the welder's actions and the functioning of the welding machine are made visible for other stakeholders across time and space, and the smartness embedded in technology aids the various stakeholders utilize this information in a smart manner. This way the physical crystallizations of the offering such as products, services, and technologies enable more efficient human-to-human interaction.

The offering itself is a value proposition. An innovation only emerges through the enactment of new practices by the different stakeholders, which is the adoption phase. The offering also has an important role as an enabler as it enables the adoption of the new practices. It supports mutual value co-creation between multiple parties at least as much as it supports the value creation of any individual stakeholder. Therefore the development efforts need to be aimed at systemic value creation in addition to the separate products, services, and technologies. The offering can well be used for solutions business but it also shows a gradual shift towards SDL: it supports joint value creation between multiple actors; it utilizes market dynamics created by ongoing institutional change; and it leverages knowledge and technologies for making the actors "smarter".

Searching for a systemic win-win-win between different parties involves risks. For this search, new organizational capabilities need to be developed. In the case company, the development of a consultative sales model allows for understanding customers' contexts and proactive discussion on new possibilities in an entrepreneurial manner. The case company did not see it as enough to know customers' present needs, they wanted to go further in thinking and develop a proactive approach. Further, in the company technologies, products, and services are developed to fill critical gaps, what enables the new value creation practices. They need to fit the social context of the different parties. So, in the case company deep insight is created about the different parties, what kinds of roles they have on multiple levels, and how they individually experience the service. Some methods used in the company are ethnography, questionnaires, and weak signals search by the front office. Also, networks are built to produce other kinds of knowledge needed and support the company's innovative capability. Further, integration of the bits and pieces is needed; it was seen as important to bring together technology development, business development, customer research, and organizational development.

# 6. Discussion

As a whole, this dissertation describes a new approach to customer orientation in industrial service innovation. The dissertation suggests that industry needs to take steps in their customer orientation to a direction that emphasizes human centricity, customer involvement and systemic interaction. It is presented that the next logical development step is based on a view of value as co-created in nested human systems. Further, the concept of value is seen as wider than financial value since the role of businesses is to create value for people as consumers, employees, different kinds of groups, networks and organizations – and also for people as society.

This final section presents a synthesis of the results in the four studies and then describes the theoretical and managerial implications of the research. Last, limitations and prospects for further research are discussed.

## 6.1 Synthesis of results

Customer orientation is an evolving concept that has been widely debated upon for six decades in marketing as well as in innovation research. Customer orientation as a business approach is well accepted by scholars and practitioners of both research fields. However, innovation practices still rely much on the technology push view; and in marketing the meaning of customer orientation has been restated several times as it is fundamentally the core of the marketing concept that marketing as a field of study tries to understand. Recently, customer orientation has been reconceptualized as the service-dominant logic of marketing; although some marketing scholars claim that not even SDL as a business approach is customer oriented enough, and that instead of SDL a customer-dominant logic needs to be adopted.

Along the evolving discussion on customer orientation, the focus of industrial development has shifted from products to services and from services as add-ons to services as solutions. It can be expected that the progress of industry will not stop at services as solutions. Instead, it is predicted that industry will undergo major changes in the near future (Rifkin 2011; Manyika et al. 2012; Foresight 2013; Kagermann et al. 2013; Hagel III et al. 2015; Schwab 2016). This dissertation accepts the view that customer orientation can be interpreted in many ways and perhaps even should be interpreted differently in different contexts. The context of this dissertation is industrial service innovation and the work focuses on customer orientation in industrial service innovation. Together, the four articles provide insight on how to interpret customer orientation today and in future, in the present and coming challenges of industry, and in the context of industrial service innovation.

*The study related to the first research question "What kinds of difficulties do companies have in getting business customers to adopt industrial service innovations and where do these difficulties stem from?"* is a starting point for the abductive knowledge creation process through which the insight of customer orientation is generated. The study does not apply SDL but more traditional innovation theory and Rogers' (2003) theory of innovation diffusion which are discussed together with the empirical case evidence. Analyzing the empirical material a complex view of business customers and their needs emerged. In the analysis organizations presented themselves as nested systems, where different parts of the organizations experienced the services differently and often ambiguously. Their needs were observed as changing abruptly when environmental conditions changed. While some customers under environmental changes wanted to upscale the services used, others in the same situation wanted to downscale them. Customers that on the outward seemed very similar were observed to have completely opposite needs due to differences in their deeper business strategies. Also individuals inside the organizations and their personal experiences seemed to matter a great deal. Negative service experience seemed to have a different kind of effect than positive experience as negative experience could easily prevent innovation adoption from occurring even in the simultaneous presence of positive experiences. The positive and negative experiences did not add up to cancel out each other. In the

end the adoption decision did not seem to come to any single aspect of the innovation, the customer, the supplier, or the environment, but the idea of compatibility was found important. However, compatibility was not seen as a characteristic of the industrial service innovation itself. Instead, it was a more profound type of compatibility that manifested itself in numerous ways in the nested customer organizations, their environment, the suppliers, and the service. It seemed that innovations may be rejected due to a lack of true compatibility.

When it comes to customer orientation in the context of industrial service innovation, the results of the first article emphasize that it is necessary to understand the nested nature of customers, the changing and ambivalent nature of customer needs and the role of the profound type of compatibility in innovation. These views represent a very different type of interpretation of customer orientation than is typically present in manufacturing companies' stage gate models of innovation management.

*The study related to the second research question "How could the concept of need be understood in a business-to-business context and how could a need of a business customer be answered through the co-creation of value?"* further deepened the understanding on how customer needs should be viewed in the B2B context as in industrial service innovation. A novel framework of needs in B2B context was put forward. The framework further emphasized that needs in B2B context are not static but changing and co-created in social interaction. The study utilized SDL to leverage other theories. SDL seemed applicable and fitting also with the empirical observations of the first study. This strengthened the view that SDL could provide an approach of customer orientation applicable in the context of industrial service innovation.

*The study related to the third research question: "How and why do companies involve business customers in industrial service innovation?"* also utilized SDL to leverage other theories. Together with the theory of open innovation it seemed to expand the understanding on customer involvement, which is an important aspect of customer orientation. When analyzing the empirical material from the six case companies together with SDL and theory on open innovation, novel reasons for customer involvement in industrial service innovation rose up. The companies involved their customers in innovation for *shaping the context of value creation*. In this activity the parties are not just optimizing value creation from the perspective of predetermined goals. Instead the whole context is changing: what it is that customers and other parties involved interpret as valuable; and what are the joint practices of value co-creation through which the different parties together create this new value. The needs are changing along the solutions. This was seen as a profound change emerging in the innovation landscape and it was stressed that such activity could be supported by new technology that is developing rapidly. *Fostering network effects* was also found to be a reason for involving customers. This is the way that crowdsourcing, user communities and developer communities can bring scale and momentum to an innovation and its ecosystem. The importance of making attractive value propositions to stakeholders other than

direct customers was also stressed for fostering network effects. As it was not seen as possible to control the systemic change taking place, *living with contingency* was a further reason for involving customers in innovation. It is argued though that *engaging in business with meaning* may be where the more profound impact of customer involvement lies. It is the meaningful experiences that make something valuable for customers whether it is the innovation itself or participation in the innovation process. The joint activity of innovative interaction may be able to generate new meaning, new perspective to the world and what is valuable, and to commit people to innovation at a deeper level.

The back and forth movement of abduction between empiria and theory expands the researcher's understanding of them both (Dubois & Gadde 2002). In abduction the researcher creates a conjecture that, if it were correct, would make the surprising phenomenon a part of the normal understanding of the world (Van de Ven 2007). Utilizing SDL to leverage other theories used in articles II and III, helped to understand the empiria of industrial service innovation but it also helped to understand SDL itself as an approach to customer orientation. The results of the three first articles were encouraging as they seemed to expand understanding of innovation and SDL as a theory seemed quite fitting to explain this new understanding. Therefore the perspective of SDL on customer orientation was further examined, this time using it not to leverage other theories but as an innovation theory in itself.

*The study related to the fourth research question: "How can the service-dominant view of value be applied to widen the perspective on industrial innovation?"* expanded understanding not only on customer orientation but on customer value and innovation itself. Based on the case study the restatement of customer orientation represented by SDL does seem to help to understand successful innovation in the context of servitizing manufacturers. It is argued in the study that the next logical step to widen the perspective on industrial innovation and continue the progress started by servitization is to view value as co-created in nested human systems. The study first discusses the nature of innovation when value is seen as co-created and then uses the case example to illustrate this view.

As a synthesis the four studies together suggest that a new approach to customer orientation is adopted in the context of industrial service innovation. Based on the four studies this new approach can be characterized as the deepening of understanding on nested customers, customer needs in B2B context, customer value, and customer involvement in innovation.

## 6.2 Theoretical implications

This chapter discusses the theoretical implications of the research for the interpretation of customer orientation in the context of industrial service innovation. The novel mindset is characterized as deepening the understanding on nested customers, customer needs in B2B context, customer value, and customer involvement in innovation.

### *6.2.1* Nested customers

*The research deepens the view on nested customers*. The empirical studies in this dissertation highlight the view that business customers are not singular or homogeneous; instead they are nested systems of individuals and groups having different needs and different contexts. Businesses further belong to larger systems such as industries and ecosystems. Not only are business customers nested, but individuals also belong to complex systems through relationships such as familial ties, friendships, employment etc. The work clarifies how the different actors participate in joint value co-creation in nested human systems. It is emphasized that this kind of social interaction is fundamental to humans. Further, the research deepens the understanding that business customers by nature are inherently human systems that facilitate human interaction for human value co-creation. It is emphasized that this also applies to industrial companies as this opens up new opportunities for understanding industrial service innovation. It is described how in these systems value accrues in multiple directions and also to other beneficiaries than those that are usually considered as customers by industrial companies, which is a perspective rarely applied before. Most of earlier research on industrial service innovation focuses on dyadic customer-supplier relationships.

### 6.2.2 Customer needs in B2B context

*The research deepens the view on customer needs in B2B context*. The earlier research has lacked a thorough discussion on the meaning of "needs" in B2B context. This dissertation elaborates the point that customer needs are not homogeneous or static. Businesses as customers represent a multitude of heterogeneous groups and individuals sharing some objectives but also driving their own agendas which may be contradictory. The needs of an individual can also be ambivalent. The work draws implications for industrial service innovation based on the understanding that both individual needs and needs of business customers change over time, in different contexts, and as a result of human interaction. It is presented that not only is value co-created, but needs in B2B context are co-created in nested human systems as well, which is essential for innovation. A novel framework is brought forward describing how needs in B2B context emerge to mediate between the needs of different actors as people engage in joint organizing for value co-creation. This deepens the understanding of organizations as means for satisfying the needs of individuals, societies and other organizations. It is also clarified how businesses having such a role

in satisfying the needs of individuals, results in business customers' needs also having an experiential, phenomenological side to them – businesses are not only about profit maximization and survival.

### 6.2.3 Customer value

*The research deepens the view on customer value*. Intrinsic value is here seen as phenomenological and experiential (c.f. Vargo & Lusch 2008; Prahalad & Ramaswamy 2004; Ramaswamy 2011), and it is explained that only human actors are able to experience such value. Exchange value can be seen as instrumental and this work links it to an organization's role in facilitating human value co-creation and satisfying human needs. Money is seen as an extremely powerful instrument for creating experiences and satisfying human needs and as such highly appreciated by people. This dissertation emphasizes that in addition to the positive side to value such as e.g. needs fulfillment, there is also negative value experience and both negative and positive value can be experienced simultaneously. This issue is essential in the networked industrial context where different parties have a different service experience, yet it is often omitted in industrial service development. Further, the work clarifies value creation as a social phenomenon of nested human-to-human interaction. Actors' value creating activities have a dual effect; they contribute both to the actors' own individual value experiences as well as to the value experiences of other actors in the system of joint value co-creation. Respectively, the value experience of an actor not only depends on its own value creating activities but on the activities of the other actors in the system as well. As suggested by SDL (Vargo & Lusch 2004; 2008) value is seen as co-created. The dissertation contributes to this discussion by explicating how well-being at individual, B2B and societal levels is dependent on businesses' facilitation of this value co-creation. Further it is suggested that the role of industrial businesses is to join together different actors for value co-creation on multiple systemic levels, including individuals inside and outside organizations, as well as systemic actors such as industries and ecosystems.

The work clarifies that goods, services and technologies do not carry value in themselves and illustrates how value that emerges to different actors is the result of the joint activity of value co-creation. The research in particular brings forward the dual nature of goods, services and technologies as manifestations and enablers of value co-creation practices embedded in social structure. The dissertation further explains how goods and services can be seen as "crystallizations" of these practices. The work concretizes how value accrues through joint value co-creation as actors integrate goods, services and technologies together with other resources in their value creation activities. As an important contribution the work captures how all types of innovation as described by Schumpeter (1934) can be seen as changes taking place in these systems of value co-creation practices. The role of technology is clarified as an enabler and enhancer of value co-creation. This does not diminish the importance of ICT in service innovation that has been emphasized by others

(Miles et al. 2014; Kowalkowski, Kindström, et al. 2013) – on the contrary, ICT is seen to have enormous potential in this role.

The empirical studies clarify and concretize SDL's view of value as emerging in a systemic context through co-creation, which is a recent step in the continuum of discussion on customer orientation. This view is also compatible with the concept of two-sided or multi-sided markets (c.f. Rochet & Tirole 2006; Eisenmann et al. 2006). The research also confirms and illustrates the importance and functioning of network effects in such systems. As there are various approaches to customer orientation that are not necessarily mutually excluding, this dissertation indicates that the systemic view of value co-creation as a specific approach can be applied in a wide range of contexts, including all types of innovation. However, it is suggested that the systemic view of value co-creation is especially highlighted in the context of complex network dynamics, such as e.g. industrial service innovation, business model innovation, market driving strategies, platform strategies, ecosystems development, social peer-to-peer networks, innovation systems, industrial transformation, and societal challenges.

### 6.2.4 Customer involvement in innovation

*The research deepens the view on customer involvement in innovation*. There are two sides to innovation: push and pull (Nelson & Winter 1977; Freeman 1979), invention and adoption (Rogers 2003), idea and implementation, value proposition and value determination (Akaka & Vargo 2014). Although it is possible for one to innovate for one's own use, this dissertation highlights that innovation as a fundamentally two-sided activity involves both the service provider and the customer. The empirical studies emphasize that customers are more than mere objects to be studied, they are active actors in the systems of value co-creation, in the change of these systems and therefore, also in innovation. Further, the empirical data indicates that innovation as a systemic multi-sided phenomenon may call for collaboration with multiple parties other than the company and its customer. Therefore, it is suggested that innovation generally involves search for a mutually beneficial arrangement among those whose collaboration is needed to generate the change. Going back to the issue of negative value experience often ignored in industrial service innovation, the empirical studies highlight that negative value in the form of adverse effects experienced by a party may cause innovation resistance. The research indicates that any party can act as the initiator or as the driver of innovation and the level of involvement of a party can change in the course of innovation. Service development activity is here viewed as co-development of value co-creation systems with different actors in them. Further, as an important contribution of this dissertation, it is presented how actors when developing industrial service systems can utilize both open and closed innovation practices in creative ways such as shaping the context of value co-creation, fostering network effects, living with contingency and engaging in business with meaning.

### 6.2.5 Summary of the theoretical contribution

A summary of the main theoretical contribution of this dissertation for customer orientation in industrial service innovation is presented in Table 5. The theoretical contribution is characterized as deepening the understanding on nested customers, customer needs in B2B context, customer value, and involvement of customers in innovation. Through this deepening of understanding, this dissertation also contributes to SDL concretizing and clarifying it as an innovation theory and as a recent progression in the evolution of the marketing concept or customer orientation. The research indirectly also contributes to other theoretical discussion on innovation. The main context of this dissertation is industrial service innovation but some contributions seem applicable also in the wider context of innovation in general.

Overall there is a trend in organization research of movement toward a view of organizations as open and natural systems as picked up by Scott (2003). Today, organizations and organizational activity, such as innovation and service, are seen more as resembling complex and continuously evolving living organisms than as rigid structures. The systemic view of SDL that also emphasizes the phenomenological and experiential side of value can be seen as contributing to this progression. Innovation discussion, that started from the simple question of the locus where innovation takes place, has progressed from the ideas of technology driven and customer driven innovation towards the ideas of interaction, networked innovation and complex evolving systems. Service discussion in a similar manner has proceeded from simple characterizations of services, such as the IHIP characteristics, through relationships to complex evolving ecosystems of value co-creation as described by SDL. Further, our view of society, and the role of knowledge in it, is shifting from an information society towards a learning society (c.f. Lundvall & Johnson 1994) – from a simplistic notion about the amount of information towards an interest in the dynamics of innovative activity. Also, scholars such as Chesbrough et al. (2006), Gassman et al. (2010), Chesbrough & Bogers (2014) and Baldwin & von Hippel (2011) suggest that we are witnessing a change of paradigm in innovation research. The focus no longer seems to be on simplistic views such as the (one) locus of innovation or the objective value of service. Instead there are multiple views to phenomena such as multiple loci of innovation and multiple actors interacting and experiencing service value in many different ways. Also, the focus seems to be shifting more towards continuously evolving complex systems and the dynamics of change or learning.

**Table 5.** Summary of the main theoretical contribution: deepened understanding on nested customers, customer needs in B2B context, customer value, and customer involvement in innovation.

| Existing theory | Discussion contributing to theory | Deepened understanding |
|---|---|---|
| • Divergence of theories on different kinds of customers such as business customers, clients, users, consumers, citizens | • Widening the concept of customers to heterogeneous beneficiaries and active actors nested in multiple levels of value co-creation systems<br>• The nature of all customer groups as humans or networks of humans facilitating human value co-creation | • Nested customers |
| • Diverging theories of customer needs in consumer markets and in business markets<br>• Confusion on the conception of need | • Needs as nested and changing through co-creation<br>• Needs in B2B context as bridging meso level needs that mediate between the needs of different actors<br>• The phenomenological and experiential side of business customers' needs | • Customer needs in B2B context |
| • Divergence of theories on different types of innovations such as technological, process, product, service, business model and market innovations<br>• The assimilation, demarcation and synthesis views on service innovation | • Convergence of different types of innovations to a general type of innovation outcome, i.e. a system of value co-creation practices<br>• General, wide view of innovation processes as change processes in these systems<br>• Clarification of how customers and other beneficiaries derive value through co-creation in these systems, not from technologies, products, services, combinations of products and services etc. as such | • Customer value |
| • Use of technology for producing goods and services | • Use of technology for enabling and enhancing value co-creation<br>• The dual nature of goods, services and technologies as manifestations and enablers of value co-creation practices | |
| • Industrial companies as customer companies' solution partners, creating added value for customer companies | • The role of industrial companies as joining together actors for value co-creation and thereby contributing to well-being at multiple levels such as individual, B2B and societal levels | |
| • Customer and market orientation as a success factor for business and innovation | • Focus on value co-creation systems, their dynamics and the way different actors derive value from them<br>• The significance of negative value experience affecting the dynamics of value co-creation systems and potentially causing a barrier for innovation | |
| • Innovation as demand pull and technology push<br>• In-house service development based on studying customers and customer value<br>• Open and user driven innovation | • Innovation as a fundamentally multi-sided phenomenon of learning in multi-actor value co-creation systems<br>• Development of industrial service as co-development of these systems with different actors in them, utilizing both open and closed innovation practices in creative ways<br>• Customers as active actors in the systems and in the co-development | • Customer involvement in innovation |

## 6.3 Managerial implications

The results and theory development discussed above and characterized as deepening the understanding on nested customers, customer needs in B2B context, customer value, and customer involvement in innovation have important managerial implications for manufacturers today and in near future and for the servitization of industry. The purpose of this chapter is to discuss those implications.

The point usually emphasized in the discussion about the service economy is that services as offerings are different from goods and that the share of these services type of offerings is increasing in the economy. Attention is drawn to services such as e.g. design services, R&D services, financial services, IT services, maintenance services, and consultancy services. This only represents a surface manifestation view of the service economy. Another point highlighted in the discussion is the intangible value creation taking place especially in the beginning and end of the manufacturing value chain. It is true that value added often is higher in these phases as suggested by the smiling curve. This dissertation supports the importance of intangible value creation and especially stresses the experiential aspects of customer value, not only in consumer services but in industrial services as well.

However, based on the results of this dissertation it is reasonable to conclude that there is more to service transition than the intangible nature of value and an emphasis on certain phases of the value chain. The value chain as such is a simplistic model that represents linear thinking. In addition to the experiential nature of customer value, this dissertation highlights the systemic nature of value co-creation. The service economy is about learning in the nested structures of human value co-creation. From this perspective the differing definitions of goods and services is not as important an issue as the difference between the linear value chain logic and the nested human systems logic of value and learning. The appearance of services is an implication of the changes that have taken place in deeper structures. These changes have been enhanced by technological development, especially in ICT, and they manifest themselves as new services and the growing share of services in the economy. The transformation taking place is only in its beginning and is rapidly accelerating. It will bring about substantially large changes to systems of value co-creation and thereby affect all industries. However, as servitization speeds up, the distinction between products and services will become even more blurred. Through this research the service economy is seen as fundamentally a human centric economy of nested systems of value co-creation and a learning economy. The taken view has major managerial implications.

Often industrial service business is described through the strengthening of the dyadic relationships between the service providers and their customers. The development of goods and services and relationships is essential also in the future, but *it is time to think of innovation from a wider perspective as nested systems change*. Development efforts should not be focused just on technologies, services, PSS's or even supplier-customer relationships as such but on enhancement of systemic value co-creation including *change in busi-*

*ness models and wider ecosystems of multiple stakeholders*. The higher the systems view, the higher the innovation potential is, although innovation at higher systemic levels can be very difficult due to system complexity and the conflicting interests of the affected parties. Industrial service innovation takes place on multiple nested levels that are connected with each other. From the policy point of view a note can be made that the view on innovation as change in nested systems of value co-creation is seen to apply to all types of innovation, including e.g. social innovations, not just industrial service innovations.

Service innovations, business model innovations, technological innovations, industrial platforms and ecosystemic change have implications on each other. Therefore, servitization and industrial service innovation affect all aspects of business from ecosystems strategy to daily operations. They truly crosscut all business functions. In line with previous research (Grönroos 2000) customer orientation as a business philosophy is seen to present itself on all functions and on all levels of business from strategy to operations. Further it is suggested that customer orientation is more than focus on customer-supplier dyads, instead *the focus of industrial service business development should be on systems of value co-creation and on how customers as well as other stakeholders, including society, derive value from them*. The deeper and more complex the intertwined linkages of different types and levels of components in these systems are, the harder it is for competitors to copy them. Therefore, it is suggested that *industrial companies should not base their innovation efforts on technological expertise and functional properties of products and services alone, but combine them with "softer" issues* such as e.g. relationships, brand, well-being and human experience in social context. Along the same line of intertwined linkages, it is suggested that *the focus on customer should be extended to beneficiaries on multiple directions and on multiple levels such as e.g. individual employees, companies, ecosystems and the society*. Further, *the focus should be on the interlinkages between the different components and beneficiaries*.

Manufacturing industry has been under great change in the recent decades due to globalization induced by ICT. It has been anticipated that there is much more turmoil ahead due to expansive progress of ICT, development of crosscutting key enabling technologies (KET), demographic changes and growing resource competition and volatility. A profound shift in the nature of work is foreseen as technology penetrates ever more jobs ever deeper and value chains are sliced into ever shorter fragments and spread globally in fierce competition for efficiency. Many of today's professions disappear or at least change their shape. Due to the expected gravity of the structural change that simultaneously presents an opportunity and a threat for industry as well as society as a whole, and due to competitive measures in the race of systems related technology that have already been taken in certain countries (c.f. Kagermann et al. 2013), *it is highly advised to develop the capabilities for systemic innovation*. The structural change will take effect in different time frames in different industries. Effort should especially be put on those industries where the change is rapid or where the change has large implications.

The systems of value co-creation are highly complex. The further one studies these nested networks, the more rapidly the costs of exploration rise. Therefore, there always is some limit beyond which it is no longer beneficial to study further. However, based on the results of this research, it is quite common that industrial companies do not study the nested customer needs deep enough even for simple services. Industrial services are often developed from too simplistic a technological or financial point of view which is an obvious reason for innovation failure. In the case of wider systemic innovations the extent of systemic change increases *the necessity of deep understanding on nested needs and value.*

Knowledge and technology are central for servitization. That is exactly why ICT has had such an enormous effect on the service economy. However, data itself has no intrinsic value – no matter how much there is of it or how "big" it is. *The fundamental issue is how technology is used in systemic value co-creation to fulfill customer or human needs.* Machines serving each other would be incapable of producing value if there were no human somewhere in the system experiencing it. The acceleration of service economy by technology is the result of human-machine interaction and the way that machines are capable of enhancing human value co-creation and the resulting human experience of value. Innovation acceptance and rejectance depends on this human experience. At the same time as technology is taking care of more and more new tasks, the nature of human work is rapidly changing causing further pressures to adapt technology to better support human work as a tool. The support for human value creation is complicated in industrial service innovation or any wide systemic innovation as there are plenty of people experiencing the industrial service innovation each from their own context. Industrial service innovations also affect the social contexts of customer organizations. There may also be multiple aspects of experiential value some of them being negative and some positive. For wider innovation acceptance *it is necessary that the innovation is experienced as beneficial at least by the critical parties in the system affected.* It is quite often though that some critical stakeholders experience the value as negative and this can be a barrier for innovation. This is why *negative service experience can be just as important if not more important to study than positive service experience.* Measures can be taken to change the situation if innovation barriers caused by negative service experiences are found early enough in the innovation process.

Although digitalization and KET's have an essential role in productivity and industrial service innovation, the perspective on service performance should be different than in the assimilation and demarcation phases of service innovation research. *Although important, financial measures and technology measures present a limited view on innovation performance.* Focusing on them only makes businesses half blind – unable to notice many new possibilities for innovation or important barriers of innovation. *The opportunities for increasing service performance are expanded when viewing industrial service innovations as systemic innovations and from a human perspective.*

There are many approaches for increasing performance and in practice the different approaches are combined. The most common approach is to focus on the service process between the service provider and its customer and to increase the productivity or efficiency of the provided service while still aiming at fulfilling the same needs as before, just with lower input per unit of output. Another way is to reduce unwanted adverse effects of service, which may be crucial for service acceptance. A further way of increasing performance would be to still focus on the service between the provider and the customer but to add new benefits valued by the customer, fulfill other types of needs or even latent needs. It can be an incremental change as an addition to previous offering or it can be a more profound change as in changing from one type of value offered to another. Also, it may be that the service yields excess output or wrong kinds of benefits that are not truly valued by the customer, and it is possible to dispense with such parts of the service. Further, instead of focusing on customers and other organizations as abstract entities, it is possible to zoom in from organizations to humans, to focus on the different roles of people or individual people experiencing the positive and negative aspects of service in their own contexts. Also, instead of focusing on the dyadic relationships between a service provider and its customers it is possible to optimize the performance of longer value chains, the way that value is added and subtracted in series of transactions spanning from multiple tiers of suppliers to customers and end customers. A new approach is made possible by changing from the linear value chain view to a non-linear view of value as co-created in nested systems yielding multiple kinds of benefits and adverse effects in multiple directions for different parties in the system and resulting in positive and negative feedback mechanisms affecting the total performance of the system.

Increasing efficiency with the aid of technology opens up possibilities for performance increase but *an understanding of multistakeholder interactional value co-creation, system dynamics and humans as social actors is needed to reach a higher potential of performance increase*. Further, *unless technology is proprietary, performance increase due to technological development alone offers a weak competitive position. A focus on complex dynamics of human interaction is a way to increase performance but at the same time it can be utilized for protection from competition* such as e.g. in brand strategies and in some platform strategies which involve network effects among people.

As is clear from the discussion on technology and performance, companies' internal efficiency will not lose its importance. Also the focus on customers will be extremely important, but industrial competition is shifting from the dyadic level to systems level. This calls for a new approach for innovation management. Another point calling for the new approach is that innovation does not take place at some specific moment of invention but extends over longer periods in time involving changes in practices but also their stabilization. It can even be argued that the processes of adoption are more significant for the final realization of innovation than the processes of invention. Therefore it is essential for innovation success to be able to understand, change and stabilize practices at the joint level of value co-creation. These practices are fundamentally

joint practices that are shared by different actors in nested systems of value co-creation. Therefore, *customers and other parties affected by industrial service innovations should be seen as inherently involved in innovation* as opposed to being merely targets of innovation or something to create knowledge about. In other words, the new approach is more than about inflows and outflows – it is about jointly changing the system – about the generative activity of innovation as interactive learning. *The different phases of innovation extending in time call for involvement of different parties and involvement in different ways*. This needs to be managed and *the new approach should be based on management of co-development relationships*, especially with customers who are often actively involved in the innovation process. The new approach should be understood as a continuous process with multiple stakeholders where *both open and closed innovation practices should be combined and utilized in purposeful ways*. There often are good reasons for keeping the level of customer involvement low at certain points of the development process. Co-development starts from *understanding the aim of co-development and who it is that should be involved and what their motivations are, in what ways should they be involved and at what time*. Involvement of own personnel outside the RDI function, especially sales and customer interface, is also important.

Open innovation should be seen as something more profound than just more efficient use of internal and external RDI resources and better access to information. *The main focus of more open involvement of different parties in innovation should be in the creation of favorable dynamics for mutual systemic learning as the parties fit their practices together in novel ways, some examples of this being shaping the context of value co-creation, fostering network effects, living with contingency and engaging in business with meaning*. It is essential that the parties feel motivated to participate in the co-development. Also, the actual adoption of the new joint practices calls for motivation of the different parties. For this reason *the development efforts should aim at benefits for all parties and reduction of adverse effects*. In addition to the innovation performance as experienced directly by the developing parties, there often are more possibilities for influencing also the indirect performance, such as environmental or societal performance, through the joint development efforts than through development by any single party alone.

It is often quite difficult to assess the complex innovation possibilities and performance in advance without some trial and error. Therefore *a critical success factor of systemic industrial innovation is the way that the parties involved in the joint development are able to perceive the system and the new solutions possibilities as well as their effects*. Therefore *it is advised that the parties involved are brought together to jointly ideate, evaluate and implement these solutions*. Further, as opposed to the traditional view of innovation as a linear process*, these phases of innovation should be viewed as simultaneous and overlapping*. The overlapping of these phases allows for more freedom of ideation, better understanding of the potential benefits and adverse effects of the ideas, better alignment of different parties aims, as well as an

understanding on the feasibility of implementation. Partly due to these reasons and partly due to the overlapping itself, this also allows for speeding up the innovation process as well as better innovation success.

The research revealed that there is ongoing a rapid advancement of methods of aiding open innovation with new technology. It is possible to utilize technology to connect the users, the designers, and the design targets in novel ways, creating new possibilities for ideation, evaluation and implementation. The different roles and phases of innovation are becoming more overlapped which opens up possibilities for accelerating innovation processes. The overall transformation might be changing the nature of human work from information work through knowledge work towards creative interactional work which is also the kind of high value added work that is seen in the two ends of the smiling curve. Technology, such as e.g. ICT and simulation, affects the generative dynamics of industrial systems, not just industrial systems as development targets. Therefore *it is suggested that technology is utilized for enhancing and speeding up the innovation process itself. Technologically enhanced innovation platforms offer an interesting possibility for fostering the joint generative activity of different parties*. At the macro level this could aid industry to adapt to and to exploit the transformation.

Even the largest systemic innovations consist of multiple smaller changes in the practices of value co-creation. The development efforts can be carried out either as more gradual development intertwined with the normal business operations with different parties or as larger development steps carried out in joint projects. In practice the possible larger joint projects overlap with the more gradual operational development of all parties. *Involvement of multiple parties in the joint development is essential for systemic industrial innovation as only through such co-development is it possible to align their development efforts towards mutually shared goals. Industrial companies should test their development ideas with real customers through dialog, by using different kinds of models, and also in real life environments as an essential part of development that yields more information about the effects of the planned changes*. This is highlighted because customer experience of innovation performance is difficult to foretell in complex environments. As described above, the testing can be aided by technology. However, taking the view of human value co-creation, the aggregate performance cannot be valued completely objectively. Instead, *performance should be approached as multiple beneficial and adverse effects and multiple stakeholders valuing them*. Therefore, rather than being self-evident, *the performance targets should be set through negotiation between different stakeholders while the solution and its joint implementation is simultaneously being negotiated.*

It is suggested that what has been said in this dissertation about involvement and a new approach to innovation management can also be applied in the context of innovation policy. Innovation policy is about decisions aimed at developing the innovation system. The nature of innovation systems can be seen as socio-technical; and institutions guide the dynamic interplay between the actors and structures in them (Geels 2004). Learning as a social activity involv-

ing interaction between people is central to them (Lundvall 1992). From the viewpoint of this dissertation *the decisions of innovation policy should influence the generative co-development processes in the systems of value co-creation in such ways that these systems are able to reach higher levels of performance*. It has been explained above what the author concludes about the performance and generative co-development of such systems. Technology is essential but its value derives from human value co-creation.

## 6.4 Limitations and prospects for future research

This chapter discusses limitations of the dissertation and makes suggestions for further research. First limitations are discussed from the point of view of topics covered and the methodology applied. Then suggestions are made for areas of further research that based on the work done are seen as particularly relevant for the development of industry.

### 6.4.1 Limitations of research

There are many topics to study in customer orientation. This dissertation has focused especially on the nested nature of customers, on customer needs, on the involvement of customers in innovation and on customer value. The research context has been industry and therefore physical products and technologies have had an important role in the industrial service innovations studied. Some of the areas not covered are specifically suggested as future research areas: how can companies together develop markets, direct their development efforts, and experiment and implement large systemic industrial service innovations; how can technology be used to support the new approach to innovation. Other relevant topics that have not been in the scope of this research are the internal organizing of industrial service innovation with companies' own personnel; the relationship between companies' strategy processes and the operative processes of service delivery, development, sales and marketing; the coordination between the more incremental service improvement and the introduction of more radical new service innovations. The research approach has been qualitative and therefore measurement of customer orientation, a topic much discussed in earlier literature, is outside the scope of the dissertation.

Concerning the methodology applied, this dissertation relies on qualitative data and abductive reasoning. This kind of methodology is not able to provide the same kind of strong proof as quantitative data and the use of induction and deduction. Taking the stance that knowledge is deepened and validated in the discourse with the communities of practitioners and scholars, more dialog is needed. The variety of points of views could be increased by adding more cases and different types of cases, and adding the number of interviewees and adding interviewees with different perspectives. The data may not give a full picture of the companies studied as it was collected from specific company representatives and therefore reflects their personal views. The company representatives studied were mostly either high executives or held managerial positions in areas such as service development, sales and marketing in the supplier companies; and sourcing and production management in the customer companies. In other words, the view is that of high and middle management, not that of the operative service personnel or customers' operative personnel. However, the managers were very knowledgeable of the topic and they were able to provide a highly strategic view on customer orientation. Most supplier companies studied provided their services globally and their important customers and markets were international. Also the customer companies studied

were very international and often developed services of their own for international markets. Some interviews were conducted in Silicon Valley to get a different kind of international perspective. Yet, the data probably reflects the Nordic management culture and the perspective of Finnish industrial B2B companies.

### 6.4.2 Suggestions for future research

Industry is facing a major transformation and the complexity of innovation in the new situation presents a challenge for management and policy calling for research. In line with the conducted research that emphasizes a new approach on innovation, the new approach should be developed further in close collaboration with industry practitioners, research organizations and policy makers. The need for an action oriented and interpretive research approach is highlighted since the industry and the wider society are going through such a rapid change. The effort needed for learning the new joint practices for systemic and human centered industrial service innovation is substantial since the development of such joint practices is a systemic innovation itself. However, the potential rewards from the effort seem significant.

Based on this dissertation four generic research questions in the context of industrial service innovation can be recognized and certain more specific research topics within them. The first two generic questions relate to the overlapping phases of joint innovation discussed in the managerial implications: joint ideation and evaluation of innovation possibilities and their joint implementation. The third generic question relates to the challenges of evaluating industrial service innovation performance as value is contextual and experienced differently by different parties. The fourth generic question relates to the nature of the service economy as a learning economy and how to enhance the joint learning needed for systemic industrial service innovation. Management of systemic service innovation in the transformation of industry requires the alignment of innovation practices at all levels of the innovation system and in all phases of innovation. The generic questions presented here are broad and intertwined as the idea is to develop through them the interlinked joint practices for the new approach on innovation that is needed in the successful transformation of industry.

First it is suggested that more research is conducted around the issue of *how to identify the most critical targets for joint industrial service development and align the development efforts of multiple parties around them*. Without such ability industrial companies easily direct their development efforts in incompatible ways and the systems level performance benefits are not reached. Without the joint scale of mutual goals and mutual implementation, their inventions might not attain enough support from other actors in the global ecosystemic competition arena. In particular it is suggested that companies need capabilities for recognizing joint service business opportunities in the industrial transition and for building platform strategies that aid the development of strong ecosystems. Also, it would be interesting to study the ways that policy can be utilized for supporting companies in their efforts to do this.

Second it is suggested that more research is conducted around the issue of *how to experiment and implement jointly large systemic industrial service innovations*. The impacts of industrial service innovations are often understood only after implementation and this phenomenon is highlighted in the context of large systemic innovations. Companies need capabilities for joint experimentation and development throughout the innovation process but also at the edge of implementation. This is particularly important in large joint development projects where the stakes are high and the interdependencies affecting the total performance are complex. Also it would be interesting to study the possibility for supporting such joint experimentation and implementation efforts through innovation platforms.

Third it is suggested that more research is conducted around the issue of *how to evaluate the systemic performance of industrial service innovation*. It is very difficult to assess the performance of industrial service innovations even after implementation due to the contextual nature of their value. New evaluation methods could be developed based on the view of this dissertation that value is experienced differently by the different actors in nested human systems of value co-creation and related to the suggestion in the managerial implications that performance targets should be seen as a matter of negotiation between different stakeholders. Further, based on the results of this dissertation, the evaluation method would need to take into account that there are multiple aspects to value and that positive and negative value can emerge simultaneously. Such methods could help both companies and policy makers in negotiating joint aims of development efforts and in assessing afterwards whether the aims were met.

Fourth it is suggested that more research is conducted around the issue of *how to enhance joint generative activity in systemic industrial service innovation with the aid of technology*. The empirical studies revealed that there is great potential for supporting the new approach on innovation with the aid of technology. Development of such technology could be based e.g. on the idea of evaluation of systemic performance presented in the third generic research question and the technology could be utilized as suggested in the interviews in the context of the overlapping phases of joint ideation, evaluation and implementation related to the first and second generic research questions.

# References


Abernathy, W.J. & Clark, K.B., 1985. Innovation: mapping the winds of creative destruction. *Research Policy*, 14(1), pp.3–22.

Adner, R., Oxley, J.E. & Silverman, B.S., 2013. Introduction: collaboration and competition in business ecosystems. In R. Adner, J. E. Oxley, & B. S. Silverman, eds. *Collaboration and competition in business ecosystems. Advances in Strategic Management, Volume 30*. Bingley, UK: Emerald, pp. ix–xviii.

Agarwal, S., Erramilli, M.K. & Dev, C.S., 2003. Market orientation and performance in service firms: role of innovation. *Journal of Services Marketing*, 17(1), pp.68–82.

Ahrweiler, P., 2010. Innovation in complex social systems: an introduction. In P. Ahrweiler, ed. *Innovation in complex social systems*. New York, NY: Routledge, pp. 1–25.

Akaka, M.A. & Vargo, S.L., 2014. Technology as an operant resource in service (eco)systems. *Information Systems and e-Business Management*, 12(3), pp.367–384.

Akaka, M.A., Vargo, S.L. & Lusch, R.F., 2012. An exploration of networks in value cocreation: a service-ecosystems view. In S. L. Vargo & R. F. Lusch, eds. *Special issue - Toward a better understanding of the role of value in markets and marketing. Review of Marketing Research, Volume 9*. Emerald Group Publishing Limited, pp. 13–50.

Akaka, M.A., Vargo, S.L. & Lusch, R.F., 2013. The complexity of context: a service ecosystems approach for international marketing. *Journal of International Marketing*, 21(4), pp.1–20.

Alam, I., 2002. An exploratory investigation of user involvement in new service development. *Journal of the Academy of Marketing Science*, 30(3), pp.250–261.

Alam, I., 2006. Removing the fuzziness from the fuzzy front-end of service innovations through customer interactions. *Industrial Marketing Management*, 35(4), pp.468–480.

Alam, I. & Perry, C., 2002. A customer-oriented new service development process. *Journal of Services Marketing*, 16(6), pp.515–534.

Alderfer, C.P., 1969. An empirical test of a new theory of human needs. *Organizational Behavior and Human Performance*, 4(2), pp.142–175.

Alvesson, M. & Sköldberg, K., 2009. *Reflexive methodology: new vistas for qualitative research* 2nd ed., London, UK: Sage Publications.

Anderson, E.W., Fornell, C. & Rust, R.T., 1997. Customer satisfaction, productivity, and profitability: differences between goods and services. *Marketing Science*, 16(2), pp.129–145.

Anderson, J.C. & Narus, J.A., 1995. Capturing the value of supplementary services. *Harvard Business Review*, 73(1), pp.75–83.

Anderson, J.C. & Narus, J.A., 1991. Partnering as a focused market strategy. *California Management Review*, 33(3), pp.95–113.

Ansoff, H.I., 1965. *Corporate strategy: an analytic approach to business policy for growth and expansion*, New York, NY: McGraw-Hill.

Appiah-Adu, K., 1998. Market orientation and performance: empirical tests in a transition economy. *Journal of Strategic Marketing*, 6(1), pp.25–45.

Arnold, E., 2004. Evaluating research and innovation policy: a systems world needs

systems evaluations. *Research Evaluation*, 13(1), pp.3–17.
Arthur, W.B., 1989. Competing technologies, increasing returns, and lock-in by historical events. *The Economic Journal*, 99(394), pp.116–131.
Arthur, W.B., 1996. Increasing returns and the new world of business. *Harvard Business Review*, 74(4), pp.100–109.
Arthur, W.B., 1990. Positive feedbacks in the economy. *Scientific American*, 262(2), pp.92–99.
Atuahene-Gima, K., 1995. An exploratory analysis of the impact of market orientation on new product performance: a contingency approach. *Journal of Product Innovation Management*, 12(4), pp.275–293.
Atuahene-Gima, K., 1996. Market orientation and innovation. *Journal of Business Research*, 35(2), pp.93–103.
Atuahene-Gima, K., Slater, S.F. & Olson, E.M., 2005. The contingent value of responsive and proactive market orientations for new product program performance. *Journal of Product Innovation Management*, 22(6), pp.464–482.
Auguste, B.G., Harmon, E.P. & Pandit, V., 2006. The right service strategies for product companies. *The McKinsey Quarterly*, 1(1), pp.41–51.
Avlonitis, G.J. & Gounaris, S.P., 1997. Marketing orientation and company performance: industrial vs. consumer goods companies. *Industrial Marketing Management*, 26(5), pp.385–402.
Baines, T.S. et al., 2007. State-of-the-art in product-service systems. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 221(10), pp.1543–1552.
Baines, T.S., Lightfoot, H.W., Benedettini, O., et al., 2009. The servitization of manufacturing: A review of literature and reflection on future challenges. *Journal of Manufacturing Technology Management*, 20(5), pp.547–567.
Baines, T.S., Lightfoot, H.W., Peppard, J., et al., 2009. Towards an operations strategy for product-centric servitization. *International Journal of Operations & Production Management*, 29(5), pp.494–519.
Baker, W.E. & Sinkula, J.M., 2005. Market orientation and the new product paradox. *Journal of Product Innovation Management*, 22(6), pp.483–502.
Baker, W.E. & Sinkula, J.M., 1999. The synergistic effect of market orientation and learning orientation on organizational performance. *Journal of the Academy of Marketing Science*, 27(4), pp.411–427.
Baldwin, C., Hienerth, C. & von Hippel, E., 2006. How user innovations become commercial products: A theoretical investigation and case study. *Research Policy*, 35(9), pp.1291–1313.
Baldwin, C. & von Hippel, E., 2011. Modeling a paradigm shift: From producer innovation to user and open collaborative innovation. *Organization Science*, 22(6), pp.1399–1417.
Baldwin, R., 2006. *Globalisation: the great unbundling(s)*, Economic Council of Finland.
Baldwin, R.E. & Evenett, S.J., 2015. Value creation and trade in 21st century manufacturing. *Journal of Regional Science*, 55(1), pp.31–50.
Ballantyne, D., Christopher, M. & Payne, A., 2003. Relationship marketing: looking back, looking forward. *Marketing Theory*, 3(1), pp.159–166.
Barcet, A., 2010. Innovation in services: a new paradigm and innovation model. In F. Gallouj & F. Djellal, eds. *The handbook of innovation and services: a multi-disciplinary perspective*. Cheltenham, UK: Edward Elgar.
Barczak, G., Griffin, A. & Kahn, K.B., 2009. Perspective: Trends and drivers of success in NPD practices: Results of the 2003 PDMA best practices study. *Journal of Product Innovation Management*, 26(1), pp.3–23.
Barney, J., 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), pp.99–120.
Barras, R., 1986. Towards a theory of innovation in services. *Research Policy*, 15(4), pp.161–173.
Bartels, R., 1974. The identity crisis in marketing. *Journal of Marketing*, 38(4), pp.73–76.
Bass, F.M., 1969. A new product growth for model consumer durables. *Management Science*, 15(5), pp.215–227.

Bennett, R.C. & Cooper, R.G., 1979. Beyond the marketing concept. *Business Horizons*, 22(3), pp.76–83.
Bennett, R.C. & Cooper, R.G., 1981. The misuse of marketing: An American tragedy. *Business Horizons*, 24(6), pp.51–61.
Berger, P. & Luckmann, T., 1966. *Social construction of reality: treatise in the sociology of knowledge*, New York, NY: Penguin Books.
Berry, L., 1983. Relationship marketing. In L. L. Berry, G. L. Shostack, & G. D. Upah, eds. *Emerging perspectives of services marketing*. Chicago, IL: American Marketing Association, pp. 25–28.
Berthon, P., Hulbert, J. Mac & Pitt, L., 2004. Innovation or customer orientation? An empirical investigation. *European Journal of Marketing*, 38(9/10), pp.1065–1090.
Berthon, P., Hulbert, J.M. & Pitt, L.F., 1999. To serve or create? Strategic orientations toward customers and innovation. *California Management Review*, 42(1), pp.37–58.
Bessant, J. & Tidd, J., 2007. *Innovation and entrepreneurship*, West Sussex, England: John Wiley.
Bettencourt, L.A., Brown, S.W. & Sirianni, N.J., 2013. The secret to true service innovation. *Business Horizons*, 56(1), pp.13–22.
Bhaskar, R., 1975. *A realist theory of science*, Leeds, UK: Leeds Books.
Bhaskar, R., 1979. *The possibility of naturalism: a philosophical critique of the contemporary human sciences*, Brighton: Harvester Press.
Biege, S. et al., 2013. Challenges of measuring service productivity in innovative, knowledge-intensive business services. *Service Industries Journal*, 33(3-4), pp.378–391.
Bowen, D.E., Siehl, C. & Schneider, B., 1989. A framework for analyzing customer service orientations in manufacturing. *Academy of Management Review*, 14(1), pp.75–95.
Bower, J.L. & Christensen, C.M., 1995. Disruptive technologies: Catching the wave. *Harvard Business Review*, 73(1), pp.43–53.
Brady, T., Davies, A. & Gann, D., 2005. Can integrated solutions business models work in construction? *Building Research & Information*, 33(6), pp.571–579.
Brady, T., Davies, A. & Gann, D.M., 2005. Creating value by delivering integrated solutions. *International Journal of Project Management*, 23(5), pp.360–365.
Braungart, M. & Engelfried, J., 1993. The intelligent product system (IPS). *Bulletin EPEA*.
Brax, S., 2005. A manufacturer becoming service provider – challenges and a paradox. *Managing Service Quality*, 15(2), pp.142–155.
Brown, P.A., 2008. A review of the literature on case study research. *Canadian Journal for New Scholars in Education*, 1(1).
Brown, S., 1995. Life begins at 40? Further thoughts on marketing's "mid-life crisis." *Marketing Intelligence & Planning*, 13(1), pp.4–17.
Brynjolfsson, E. & Mcafee, A., 2014. *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*, New York, NY: W. W. Norton & Company.
Van den Bulte, C. & Joshi, Y. V, 2007. New product diffusion with influentials and imitators. *Marketing Science*, 26(3), pp.400–421.
Burns, T.E. & Stalker, G.M., 1994. *The management of innovation* rev. ed., New York, NY: Oxford University Press.
Bush, V., 1945. *Science the endless frontier*, North Stratford, NH: Ayer Co.
Bushe, G.R., 2007. Appreciative inquiry is not (just) about the positive. *OD Practitioner*, 39(4), pp.30–35.
Butter, M. et al., 2015. *Assessing support of pilot production in multi-KETs activities: D7 Final report of the multi-KETs Pilot lines project, including the tentative policy roadmap*, Available at: http://www.mkpl.eu/results/final-results/ [Accessed February 10, 2016].
Calantone, R.J., Cavusgil, S.T. & Zhao, Y., 2002. Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management*, 31(6), pp.515–524.
Campbell, A.J. & Cooper, R.G., 1999. Do customer partnerships improve new product

success rates? *Industrial Marketing Management*, 28(5), pp.507–519.
Cano, C.R., Carrillat, F.A. & Jaramillo, F., 2004. A meta-analysis of the relationship between market orientation and business performance: evidence from five continents. *International Journal of Research in Marketing*, 21(2), pp.179–200.
Carlborg, P., Kindström, D. & Kowalkowski, C., 2014. The evolution of service innovation research: a critical review and synthesis. *The Service Industries Journal*, 34(5), pp.373–398.
Carpenter, G.S., 2010. Creating customers and shaping the competitive game. In A. Tybout & B. J. Calder, eds. *Kellogg on marketing*. Hoboken, NJ: John Wiley & Sons.
Carr, N.G., 2003. IT doesn't matter. *Harvard Business Review*, 81(5), pp.41–49.
Carter, C.F. & Williams, B.R., 1957. *Industry and technical progress: factors governing the speed of application of science*, London, UK: Oxford University Press.
Carù, A. & Cova, B., 2015. Co-creating the collective service experience. *Journal of Service Management*, 26(2), pp.276–294.
Ceci, F. & Prencipe, A., 2008. Configuring capabilities for integrated solutions: Evidence from the IT sector. *Industry and Innovation*, 15(3), pp.277–296.
Chaganti, R. & Sambharya, R., 1987. Strategic orientation and characteristics of upper management. *Strategic Management Journal*, 8(4), pp.393–401.
Chandler, J.D. & Vargo, S.L., 2011. Contextualization and value-in-context: How context frames exchange. *Marketing Theory*, 11(1), pp.35–49.
Chang, Y.-C., Miles, I. & Hung, S.-C., 2014. Introduction to special issue: Managing technology-service convergence in Service Economy 3.0. *Technovation*, 34(9), pp.499–504.
Chesbrough, H., Vanhaverbeke, W. & West, J. eds., 2006. *Open innovation: researching a new paradigm*, Oxford, UK: Oxford University Press.
Chesbrough, H.W. et al., 2011. Open innovation and public policy in Europe. *A Research Report commissioned by ESADE Business School & the Science Business Innovation Board AISBL*, pp.1–36.
Chesbrough, H.W., 2006. Open innovation: a new paradigm for understanding industrial innovation. In H. Chesbrough, W. Vanhaverbeke, & J. West, eds. *Open innovation: researching a new paradigm*. Oxford, UK: Oxford University Press, pp. 1–12.
Chesbrough, H.W., 2003. *Open innovation: the new imperative for creating and profiting from technology*, Boston, MA: Harvard Business School Press.
Chesbrough, H.W., 2011. The case for open services innovation: the commodity trap. *California Management Review*, 53(3), pp.5–20.
Chesbrough, H.W. & Bogers, M., 2014. Explicating open innovation: Clarifying an emerging paradigm for understanding innovation. In H. W. Chesbrough, W. Vanhaverbeke, & J. West, eds. *New frontiers in open innovation*. Oxford: Oxford University Press, pp. 3–28.
Chesbrough, H.W. & Rosenbloom, R.S., 2002. The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*, 11(3), pp.529–555.
Christensen, C.M., 1997. *The innovator's dilemma*, Boston, MA: Harvard Business School Press.
Christensen, C.M. & Bower, J.L., 1996. Customer power, strategic investment, and the failure of leading firms. *Strategic Management Journal*, 17(3), pp.197–218.
Christensen, C.M. & Raynor, M.E., 2003. *The innovator's solution: creating and sustaining successful growth*, Boston, MA: Harvard Business School Press.
Clark, J., Freeman, C. & Soete, L., 1981. Long waves, inventions, and innovations. *Futures*, 13(3), pp.308–322.
Coghlan, D., 2000. Interlevel dynamics in clinical inquiry. *Journal of Organizational Change Management*, 13(2), pp.190–200.
Coghlan, D., 2009. Toward a philosophy of clinical inquiry/research. *The Journal of Applied Behavioral Science*, 45(1), pp.106–121.
Cohen, W.M. & Levinthal, D.A., 1990. Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), pp.128–152.
COM, 2009. *Internet of Things. An action plan for Europe*, Brussels, Belgium:

Commission of the European Communities.
Coombs, R. & Miles, I., 2000. Innovation, measurement and services: the new problematique. In J. S. Metcalfe & I. Miles, eds. *Innovation systems in the service economy*. Boston, MA: Springer US, pp. 85–103.
Coombs, R., Saviotti, P. & Walsh, V., 1987. *Economics and technological change*, Totowa, NJ: Rowman & Littlefield.
Cooper, R.G., 1980. Project NewProd: Factors in new product success. *European Journal of Marketing*, 14(5/6), pp.277–292.
Cooper, R.G. & Edgett, S.J., 1996. Critical success factors for new financial services. *Marketing Management*, 5(3), pp.26–37.
Cooper, R.G. & Kleinschmidt, E.J., 1986. An investigation into the new product process: Steps, deficiencies, and impact. *Journal of Product Innovation Management*, 3(2), pp.71–85.
Crawford, C.M., 1977. Marketing research and the new product failure rate. *Journal of Marketing*, 41(2), pp.51–61.
Cronbach, L.J., 1975. Beyond the two disciplines of scientific psychology. *American Psychologist*, 30(2), pp.116–127.
Davidson, R. & Büchel, B., 2011. The art of piloting new initiatives. *MIT Sloan Management Review*, 53(1), pp.79–86.
Davies, A., 2004. Moving base into high-value integrated solutions: a value stream approach. *Industrial and Corporate Change*, 13(5), pp.727–756.
Davies, A. & Brady, T., 2000. Organisational capabilities and learning in complex product systems: towards repeatable solutions. *Research Policy*, 29(7-8), pp.931–953.
Day, G.S., 1999a. Creating a market-driven organization. *Sloan Management Review*, 41(1), pp.11–22.
Day, G.S., 1990. *Market-driven strategy: processes for creating value*, New York, NY: The Free Press.
Day, G.S., 1999b. Misconceptions about market orientation. *Journal of Market-Focused Management*, 4(1), pp.5–16.
Day, G.S., 1994. The capabilities of market-driven organizations. *Journal of Marketing*, 58(4), pp.37–52.
Deci, E.L. & Ryan, R.M., 1985. *Intrinsic motivation and self-determination in human behavior*, New York, NY: Plenum.
Deci, E.L. & Ryan, R.M., 2000. The "What" and "Why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), pp.227–268.
Deeds, D.L. & Hill, C.W.L., 1996. Strategic alliances and the rate of new product development: An empirical study of entrepreneurial biotechnology firms. *Journal of Business Venturing*, 11(1), pp.41–55.
Delaunay, J.-C. & Gadrey, J., 1987. *Les enjeux de la société de service*, Paris, France: Presses de la Fondation Nationale des Sciences Politiques.
Denzin, N.K., 1989. *Interpretive interactionism. Applied social research methods series, Vol. 16.*, London, UK: SAGE.
Denzin, N.K., 1970. *The research act*, Chicago, IL: Aldine.
Denzin, N.K., 1978. *The research act* 2nd ed., New York, NY: McGraw-Hill.
Denzin, N.K., 2012. Triangulation 2.0. *Journal of Mixed Methods Research*, 6(2), pp.80–88.
Deshpandé, R. & Farley, J.U., 1998. Measuring market orientation: generalization and synthesis. *Journal of Market Focused Management*, 2(3), pp.213–232.
Deshpandé, R., Farley, J.U. & Webster Jr, F.E., 1993. Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis. *Journal of Marketing*, 57(1), pp.23–37.
Desouza, K.C. et al., 2008. Customer-driven innovation. *Research Technology Management*, 51(3), pp.35–44.
Djellal, F., 2002. Innovation trajectories and employment in the cleaning industry. *New Technology, Work and Employment*, 17(2), pp.119–131.
Djellal, F., 2000. The rise of information technologies in "non-informational" services. *Vierteljahrshefte zur Wirtschaftsforschung*, 69(4), pp.646–656.
Djellal, F. & Gallouj, F., 2010. The innovation gap and the performance gap in the

service economies: a problem for public policy. In *The handbook of innovation and services: a multi-disciplinary perspective*. Cheltenham, UK: Edward Elgar, pp. 653–673.
Djellal, F. & Gallouj, F., 2013. The productivity challenge in services: measurement and strategic perspectives. *Service Industries Journal*, 33(3-4), pp.1–18.
Dosi, G., 1982. Technological paradigms and technological trajectories: A suggested interpretation of the determinants and directions of technical change. *Research Policy*, 11(3), pp.147–162.
Dosi, G., 1988. The nature of the innovation process. In G. Dosi et al., eds. *Technical change and economic theory*. London, UK: Pinter Publishers, pp. 221–238.
Doyal, L. & Gough, I., 1991. *A theory of human need*, London, UK: The Macmillan Press Ltd.
Drejer, I., 2004. Identifying innovation in surveys of services: a Schumpeterian perspective. *Research Policy*, 33(3), pp.551–562.
Droege, H., Hildebrand, D. & Heras Forcada, M.A., 2009. Innovation in services: present findings, and future pathways. *Journal of Service Management*, 20(2), pp.131–155.
Drucker, P.F., 1974. *Management: tasks, responsibilities, practices*, New York, NY: Harper & Row Publishers Inc.
Drucker, P.F., 1954. *The practice of management*, New York, NY: Harper & Row Publishers Inc.
Dubois, A. & Araujo, L., 2007. Case research in purchasing and supply management: Opportunities and challenges. *Journal of Purchasing and Supply Management*, 13(3), pp.170–181.
Dubois, A. & Gadde, L.-E., 2002. Systematic combining: an abductive approach to case research. *Journal of Business Research*, 55(7), pp.553–560.
Dubois, A. & Gadde, L.-E., 2014. "Systematic combining"—A decade later. *Journal of Business Research*, 67(6), pp.1277–1284.
Dubois, A. & Gibbert, M., 2010. From complexity to transparency: managing the interplay between theory, method and empirical phenomena in IMM case studies. *Industrial Marketing Management*, 39(1), pp.129–136.
Easton, G., 1995. Case research as a methodology for industrial networks: a realist apologia. *Proceedings of the 11th IMP Conference, Manchester*, pp.368–391.
Easton, G., 2010. Critical realism in case study research. *Industrial Marketing Management*, 39(1), pp.118–128.
Edvardsson, B. et al., 2012. Customer integration within service development - A review of methods and an analysis of insitu and exsitu contributions. *Technovation*, 32(7-8), pp.419–429.
Edvardsson, B. et al., 2000. *New service development and innovation in the new economy*, Lund, Sweden: Studentlitteratur.
Edvardsson, B., 1997. Quality in new service development: Key concepts and a frame of reference. *International Journal of Production Economics*, 52(1-2), pp.31–46.
Edvardsson, B., 1988. Service quality in customer relationships: a study of critical incidents in mechanical engineering companies. *Service Industries Journal*, 8(4), pp.427–445.
Edvardsson, B., 2005. Service quality: beyond cognitive assessment. *Managing Service Quality*, 15(2), pp.127–131.
Edvardsson, B., 2014. Service-dominant logic and service science as lenses for service productivity. In J. Bessant, C. Lehmann, & K. M. Möslein, eds. *Driving service productivity: value-creation through innovation*. London, UK: Springer, pp. 73–91.
Edvardsson, B. & Gustafsson, A., 1999. *The Nordic school of quality management*, Lund, Sweden: Studentlitteratur.
Edvardsson, B., Gustafsson, A. & Enquist, B., 2007. Success factors in new service development and value creation through services. In D. Spath & K.-P. Fähnrich, eds. *Advances in services innovations*. Berlin, Germany, pp. 165–183.
Edvardsson, B., Gustafsson, A. & Roos, I., 2005. Service portraits in service research: a critical review. *International Journal of Service Industry Management*, 16(1), pp.107–121.
Edvardsson, B. & Olsson, J., 1996. Key concepts for new service development. *Service*

*Industries Journal*, 16(2), pp.140–164.
Edvardsson, B. & Tronvoll, B., 2013. A new conceptualization of service innovation grounded in S-D logic and service systems. *International Journal of Quality and Service Sciences*, 5(1), pp.19–31.
Edvardsson, B., Tronvoll, B. & Gruber, T., 2011. Expanding understanding of service exchange and value co-creation: a social construction approach. *Journal of the Academy of Marketing Science*, 39(2), pp.327–339.
Eiglier, P. & Langeard, E., 1976. Principes de politique marketing pour les entreprises de services. *Working paper of the Institute d'Administration des Enterprises Université d'Aix-Marseille*.
Eisen, S., 1995. Redesigning human and global systems: A conceptual and strategic framework. *Academy of Management and Case-Western Reserve University Joint Divisional Conference on the Organizational Dimensions of Global Change, Cleveland, Ohio, May 1995*.
Eisenhardt, K.M., 1989. Building theories from case study research. *Academy of Management Review*, 14(4), pp.532–550.
Eisenhardt, K.M. & Graebner, M.E., 2007. Theory building from cases: opportunities and challenges. *Academy of Management Journal*, 50(1), pp.25–32.
Eisenmann, T.R., Parker, G. & Van Alstyne, M.W., 2006. Strategies for two-sided markets. *Harvard Business Review*, 84(10), pp.92–101.
Ellingson, L.L., 2009. *Engaging crystallization in qualitative research: An introduction*, Thousand Oaks, CA: Sage Publications.
Enos, J.L., 1962. *Petroleum progress and profits: a history of process innovation*, Cambridge, MA: MIT Press.
Enquist, B., Edvardsson, B. & Sebhatu, S.P., 2007. Values-based service quality for sustainable business. *Managing Service Quality*, 17(4), pp.385–403.
Eskola, J. & Suoranta, J., 1998. *Johdatus laadulliseen tutkimukseen*, Tampere, Finland: Vastapaino.
Ettlie, J.E. & Rosenthal, S.R., 2012. Service innovation in manufacturing. *Journal of Service Management*, 23(3), pp.440–454.
Evanschitzky, H., Wangenheim, F. V. & Woisetschläger, D.M., 2011. Service & solution innovation: Overview and research agenda. *Industrial Marketing Management*, 40(5), pp.657–660.
Fischer, T., Gebauer, H. & Fleisch, E., 2012. *Service business development: strategies for value creation in manufacturing firms*, Cambridge, UK: Cambridge University Press.
Fisk, R.P., Brown, S.W. & Bitner, M.J., 1993. Tracking the evolution of the services marketing literature. *Journal of Retailing*, 69(1), pp.61–103.
Flint, D.J. & Mentzer, J.T., 2006. Striving for integrated value chain management given a service-dominant logic for marketing. In R. F. Lusch & S. L. Vargo, eds. *The service-dominant logic of marketing: Dialog, debate, and directions*. New York, NY: Routledge, pp. 139–149.
Flyvbjerg, B., 2006. Five misunderstandings about case-study research. *Qualitative Inquiry*, 12(2), pp.219–245.
Foresight, 2013. *The future of manufacturing: A new era of opportunity and challenge for the UK. Summary Report*, London, UK: The Government Office for Science.
Franke, N. & von Hippel, E., 2003. Satisfying heterogeneous user needs via innovation toolkits: The case of Apache security software. *Research Policy*, 32(7), pp.1199–1215.
Franke, N., Keinz, P. & Klausberger, K., 2013. "Does this sound like a fair deal?": Antecedents and consequences of fairness expectations in the individual's decision to participate in firm innovation. *Organization Science*, 24(5), pp.1495–1516.
Franke, N. & Piller, F., 2004. Value creation by toolkits for user innovation and design: The case of the watch market. *Journal of Product Innovation Management*, 21(6), pp.401–415.
Franke, N. & Shah, S., 2003. How communities support innovative activities: An exploration of assistance and sharing among end-users. *Research Policy*, 32(1), pp.157–178.

Fredrickson, B.L., 2003. Positive emotions and upward spirals in organizations. In K. S. Cameron, J. E. Dutton, & R. E. Quinn, eds. *Positive organizational scholarship*. San Francisco, CA: Berret-Koehler, pp. 163–175.
Fredrickson, B.L., 1998. What good are positive emotions? *Review of General Psychology*, 2(3), pp.300–319.
Fredrickson, B.L. & Joiner, T., 2002. Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, 13(2), pp.172–175.
Freeman, C. et al., 1968. Chemical process plant: innovation and the world market. *National Institute Economic Review*, (45), pp.29–57.
Freeman, C., 1979. The determinants of innovation: Market demand, technology, and the response to social problems. *Futures*, 11(3), pp.206–215.
Freeman, C., 1982. *The economics of industrial innovation* 2nd ed., Cambridge, MA: MIT Press.
Freeman, C., 1996. The greening of technology and models of innovation. *Technological Forecasting and Social Change*, 53(1), pp.27–39.
Freeman, C., 1983. *The long wave and the world economy*, Boston, MA: Butterworths.
Freeman, C., Clark, J. & Soete, L., 1982. *Unemployment and technical innovation: a study of long waves and economic development*, Westport, CT: Greenwood Press.
Freeman, C. & Perez, C., 1988. Structural crises of adjustment, business cycles and investment behaviour. In G. Dosi et al., eds. *Technical change and economic theory*. London, UK: Pinter, pp. 38–66.
Frey, C.B. & Osborne, M.A., 2013. *The future of employment: how susceptible are jobs to computerisation?*, Oxford, UK: Oxford Martin School, University of Oxford.
Fritz, W., 1996. Market orientation and corporate success: findings from Germany. *European Journal of Marketing*, 30(8), pp.59–74.
Fuchs, V.R., 1965. The growing importance of the service industries. *Journal of Business*, 38(4), pp.344–373.
Gadrey, J., 1992. *L'économie des service*, Paris, France: La Découverte.
Gadrey, J., 2000. The characterization of goods and services: an alternative approach. *Review of Income and Wealth*, 46(3), pp.369–387.
Gallouj, C. & Gallouj, F., 1996. *L'innovation dans les services*, Paris, France: Economica.
Gallouj, F., 1994. *Economie de l'innovation dans les services*, Paris, France: Editions L'Harmattan, Logiques économiques.
Gallouj, F., 1998. Innovating in reverse: services and the reverse product cycle. *European Journal of Innovation Management*, 1(3), pp.123–138.
Gallouj, F., 2002a. Innovation in services and the attendant old and new myths. *Journal of Socio-Economics*, 31(2), pp.137–154.
Gallouj, F., 2002b. *Innovation in the service economy: the new wealth of nations*, Cheltenham, UK: Edward Elgar.
Gallouj, F., 2002c. Knowledge-intensive business services: processing knowledge and producing innovation. In J. Gadrey & F. Gallouj, eds. *Productivity, innovation and knowledge in services: new economic and socio-economic approaches*. Cheltenham, UK: Edward Elgar.
Gallouj, F., 2010. Services innovation: assimilation, differentiation, inversion and integration. In H. Bidgoli, ed. *The handbook of technology management*. Hoboken, NJ: John Wiley & Sons, pp. 989–1000.
Gallouj, F. & Savona, M., 2009. Innovation in services: a review of the debate and a research agenda. *Journal of Evolutionary Economics*, 19(2), pp.149–172.
Gallouj, F. & Savona, M., 2010. Towards a theory of innovation in services: a state of the art. In F. Gallouj & F. Djellal, eds. *The handbook of innovation and services: a multi-disciplinary perspective*. Cheltenham, UK: Edward Elgar, pp. 27–48.
Gallouj, F. & Toivonen, M., 2011. Elaborating the characteristics-based approach to service innovation: making the service process visible. *Journal of Innovation Economics*, 8(2), pp.33–58.
Gallouj, F. & Weinstein, O., 1997. Innovation in services. *Research Policy*, 26(4), pp.537–556.
Gallouj, F. & Windrum, P., 2009. Services and services innovation. *Journal of Evolutionary Economics*, 19(2), pp.141–148.

Gassmann, O., Enkel, E. & Chesbrough, H.W., 2010. The future of open innovation. *R&D Management*, 40(3), pp.213–221.
Gatignon, H. & Robertson, T.S., 1985. A propositional inventory for new diffusion research. *Journal of Consumer Research*, 11(4), pp.849–867.
Gatignon, H. & Xuereb, J.-M., 1997. Strategic orientation of the firm and new product performance. *Journal of Marketing Research*, 34(1), pp.77–90.
Gawer, A. & Cusumano, M.A., 2008. How companies become platform leaders. *MIT Sloan Management Review*, 49(2), pp.28–35.
Gawer, A. & Cusumano, M.A., 2002. *Platform leadership:How Intel, Microsoft, and Cisco drive industry innovation*, Boston, MA: Harvard Business School Press.
Gebauer, H., Edvardsson, B., Gustafsson, A., et al., 2010. Match or mismatch: strategy-structure configurations in the service business of manufacturing companies. *Journal of Service Research*, 13(2), pp.198–215.
Gebauer, H., Edvardsson, B. & Bjurko, M., 2010. The impact of service orientation in corporate culture on business performance in manufacturing companies. *Journal of Service Management*, 21(2), pp.237–259.
Gebauer, H. & Fleisch, E., 2007. An investigation of the relationship between behavioral processes, motivation, investments in the service business and service revenue. *Industrial Marketing Management*, 36(3), pp.337–348.
Gebauer, H., Fleisch, E. & Friedli, T., 2005. Overcoming the service paradox in manufacturing companies. *European Management Journal*, 23(1), pp.14–26.
Gebauer, H. & Friedli, T., 2005. Behavioral implications of the transition process from products to services. *Journal of Business & Industrial Marketing*, 20(2), pp.70–78.
Gebauer, H., Friedli, T. & Fleisch, E., 2006. Success factors for achieving high service revenues in manufacturing companies. *Benchmarking: An International Journal*, 13(3), pp.374–386.
Gebauer, H., Gustafsson, A. & Witell, L., 2011. Competitive advantage through service differentiation by manufacturing companies. *Journal of Business Research*, 64(12), pp.1270–1280.
Geels, F.W., 2004. From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. *Research Policy*, 33(6-7), pp.897–920.
Geels, F.W., 2005. Processes and patterns in transitions and system innovations: Refining the co-evolutionary multi-level perspective. *Technological Forecasting and Social Change*, 72(6), pp.681–696.
Geels, F.W., 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy*, 31(8-9), pp.1257–1274.
Geertz, C., 1973. Thick description: toward an interpretive theory of culture. In C. Geertz, ed. *The interpretation of cultures: selected essays*. New York, NY: Basic Books, pp. 3–30.
Geroski, P.A., 2000. Models of technology diffusion. *Research Policy*, 29(4-5), pp.603–625.
Gershenfeld, N., Krikorian, R. & Cohen, D., 2004. The internet of things. *Scientific American*, 291(4), pp.76–81.
Giddens, A., 1984. *The constitution of society: outline of the theory of structuration*, Cambridge, UK: Polity.
Gilmore, J.H. & Pine II, J.B., 2002. Customer experience places: the new offering frontier. *Strategy & Leadership*, 30(4), pp.4–11.
Glaser, B.G. & Strauss, A.L., 1967. *The discovery of grounded theory: strategies for qualitative research*, New York, NY: Aldine.
Godin, B. & Lane, J.P., 2013. Pushes and pulls: Hi(S)tory of the demand pull model of innovation. *Science, Technology & Human Values*, 38(5), pp.621–654.
Goedkoop, M.J. et al., 1999. *Product service systems: ecological and economic basics. Report for the Dutch ministries of Environment (VROM) and Economic Affairs (EZ)*, Hague, The Netherlands: VROM.
Gold, J. et al., 2011. Theorising and practitioners in HRD: the role of abductive reasoning. *Journal of European Industrial Training*, 35(3), pp.230–246.
Goodman, P.S. et al., 1995. Customer-firm relationships, involvement, and customer

satisfaction. *Academy of Management Journal*, 38(5), pp.1310–1324.
Gounaris, S.P., Avlonitis, G.J. & Papastathopoulou, P., 2004. Managing a firm's behavior through market orientation development: some empirical findings. *European Journal of Marketing*, 38(11-12), pp.1481–1508.
Graebner, M.E., Martin, J.A. & Roundy, P.T., 2012. Qualitative data: Cooking without a recipe. *Strategic Organization*, 10(3), pp.276–284.
Greenley, G.E., 1995. Market orientation and company performance: Empirical evidence from UK companies. *British Journal of Management*, 6(1), pp.1–13.
Gruber, W.H. & Marquis, D.G., 1969. Research on the human factor in the transfer of technology. In W. H. Gruber & D. G. Marquis, eds. *Factors in the transfer of technology*. Cambridge, MA: MIT Press.
Gruner, K.E. & Homburg, C., 2000. Does customer interaction enhance new product success? *Journal of Business Research*, 49(1), pp.1–14.
Grönroos, C., 2011a. A service perspective on business relationships: The value creation, interaction and marketing interface. *Industrial Marketing Management*, 40(2), pp.240–247.
Grönroos, C., 2006a. Adopting a service logic for marketing. *Marketing Theory*, 6(3), pp.317–333.
Grönroos, C., 2007. *In search of a new logic for marketing: foundations of a contemporary theory*, Hoboken, NJ: John Wiley & Sons.
Grönroos, C., 1991. Scandinavian management and the Nordic School of Services - Contributions to service management and quality. *International Journal of Service Industry Management*, 2(3), pp.17–25.
Grönroos, C., 2000. *Service management and marketing: a customer relationship management approach* 2nd ed., Chichester, UK: John Wiley & Sons.
Grönroos, C., 1990. Service management: a management focus for service competition. *International Journal of Service Industry Management*, 1(1), pp.6–14.
Grönroos, C., 1983. *Strategic management and marketing in the service sector*, Cambridge, MA: Marketing Science Institute.
Grönroos, C., 2011b. Value co-creation in service logic: A critical analysis. *Marketing Theory*, 11(3), pp.279–301.
Grönroos, C., 2006b. What can a service logic offer marketing theory? In R. F. Lusch & S. L. Vargo, eds. *The service-dominant logic of marketing: dialog, debate, and directions*. Armonk, NY: M.E. Sharpe, pp. 354–364.
Grönroos, C. & Gummesson, E., 1985. The Nordic school of services - an introduction. In C. Grönroos & E. Gummesson, eds. *Service marketing - Nordic school perspectives. Series R:2*. Stockholm, Sweden: Stockholm University.
Grönroos, C. & Helle, P., 2010. Adopting a service logic in manufacturing: Conceptual foundation and metrics for mutual value creation. *Journal of Service Management*, 21(5), pp.564–590.
Guba, E.G., 1981. Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology Journal*, 29(2), pp.75–91.
Guba, E.G. & Lincoln, Y.S., 1994. Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln, eds. *Handbook of qualitative research*. Thousand Oaks, CA: Sage, pp. 105–117.
Guba, E.G. & Lincoln, Y.S., 1989. *Fourth generation evaluation*, Newbury Park, CA: Sage Publications.
Gulati, R. & Oldroyd, J.B., 2005. The quest for customer focus. *Harvard business review*, 83(4), pp.92–101.
Gummesson, E., 2011. 2B or not 2B: That is the question. *Industrial Marketing Management*, 40(2), pp.190–192.
Gummesson, E., 2003. All research is interpretive! *Journal of Business & Industrial Marketing*, 18(6/7), pp.482–492.
Gummesson, E., 2008a. Customer centricity: reality or a wild goose chase? *European Business Review*, 20(4), pp.315–330.
Gummesson, E., 2008b. Extending the service-dominant logic: from customer centricity to balanced centricity. *Journal of the Academy of Marketing Science*, 36(1), pp.15–17.
Gummesson, E., 2006. Many-to-many marketing as grand theory: a Nordic school

contribution. In R. F. Lusch & S. L. Vargo, eds. *The service-dominant logic of marketing: dialog, debate, and directions*. Armonk, NY: M.E. Sharpe, pp. 339–353.
Gummesson, E., 2000. *Qualitative methods in management research* 2nd ed., Thousand Oaks, CA: Sage Publications.
Gummesson, E., 1996. Relationship marketing and imaginary organizations: a synthesis. *European Journal of Marketing*, 30(2), pp.31–44.
Gummesson, E., 1987. The new marketing - Developing long-term interactive relationships. *Long Range Planning*, 20(4), pp.10–20.
Gummesson, E., 1999. Total relationship marketing: Experimenting with a synthesis of research frontiers. *Australasian Marketing Journal*, 7(1), pp.72–85.
Gummesson, E. & Grönroos, C., 2012. The emergence of the new service marketing: Nordic School perspectives. *Journal of Service Management*, 23(4), pp.479–497.
Gummesson, E., Kuusela, H. & Närvänen, E., 2014. Reinventing marketing strategy by recasting supplier/customer roles. *Journal of Service Management*, 25(2), pp.228–240.
Hadjikhani, A. & LaPlaca, P., 2013. Development of B2B marketing theory. *Industrial Marketing Management*, 42(3), pp.294–305.
Hagedoorn, J. & Duysters, G., 2002. External sources of innovative capabilities: The preference for strategic alliances or mergers and acquisitions. *Journal of Management Studies*, 39(2), pp.167–188.
Hagel III, J. et al., 2015. *The future of manufacturing: Making things in a changing world*, Deloitte University Press.
Hakala, H., 2011. Strategic orientations in management literature: Three approaches to understanding the interaction between market, technology, entrepreneurial and learning orientations. *International Journal of Management Reviews*, 13(2), pp.199–217.
Hales, M., 2001. *Birds were dinosaurs once - The diversity and evolution of research and technology organisations. A final report of RISE: RTOs in the service economy - Knowledge infrastructures, innovation intermediaries and institutional change*, Brighton, UK: University of Brighton, CENTRIM - The Centre for Research in Innovation Management.
Han, J.K., Kim, N. & Srivastava, R.K., 1998. Market orientation and organizational performance: is innovation a missing link? *Journal of Marketing*, 62(4), pp.30–45.
Harhoff, D., Henkel, J. & von Hippel, E., 2003. Profiting from voluntary information spillovers: how users benefit by freely revealing their innovations. *Research Policy*, 32(10), pp.1753–1769.
Harris, T., 2007. *Collaborative research and development projects*, Berlin, Germany: Springer-Verlag.
Heiens, R.A., 2000. Market orientation: Toward an integrated framework. *Academy of Marketing Science Review*, 1(1), pp.1–15.
Heinonen, K. et al., 2010. A customer-dominant logic of service. *Journal of Service Management*, 21(4), pp.531–548.
Heinonen, K., Strandvik, T. & Voima, P., 2013. Customer dominant value formation in service. *European Business Review*, 25(2), pp.104–123.
Helkkula, A., 2011. Characterising the concept of service experience. *Journal of Service Management*, 22(3), pp.367–389.
Helkkula, A. & Holopainen, M., 2011. Service innovation as an experience: differences between employee and user narratives. In J. Sundbo & M. Toivonen, eds. *User-based innovation in services*. Cheltenham, UK: Edward Elgar, pp. 281–302.
Helkkula, A., Kelleher, C. & Pihlström, M., 2012. Characterizing value as an experience: Implications for service researchers and managers. *Journal of Service Research*, 15(1), pp.59–75.
Henderson, R.M. & Clark, K.B., 1990. Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35(1), pp.9–30.
Hienerth, C., 2006. The commercialization of user innovations: The development of the rodeo kayak industry. *R&D Management*, 36(3), pp.273–294.
Hienerth, C. & Lettl, C., 2011. Exploring how peer communities enable lead user

innovations to become standard equipment in the industry: Community pull effects. *Journal of Product Innovation Management*, 28(1), pp.175–195.
Hill, T.P., 1977. On goods and services. *Review of Income and Wealth*, 23(4), pp.314–339.
Hinkin, T., Holtom, B.C. & Klag, M., 2007. Collaborative research: Developing mutually beneficial relationships between researchers and organizations. *Organizational Dynamics*, 36(1), pp.105–118.
von Hippel, E., 2005. *Democratizing innovation*, Cambridge, MA: MIT Press.
von Hippel, E., 1986. Lead users a source of novel product concepts. *Management Science*, 32(7), pp.791–805.
von Hippel, E., 2001. Perspective: User toolkits for innovation. *Journal of Product Innovation Management*, 18(4), pp.247–257.
von Hippel, E., 1994. "Sticky information" and the locus of problem solving: Implications for innovation. *Management Science*, 40(4), pp.429–439.
von Hippel, E., 1976. The dominant role of users in the scientific instrument innovation. *Research Policy*, 5(3), pp.212–239.
von Hippel, E., 1988. *The sources of innovation*, New York, NY: Oxford University Press.
Hjørland, B., 2005. Empiricism, rationalism and positivism in library and information science. *Journal of Documentation*, 61(1), pp.130–155.
Hobday, M., Davies, A. & Prencipe, A., 2005. Systems integration: a core capability of the modern corporation. *Industrial and Corporate Change*, 14(6), pp.1109–1143.
Holbrook, M.B., 1999. Introduction to consumer value. In M. B. Holbrook, ed. *Consumer value: a framework for analysis and research*. London, UK: Routledge, pp. 1–28.
Holbrook, M.B. & Hirschman, E.C., 1982. The experiential aspects of consumption: Consumer fantasies, feelings, and fun. *Journal of Consumer Research*, 9(2), pp.132–140.
Holbrook, M.B. & Hulbert, J.M., 2002. Elegy on the death of marketing: Never send to know why we have come to bury marketing but ask what you can do for your country churchyard. *European Journal of Marketing*, 36(5/6), pp.706–732.
Holmström, J., Brax, S. & Ala-Risku, T., 2010. Comparing provider-customer constellations of visibility-based service. *Journal of Service Management*, 21(5), pp.675–692.
Homburg, C., Hoyer, W.D. & Fassnacht, M., 2002. Service orientation of a retailer's business strategy: Dimensions, antecedents, and performance outcomes. *Journal of Marketing*, 66(4), pp.86–101.
Hooley, G. et al., 2000. Market orientation in the transition economies of Central Europe: Tests of the Narver and Slater market orientation scales. *Journal of Business Research*, 50(3), pp.273–285.
Hopkins, M.M. et al., 2011. Generative and degenerative interactions: Positive and negative dynamics of open, user-centric innovation in technology and engineering consultancies. *R&D Management*, 41(1), pp.44–60.
Howells, J. et al., 2004. *Innovation in services: Issues at Stake and trends. A report for the European Commission, INNO-studies 2001: Lot 3 (ENTR-C/2001)*, Brussels: Commission of the European Communities.
Howells, J., 1997. Rethinking the market-technology relationship for innovation. *Research Policy*, 25(8), pp.1209–1219.
Hsieh, K.N. & Tidd, J., 2012. Open versus closed new service development: The influences of project novelty. *Technovation*, 32(11), pp.600–608.
Hull, C.L., 1943. *Principles of behavior: An introduction to behavior theory*, New York, NY: Appleton-Century-Crofts, Inc.
Hyytinen, K. et al., 2014. A system dynamic and multi-criteria evaluation of innovations in environmental services. *Economics and Policy of Energy and the Environment*, (3), pp.29–52.
Håkansson, H. & Ford, D., 2002. How should companies interact in business networks? *Journal of Business Research*, 55(2), pp.133–139.
Håkansson, H. & Snehota, I., 2006. No business is an island: The network concept of business strategy. *Scandinavian Journal of Management*, 22(3), pp.256–270.
Iansiti, M. & Levien, R., 2004. *The keystone advantage: what the new dynamics of*

*business ecosystems mean for strategy, innovation, and sustainability*, Boston, MA: Harvard Business School Press.
ISIC, 2008. *International Standard Industrial Classification of All Economic Activities, Rev. 4*, New York, NY: United Nations, Department of Economic and Social Affairs. Available at: http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=27&Lg=1 [Accessed June 1, 2015].
Jacob, F. & Ulaga, W., 2008. The transition from product to service in business markets: An agenda for academic inquiry. *Industrial Marketing Management*, 37(3), pp.247–253.
Jaffe, A.B., Newell, R.G. & Stavins, R.N., 2005. A tale of two market failures: Technology and environmental policy. *Ecological Economics*, 54(2-3), pp.164–174.
Jaworski, B.J. & Kohli, A.K., 1993. Market orientation: Antecedents and consequences. *Journal of Marketing*, 57(3), pp.53–70.
Jaworski, B.J., Kohli, A.K. & Sahay, A., 2000. Market-driven versus driving markets. *Journal of the Academy of Marketing Science*, 28(1), pp.45–54.
Jeppesen, L.B. & Frederiksen, L., 2006. Why do users contribute to firm-hosted user communities? The case of computer-controlled music instruments. *Organization Science*, 17(1), pp.45–63.
Jick, T.D., 1979. Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24(4), pp.602–611.
Johnson, M.W., Christensen, C.M. & Kagermann, H., 2008. Reinventing your business model. *Harvard Business Review*, 86(12), pp.57–68.
Jones, M. & Samalionis, F., 2008. From small ideas to radical service innovation. *Design Management Review*, 19(1), pp.20–26.
de Jong, J.P.J. & Vermeulen, P.A.M., 2003. Organizing successful new service development: a literature review. *Management Decision*, 41(9), pp.844–858.
Järvenpää, E. & Immonen, S., 2011. ICT tools and transform in work: From computer supported work to knowledge work. In D. Haftor & A. Mirijamdotter, eds. *Information and communication technologies, society and human beings: Theory and framework*. Hershey, PA: IGI Global, pp. 209–224.
Järvensivu, T. & Törnroos, J.-Å., 2010. Case study research with moderate constructionism: Conceptualization and practical illustration. *Industrial Marketing Management*, 39(1), pp.100–108.
Kagermann, H., Wahlster, W. & Helbig, J., 2013. *Securing the future of German manufacturing industry: Recommendations for implementing the strategic initiative Industrie 4.0. Final report of the Industrie 4.0 Working Group*, Frankfurt, Germany: National Academy of Science and Engineering.
Kamien, M.I. & Schwartz, N.L., 1982. *Market structure and innovation*, Cambridge, UK: Cambridge University Press.
Kastalli, I.V., Van Looy, B. & Neely, A., 2013. Steering manufacturing firms towards service business model innovation. *California Management Review*, 56(1), pp.100–123.
Katz, M.L. & Shapiro, C., 1985. Network externalities, competition, and compatibility. *American Economic Review*, 75(3), pp.424–440.
Katz, M.L. & Shapiro, C., 1994. Systems competition and network effects. *Journal of Economic Perspectives*, 8(2), pp.93–115.
Kaulio, M.A., 1998. Customer, consumer and user involvement in product development: A framework and a review of selected methods. *Total Quality Management*, 9(1), pp.141–149.
Kavanagh, D., 1994. Hunt versus Anderson: Round 16. *European Journal of Marketing*, 28(3), pp.26–41.
Kenney, M. & Zysman, J., 2015. Choosing a future in the platform economy: the implications and consequences of digital platforms. *Kauffman Foundation New Entrepreneurial Growth Conference, June 2015, Amelia Island, Florida*.
Ketchen, D.J.J., Hult, T.M. & Slater, S.F., 2007. Toward greater understanding of market orientation and the resource-based view. *Strategic Management Journal*, 28, pp.961–964.
Kim, W.C. & Mauborgne, R., 2005. *Blue ocean strategy: how to create uncontested*

*market space and make the competition irrelevant*, Boston, MA: Harvard Business School Press.
Kim, W.C. & Mauborgne, R., 1997. Value innovation: the strategic logic of high growth. *Harvard Business Review*, 82(7-8), pp.172–180.
Kindström, D., 2010. Towards a service-based business model – Key aspects for future competitive advantage. *European Management Journal*, 28(6), pp.479–490.
Kindström, D. & Brege, S., 2008. The nexst step for e-business among mature and established companies: a focus on revenue and differentiation instead of costs. *International Journal of Electronic Business*, 6(5), pp.462–475.
Kindström, D. & Kowalkowski, C., 2009. Development of industrial service offerings: a process framework. *Journal of Service Management*, 20(2), pp.156–172.
Kirsilä, J., Hellström, M. & Wikström, K., 2007. Integration as a project management concept: A study of the commissioning process in industrial deliveries. *International Journal of Project Management*, 25(7), pp.714–721.
Kleinknecht, A. & Verspagen, B., 1990. Demand and innovation: Schmookler re-examined. *Research Policy*, 19, pp.387–394.
Kline, J. & Rosenberg, N., 1986. An overview of innovation. In R. Landau & N. Rosenberg, eds. *The positive sum strategy: Harnessing technology for economic growth*. Washington, DC: National Academic Press, pp. 275–305.
Koen, P. et al., 2002. Fuzzy front end: Effective methods, tools, and techniques. In P. Belliveau, A. Griffin, & S. Somermeyer, eds. *The PDMA toolbook for new product development*. New York, NY: John Wiley & Sons, pp. 5–35.
Koen, P. et al., 2001. Providing clarity and a common language to the "Fuzzy Front End." *Research-Technology Management*, 44(2), pp.46–55.
Kohli, A.K. & Jaworski, B.J., 1990. Market orientation: the construct, research propositions, and managerial implications. *The Journal of Marketing*, 54(2), pp.1–18.
Kohli, A.K., Jaworski, B.J. & Kumar, A., 1993. MARKOR: a measure of market orientation. *Journal of Marketing Research*, 30(4), pp.467–477.
Kok, R.A.W. & Biemans, W.G., 2009. Creating a market-oriented product innovation process: A contingency approach. *Technovation*, 29(8), pp.517–526.
Kok, R.A.W., Hillebrand, B. & Biemans, W.G., 2003. What makes product development market oriented? Towards a conceptual framework. *International Journal of Innovation Management*, 7(2), pp.137–162.
Kotler, P. & Keller, K.L., 2006. *Marketing management* 12th ed., Upper Saddle River, NJ: Pearson Education.
Koudal, P., 2006. *The service revolution in global manufacturing industries*, New York, NY.
Kowalkowski, C. et al., 2012. Service infusion as agile incrementalism in action. *Journal of Business Research*, 65(6), pp.765–772.
Kowalkowski, C. & Brehmer, P.-O., 2008. Technology as a driver for changing customer-provider interfaces. *Management Research News*, 31(10), pp.746–757.
Kowalkowski, C., Kindström, D. & Brehmer, P.-O., 2011. Managing industrial service offerings in global business markets. *Journal of Business & Industrial Marketing*, 26(3), pp.181–192.
Kowalkowski, C., Kindström, D. & Gebauer, H., 2013. ICT as a catalyst for service business orientation. *Journal of Business & Industrial Marketing*, 28(6), pp.506–513.
Kowalkowski, C., Witell, L. & Gustafsson, A., 2013. Any way goes: Identifying value constellations for service infusion in SMEs. *Industrial Marketing Management*, 42(1), pp.18–30.
Kox, H.L.M., 2002. *Growth challenges for the Dutch business services industry: International comparison and policy issues. No. 40*, The Hague, The Netherlands: CPB Netherlands Bureau for Economic Policy Analysis.
Kuhn, T.S., 1962. *The structure of scientific revolutions*, Chicago, IL: The University of Chicago Press.
Kumar, N., Scheer, L. & Kotler, P., 2000. From market driven to market driving. *European Management Journal*, 18(2), pp.129–142.
Kumar, V., Lemon, K.N. & Parasuraman, A., 2006. Managing customers for value: An overview and research agenda. *Journal of Service Research*, 9(2), pp.87–94.

Kvale, S., 1996. *InterViews: an introduction to qualitative research interviewing*, London, UK: Sage Publications.
Kvale, S., 1994. Ten standard objections to qualitative research interviews. *Journal of Phenomenological Psychology*, 25(2), pp.147–173.
Kvale, S., 1995. The social construction of validity. *Qualitative Inquiry*, 1(1), pp.19–40.
Kwan, K.-M. & Tsang, E.W.K., 2001. Realism and constructivism in strategy research: A critical realist response to Mir and Watson. *Strategic Management Journal*, 22(12), pp.1163–1168.
Lancaster, K.J., 1966. A new approach to consumer theory. *Journal of Political Economy*, 74(2), pp.132–157.
Lane, D. & Maxfield, R., 1996. Strategy under complexity: Fostering generative relationships. *Long Range Planning*, 29(2), pp.215–231.
Langeard, E. & Eiglier, P., 1987. *Servuction: Le marketing des services*, Paris, France: John Wiley & Sons.
Langerak, F., Hultink, E.J. & Robben, H.S.J., 2004. The impact of market orientation, product advantage, and launch proficiency on new product performance and organizational performance. *Journal of Product Innovation Management*, 21(2), pp.79–94.
Langrish, J. et al., 1972. *Wealth from knowledge: a study of innovation in industry*, London, UK: Palgrave Macmillan.
Lanz, R. & Maurer, A., 2015. Services and global value chains: Some evidence on servicification of manufactuing and services networks. *WTO Staff Working Paper, No. ERSD-2015-03*.
Laursen, K. & Salter, A., 2006. Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal*, 27(2), pp.131–150.
Lay, G., 2014. Servitization by sector and manufacturers' operational departments: lessons learned. In G. Lay, ed. *Servitization in industry*. New York, NY: Springer, pp. 333–349.
Lay, G. et al., 2010. The relevance of service in European manufacturing industries. *Journal of Service Management*, 21(5), pp.715–726.
Lee, Y.S., 1996. "Technology transfer" and the research university: a search for the boundaries of university-industry collaboration. *Research Policy*, 25, pp.843–863.
Levin-Rozalis, M., 2000. Abduction: a logical criterion for programme and project evaluation. *Evaluation*, 6(4), pp.415–432.
Levitt, T., 1981. Marketing intangible products and product intangibles. *Harvard Business Review*, 59(3), pp.94–102.
Levitt, T., 1960. Marketing myopia. *Harvard business review*, 38(4), pp.24–47.
Levitt, T., 1980. Marketing success through differentiation - of anything. *Harvard Business Review*, 58(1), pp.83–91.
Levitt, T., 1969. *The marketing mode: pathways to corporate growth*, New York, NY: McGraw-Hill.
Li, T. & Calantone, R.J., 1998. The impact of market knowledge competence on new product advantage: Conceptualization and empirical examination. *Journal of Marketing*, 62(4), pp.13–29.
Li, T., Nicholls, J.A.F. & Roslow, S., 1999. The relationships between market-driven learning and new product success in export markets. *International Marketing Review*, 16(6), pp.476–503.
Lilien, G.L. et al., 2002. Performance assessment of the lead user idea-generation process for new product development. *Management Science*, 48(8), pp.1042–1059.
Liljander, V. & Strandvik, T., 1995. The nature of customer relationships in services. In T. A. Swartz, D. E. Bowen, & S. W. Brown, eds. *Advances in services marketing and management, Volume 4*. Bingley, UK: Emerald, pp. 141–168.
Lim, K.-S., Hahn, Y.-H. & Yu, P.-I., 2004. Technological competition in network markets with policy implications. *Technovation*, 24(9), pp.721–728.
Lincoln, Y.S., 2007. Naturalistic inquiry. In G. Ritzer, ed. *Blackwell Encyclopedia of Sociology*. Malden, MA: Blackwell. Available at: http://www.blackwellreference.com/public/tocnode?id=g9781405124331_chun

k_g9781405124331120_ss1-6#citation [Accessed April 11, 2015].
Lincoln, Y.S. & Guba, E.G., 1986. But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Directions for Program Evaluation*, (30), pp.73–84.
Lincoln, Y.S. & Guba, E.G., 2000. The only generalization is: there is no generalization. In R. Gomm, M. Hammersley, & P. Foster, eds. *Case study method*. London, UK: Sage Publications, pp. 27–44.
Little, A.D., 1965. *Management factors affecting research and exploratory development. Report submitted to the US Department of Defense*, Washington, DC: Department of Defense, Office of the Director of Defense Research and Engineering.
Locke, K., Golden-Biddle, K. & Feldman, M.S., 2004. Imaginative theorizing in interpretive organizational research. *Academy of Management Best Paper Proceedings*, pp.B1–B6.
Locke, K., Golden-Biddle, K. & Feldman, M.S., 2008. Making doubt generative: Rethinking the role of doubt in the research process. *Organization Science*, 19(6), pp.907–918.
Longino, H.E., 2002. *The fate of knowledge*, Princeton, NJ: Princeton University Press.
Longino, H.E., 2015. The social dimensions of scientific knowledge. In E. N. Zalta, ed. *The Stanford Encyclopedia of Philosophy*. Stanford University. Available at: http://plato.stanford.edu/archives/spr2015/entries/scientific-knowledge-social/ [Accessed December 4, 2015].
Lovelock, C. & Gummesson, E., 2004. Whither services marketing? In search of a new paradigm and fresh perspectives. *Journal of Service Research*, 7(1), pp.20–41.
Lovelock, C.H., 1991. *Services marketing* 2nd ed., Englewood Cliffs, NJ: Prentice Hall.
Lumpkin, G.T. & Dess, G.G., 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21(1), pp.135–172.
Lundvall, B.-Å., 1992. Introduction. In B.-Å. Lundvall, ed. *National systems of innovation: towards a theory of innovation and interactive learning*. London, UK: Pinter.
Lundvall, B.-Å., 2007. National innovation systems - analytical concept and development tool. *Industry & Innovation*, 14(1), pp.95–119.
Lundvall, B.-Å. & Johnson, B., 1994. The learning economy. *Journal of Industry Studies*, 1(2), pp.23–42.
Lusch, R.F. & Nambisan, S., 2015. Service innovation: a service-dominant logic perspective. *MIS Quarterly*, 39(1), pp.155–175.
Lusch, R.F. & Vargo, S.L., 2006a. Service-dominant logic as a foundation for a general theory. In R. F. Lusch & S. L. Vargo, eds. *The service-dominant logic of marketing: Dialog, debate, and directions*. New York, NY: Routledge, pp. 406–420.
Lusch, R.F. & Vargo, S.L., 2014. *Service-dominant logic: premises, perspectives, possibilities*, Cambridge, UK: Cambridge University Press.
Lusch, R.F. & Vargo, S.L., 2006b. Service-dominant logic: reactions, reflections and refinements. *Marketing Theory*, 6(3), pp.281–288.
Lynn, G.S., Morone, J.G. & Paulson, A.S., 1996. Marketing and discontinuous innovation: The probe and learn process. *California Management Review*, 38(3), pp.8–37.
Lyons, A.C. et al., 2012. *Customer-driven supply chains: From glass pipelines to open innovation networks*, London, UK: Springer-Verlag.
Lyotard, J.-F., 1984. *The postmodern condition: a report on knowledge*, Manchester, UK: Manchester University Press.
Lüthje, C., 2004. Characteristics of innovating users in a consumer goods field: An empirical study of sport-related product consumers. *Technovation*, 24(9), pp.683–695.
Lüthje, C. & Herstatt, C., 2004. The lead user method: An outline of empirical findings and issues for future research. *R & D Management*, 34(5), pp.553–568.
Lytle, R.S., Hom, P.W. & Mokwa, M.P., 1998. SERV*OR: A managerial measure of organizational service-orientation. *Journal of Retailing*, 74(4), pp.455–489.

Lytle, R.S. & Timmerman, J.E., 2006. Service orientation and performance: an organizational perspective. *Journal of Services Marketing*, 20(2), pp.136–147.
Löbler, H. & Lusch, R.F., 2014. Signs and practices as resources in IT-related service innovation. *Service Science*, 6(3), pp.1–16.
Van Maanen, J., Sørensen, J.B. & Mitchell, T.R., 2007. The interplay between theory and method. *Academy of Management Review*, 32(4), pp.1145–1154.
Maglio, P.P. & Spohrer, J., 2013. A service science perspective on business model innovation. *Industrial Marketing Management*, 42(5), pp.665–670.
Maglio, P.P. & Spohrer, J., 2008. Fundamentals of service science. *Journal of the Academy of Marketing Science*, 36(1), pp.18–20.
Manyika, J. et al., 2012. Manufacturing the future: The next era of global growth and innovation. *McKinsey Global Institute*.
Markovich, S. & Moenius, J., 2009. Winning while losing: Competition dynamics in the presence of indirect network effects. *International Journal of Industrial Organization*, 27(3), pp.346–357.
Martin Jr, C.R. & Horne, D.A., 1992. Restructuring towards a service orientation: the strategic challenges. *International Journal of Service Industry Management*, 3(1), pp.25–38.
Martin, C.R., Horne, D.A. & Schultz, A.M., 1999. The business-to-business customer in the service innovation process. *European Journal of Innovation Management*, 2(2), pp.55–62.
Martinez, V. et al., 2010. Challenges in transforming manufacturing organizations into product-service providers. *Journal of Manufacturing Technology Management*, 21(4), pp.449–469.
Maslow, A.H., 1954. *Motivation and personality* 3rd 1978 ed., New York, NY: Harper & Row Publishers Inc.
Mason, K. & Harris, L.C., 2005. Pitfalls in evaluating market orientation: An exploration of executives' interpretations. *Long Range Planning*, 38(4), pp.373–391.
Matear, S. et al., 2002. How does market orientation contribute to service firm performance. *European Journal of Marketing*, 36(9/10), pp.1058–1075.
Materials Advisory Board, 1966. *Report of the ad hoc committee on principles of research-engineering interaction*, Washington, DC: National Academy of Sciences - National Research Council, US Government Printing Office.
Mathiassen, L., 2002. Collaborative practice research. *Information Technology & People*, 15(4), pp.321–345.
Mathieu, V., 2001. Product services: From a service supporting the product to a service supporting the client. *Journal of Business & Industrial Marketing*, 16(1), pp.39–58.
Matthing, J., Sandén, B. & Edvardsson, B., 2004. New service development: learning from and with customers. *International Journal of Service Industry Management*, 15(5), pp.479–498.
Matthyssens, P. & Vandenbempt, K., 2008. Moving from basic offerings to value-added solutions: Strategies, barriers and alignment. *Industrial Marketing Management*, 37(3), pp.316–328.
Matthyssens, P. & Vandenbempt, K., 2010. Service addition as business market strategy: identification of transition trajectories. *Journal of Service Management*, 21(5), pp.693–714.
Maurer, C. & Valkenburg, R., 2014. Approaches to networked innovation. *International Journal of Innovation & Technology Management*, 11(1), pp.1–18.
Max-Neef, M.A., 1991. *Human scale development: conception, application and further reflections*, New York, NY: The Apex Press.
McClelland, D.C., 1961. *The achieving society*, New York, NY: D. Van Nostrand Company, Inc.
McDonald, M., 2009. The future of marketing: brightest star in the firmament, or a fading meteor? Some hypotheses and a research agenda. *Journal of Marketing Management*, 25(5-6), pp.431–450.
McDonald, M., Millman, T. & Rogers, B., 1997. Key account management: Theory, practice and challenges. *Journal of Marketing Management*, 13(8), pp.737–757.
McKitterick, J.B., 1957. What is the marketing management concept? In F. M. Bass,

ed. *The frontiers of marketing thought and science*. Chicago, IL: American Marketing Association, pp. 71–82.
Meadows, D.H., 2008. *Thinking in systems: a primer* D. Wright, ed., White River Junction, VT: Chelsea Green Publishing.
Merriam-Webster, 2016. Industry. *Online dictionary*. Available at: http://www.merriam-webster.com/dictionary/industry [Accessed February 10, 2016].
Merriam-Webster, 2015. Orientation. *Online dictionary*. Available at: http://www.merriam-webster.com/dictionary/orientation [Accessed June 1, 2015].
Merz, M.A., He, Y. & Vargo, S.L., 2009. The evolving brand logic: a service-dominant logic perspective. *Journal of the Academy of Marketing Science*, 37(3), pp.328–344.
Michel, S., Brown, S.W. & Gallan, A.S., 2008. Service-logic innovations: How to innovate customers, not products. *California Management Review*, 50(3), pp.49–65.
Miles, I. et al., 1995. *Knowledge-intensive business services – users, carriers and sources of innovation*, Manchester, UK.
Miles, I., 1993. Services in the new industrial economy. *Futures*, 25(6), pp.653–672.
Miles, I., 2002. Services innovation: towards a tertiarization of innovation studies. In J. Gadrey & F. Gallouj, eds. *Productivity, innovation and knowledge in services: new economic and socio-economic approaches*. Chichester, UK: Edward Elgar, pp. 164–196.
Miles, I., Rush, H. & Bessant, J., 2014. Services transformation through new information technology: information horizons revisited. In J. Bessant, C. Lehmann, & K. M. Möslein, eds. *Driving service productivity: value-creation through innovation*. London, UK: Springer, pp. 19–42.
Mintzberg, H., 1994. *The rise and fall of strategic planning*, New York, NY: Prentice Hall.
Mohr, J.J. & Sarin, S., 2009. Drucker's insights on market orientation and innovation: implications for emerging areas in high-technology marketing. *Journal of the Academy of Marketing Science*, 37(1), pp.85–96.
Mont, O.K., 2002. Clarifying the concept of product-service system. *Journal of Cleaner Production*, 10(3), pp.237–245.
Moore, J.F., 2006. Business ecosystems and the view from the firm. *Antitrust Bulletin*, 51(1), pp.31–75.
Moore, J.F., 1993. Predators and prey: A new ecology of competition. *Harvard Business Review*, 71(3), pp.75–87.
Moore, J.F., 1996. *The death of competition: leadership and strategy in the age of business ecosystems*, New York, NY: HarperCollins.
Morrar, R., 2014. Innovation in services : A literature review. *Technology Innovation Management Review*, 4(4), pp.6–14.
Mowery, D. & Rosenberg, N., 1979. The influence of market demand upon innovation: A critical review of some recent empirical studies. *Research Policy*, 8(2), pp.102–153.
Mowery, D.C., 2009. Plus ca change: Industrial R&D in the "third industrial revolution." *Industrial and Corporate Change*, 18(1), pp.1–50.
Murray, H.A., 1938. *Explorations in personality*, New York, NY: Oxford University Press.
Mustak, M., Jaakkola, E. & Halinen, A., 2013. Customer participation and value creation: a systematic review and research implications. *Managing Service Quality*, 23(4), pp.341–359.
Myers, S. & Marquis, D.G., 1969. *Successful industrial innovations: a study of factors underlying innovation in selected firms*, Washington, DC: National Science Foundation (U.S.).
Müller, M.O., Groesser, S.N. & Ulli-Beer, S., 2012. How do we know who to include in collaborative research? Toward a method for the identification of experts. *European Journal of Operational Research*, 216(2), pp.495–502.
Möller, K., Rajala, R. & Westerlund, M., 2008. Service innovation myopia? A new recipe for client-provider value creation. *California Management Review*, 50(3),

pp.31–48.
Nambisan, S., 2002. Designing virtual customer environments for new product develepment:Toward a theory. *Academy of Management Review*, 27(3), pp.329–413.
Narver, J.C. & Slater, S.F., 1990. The effect of a market orientation on business profitability. *Journal of Marketing*, 54(4), pp.20–35.
Narver, J.C., Slater, S.F. & MacLachlan, D.L., 2004. Responsive and proactive market orientation and new product success. *Journal of Product Innovation Management*, 21(5), pp.334–347.
Narver, J.C., Slater, S.F. & Tietje, B., 1998. Creating a market orientation. *Journal of Market-Focused Management*, 2(3), pp.241–255.
Neale, M.R. & Corkindale, D.R., 1998. Co-developing products: Involving customers earlier and more deeply. *Long Range Planning*, 31(3), pp.418–425.
Neely, A., 2008. Exploring the financial consequences of the servitization of manufacturing. *Operations Management Research*, 1(2), pp.103–118.
Nelson, R.R. & Winter, S.G., 1982. *An evolutionary theory of economic change*, Cambridge, MA: The Belknap Press.
Nelson, R.R. & Winter, S.G., 1977. In search of useful theory of innovation. *Research Policy*, 6(1), pp.36–76.
Nemet, G.F., 2009. Demand-pull, technology-push, and government-led incentives for non-incremental technical change. *Research Policy*, 38(5), pp.700–709.
Ng, I.C.L., Maull, R. & Yip, N., 2009. Outcome-based contracts as a driver for systems thinking and service-dominant logic in service science: Evidence from the defence industry. *European Management Journal*, 27(6), pp.377–387.
Niiniluoto, I., 2011. Abduction, tomography, and other inverse problems. *Studies in History and Philosophy of Science*, 42(1), pp.135–139.
Niiniluoto, I., 1999. Defending abduction. *Philosophy of Science*, 66(3), pp.436–451.
Nordin, F. & Kowalkowski, C., 2010. Solutions offerings: a critical review and reconceptualisation. *Journal of Service Management*, 21(4), pp.441–459.
Nordås, H.K. & Rouzet, D., 2015. The impact of services trade restrictiveness on trade flows: first estimates. *OECD Trade Policy Papers, No. 178*, p.40.
Normann, R., 2001. *Reframing business: When the map changes the landscape*, New York, NY: John Wiley & Sons.
Normann, R., 1984. *Service management: strategy and leadership in service businesses*, New York, NY: John Wiley & Sons.
Normann, R. & Ramirez, R., 1993. Designing interactive strategy. *Harvard Business Review*, 71(4), pp.65–77.
Ogawa, S. & Piller, F.T., 2006. Reducing the risks of new product development. *MIT Sloan management review*, 47(2), pp.65–71.
Oliva, R. & Kallenberg, R., 2003. Managing the transition from products to services. *International Journal of Service Industry Management*, 14(2), pp.160–172.
Osterwalder, A. & Pigneur, Y., 2010. *Business model generation*.
Paavola, S., 2004. Abduction as a logic and methodology of discovery: the importance of strategies. *Foundations of Science*, 9(3), pp.267–283.
Paavola, S., 2012. *On the origin of ideas: an abductivist approach to discovery*, Lambert Academic Publishing.
Pajarinen, M. & Rouvinen, P., 2014. Computerization threatens one third of Finnish employment. *ETLA Brief*, (22), pp.1–6.
Pajarinen, M., Rouvinen, P. & Ylä-Anttila, P., 2013. Services: A new source of value. *ETLA Briefs*, (11), pp.1–8.
Patton, M.Q., 2011. *Developmental evaluation: Applying complexity concepts to enhance innovation and use*, New York, NY: Guilford Press.
Patton, M.Q., 2015. *Qualitative research and evaluation methods* 4th ed., Thousand Oaks, CA: Sage Publications.
Pavitt, K., 1984. Sectoral patterns of technical change: Towards a taxonomy and a theory. *Research Policy*, 13(6), pp.343–373.
Pelham, A.M., 1999. Influence of environment, strategy, and market orientation on performance in small manufacturing firms. *Journal of Business Resarch*, 45(1), pp.33–46.
Pelham, A.M. & Wilson, D.T., 1996. A longitudinal study of the impact of market

structure, firm structure, strategy, and market orientation culture on dimensions of small-firm performance. *Journal of the Academy of Marketing Science*, 24(1), pp.27 – 43.
Penrose, E.T., 1959. *The theory of the growth of the firm*, New York, NY: John Wiley.
Penttinen, E. & Palmer, J., 2007. Improving firm positioning through enhanced offerings and buyer-seller relationships. *Industrial Marketing Management*, 36(5), pp.552–564.
Peres, R., Muller, E. & Mahajan, V., 2010. Innovation diffusion and new product growth models: A critical review and research directions. *International Journal of Research in Marketing*, 27(2), pp.91–106.
Perez, C., 1985. Microelectronics, long waves and world structural change: New perspectives for developing countries. *World Development*, 13(3), pp.441–463.
Peters, M. et al., 2012. The impact of technology-push and demand-pull policies on technical change – Does the locus of policies matter? *Research Policy*, 41(8), pp.1296–1308.
Phillips, N., Lawrence, T.B. & Hardy, C., 2000. Inter-organizational collaboration and the dynamics of institutional fields. *Journal of Management Studies*, 37(1), pp.23–41.
Piekkari, R., Plakoyiannaki, E. & Welch, C., 2010. "Good" case research in industrial marketing: Insights from research practice. *Industrial Marketing Management*, 39(1), pp.109–117.
Piller, F.T. & Walcher, D., 2006. Toolkits for idea competitions: A novel method to integrate users in new product development. *R&D Management*, 36(3), pp.307–318.
Pine II, J.B., 1993. Mass customizing products and services. *Planning Review*, 21(4), pp.6–13, 55.
Piva, M. & Vivarelli, M., 2007. Is demand-pulled innovation equally important in different groups of firms? *Cambridge Journal of Economics*, 31(5), pp.691–710.
Plepys, A., Heiskanen, E. & Mont, O., 2015. European policy approaches to promote servicizing. *Journal of Cleaner Production*, 97, pp.117–123.
Porter, M.E., 1985. *Competitive advantage: creating and sustaining superior performance*, New York, NY: The Free Press.
Porter, M.E., 1996. What is strategy? *Harvard Business Review*, 74(6), pp.61–78.
Prahalad, C.K. & Bettis, R.A., 1986. The dominant logic: a new linkage between diversity and performance. *Strategic Management Journal*, 7(6), pp.485–501.
Prahalad, C.K. & Hamel, G., 1990. The core competence of the corporation. *Harvard Business Review*, 68(3), pp.79–91.
Prahalad, C.K. & Ramaswamy, V., 2004. Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), pp.5–14.
Preissl, B., 2000. Service innovation: What makes it different? In J. S. Metcalfe & I. Miles, eds. *Innovation systems in the service economy: measurement and case study analysis*. New York, NY: Kluwer Academic Publisher.
Price, W.J. & Bass, L., 1969. Scientific research and the innovative process. *Science*, 164(16 May), pp.802–806.
Raddats, C. & Easingwood, C., 2010. Services growth options for B2B product-centric businesses. *Industrial Marketing Management*, 39(8), pp.1334–1345.
Ragin, C.C., 1997. Turning the tables: How case-oriented research challenges variable-oriented research. *Comparative Social Research*, 16, pp.27–42.
Rai, A. & Sambamurthy, V., 2006. The growth of interest in services management: Opportunities for information systems scholars. *Information Systems Research*, 17(4), pp.327–331.
Ramaswamy, V., 2011. It's about human experiences… and beyond, to co-creation. *Industrial Marketing Management*, 40(2), pp.195–196.
Randhawa, K. & Scerri, M., 2015. Service innovation: a review of the literature. In R. Agarwal et al., eds. *The handbook of service innovation*. London, UK: Springer-Verlag, pp. 27–51.
Reinartz, W.J. & Ulaga, W., 2008. How to sell services more profitably. *Harvard Business Review*, 86(5), pp.90–96.
Reiskin, E.D. et al., 2000. Servicizing the chemical supply chain. *Journal of Industrial Ecology*, 3(2/3), pp.19–31.

Remneland-Wikhamn, B. et al., 2011. Open innovation, generativity and the supplier as peer: the case of iPhone and Android. *International Journal of Innovation Management*, 15(1), pp.205–230.
Richardson, L. & St. Pierre, E.A., 2005. Writing: a method of inquiry. In N. K. Denzin & Y. S. Lincoln, eds. *The Sage handbook of qualitative research*. Thousand Oaks, CA: Sage Publications, pp. 959–978.
Rifkin, J., 2011. *The third industrial revolution: How lateral power is transforming energy, the economy, and the world*, New York, NY: Palgrave Macmillan.
Rizzo, F. & Cantù, D., 2013. Live piloting and prototyping services. *Challenges*, 4, pp.154–168.
Robertson, I.T. & Cooper, C.L., 2010. Full engagement: the integration of employee engagement and psychological well-being. *Leadership & Organization Development Journal*, 31(4), pp.324–336.
Rochet, J.-C. & Tirole, J., 2006. Two-sided markets: a progress report. *RAND Journal of Economics*, 37(3), pp.645–667.
Rod, M., 2009. Marketing: philosophy of science and "epistobabble warfare." *Qualitative Market Research*, 12(2), pp.120–129.
Rogers, E.M., 2003. *Diffusion of innovations* 5th ed., New York, NY: The Free Press.
Rong, K. & Shi, Y., 2015. *Business ecosystems: constructs, configurations, and the nurturing process*, New York, NY: Palgrave Macmillan.
Rorty, R., 1979. *Philosophy and the mirror of nature*, Princeton, NJ: Princeton University Press.
Rothwell, R., 1994. Industrial innovation: success, strategy, trends. In M. Dodgson & R. Rothwell, eds. *The handbook of industrial innovation*. Cheltenham, UK: Edward Elgar, pp. 33–53.
Rothwell, R. et al., 1974. SAPPHO updated - project SAPPHO phase II. *Research Policy*, 3(3), pp.258–291.
Rothwell, R. & Robertson, A.B., 1973. The role of communications in technological innovation. *Research Policy*, 2(3), pp.204–225.
Rothwell, R. & Zegveld, W., 1985. *Reindustrialization and technology*, Armonk, NY: M.E. Sharpe.
Rowley, J., 2002. Reflections on customer knowledge management in e-business. *Qualitative Market Research: An International Journal*, 5(4), pp.268 – 280.
Rubin, H.J. & Rubin, I.S., 2012. *Qualitative interviewing: the art of hearing data* 3rd ed., Thousand Oaks, CA: Sage Publications.
Ruekert, R.W., 1992. Developing a market orientation: An organizational strategy perspective. *International Journal of Research in Marketing*, 9(3), pp.225–245.
Rust, R.T., 2004. If everything is service, why is this happening now, and what difference does it make? *Journal of Marketing*, 68(1), pp.23–24.
Rynes, S. & Gephart Jr, R.P., 2004. From the editors: qualitative research and the "Academy of Management Journal." *Academy of Management Journal*, 47(4), pp.454–462.
Salonen, A., 2011. Service transition strategies of industrial manufacturers. *Industrial Marketing Management*, 40(5), pp.683–690.
Salvador, F., de Holan, P.M. & Piller, F., 2009. Cracking the code of mass customization. *MIT Sloan Management Review*, 50(3), pp.71–78.
Sandström, S. et al., 2008. Value in use through service experience. *Managing Service Quality*, 18(2), pp.112–126.
Saviotti, P.P. & Metcalfe, J.S., 1984. A theoretical approach to the construction of technological output indicators. *Research Policy*, 13(3), pp.141–151.
Schein, E.H., 2006. Clinical inquiry/research. In P. Reason & H. Bradbury, eds. *Handbook of action research*. London, UK: Sage Publications, pp. 185–194.
Schein, E.H., 1995. Process consultatioon, action research, and clinical inquiry: are they the same? *Journal of Managerial Psychology*, 10(6), pp.14-19.
Schembri, S., 2006. Rationalizing service logic, or understanding services as experience? *Marketing Theory*, 6(3), pp.381–392.
Scheuing, E.E. & Johnson, E.M., 1989. A proposed model for new service development. *Journal of Services Marketing*, 3(2), pp.25–34.
Schmitt, R. & Hatfield, S., 2008. Strategic servicification – A quality based approach beyond service-engineering. In M. Mitsuishi, K. Ueda, & F. Kimura, eds.

*Manufacturing Systems and Technologies for the New Frontier: The 41st CIRP Conference on Manufacturing Systems May 2008, Tokyo, Japan*. London, UK: Springer, pp. 511–514.
Schmookler, J., 1968. Catastrophe and utilitarianism in the development of basic science. In R. A. Tybout, ed. *Economics of research and development*. Columbus, OH: Ohio State University Press, pp. 19–33.
Schmookler, J., 1962. Changes in industry and in the state of knowledge as determinants of industrial invention. In H. M. Groves, ed. *The rate and direction of inventive activity: economic and social factors*. Princeton, NJ, pp. 195–232.
Schmookler, J., 1966. *Invention and economic growth*, Cambridge, MA: Harvard University Press.
Schreier, M., 2006. The value increment of mass customized products: an empirical assessment. *Journal of Consumer Behaviour*, 5(4), pp.317–327.
Schumpeter, J.A., 1939. *Business cycles: a theoretical, historical and statistical analysis of the capitalist process*, New York, NY: McGraw-Hill.
Schumpeter, J.A., 1942. *Capitalism, socialism and democracy* 5th 2003 ed., London, UK: Routledge.
Schumpeter, J.A., 1934. *The theory of economic development: an inquiry into profits, capital, credit, interest and the business cycle*, New Brunswick, NJ: Transaction Publishers.
Schwab, K., 2016. *The fourth industrial revolution*, Geneva, Switzerland: World Economic Forum.
Scott, W.R., 2003. *Organizations: rational, natural, and open systems* 5th ed., Upper Saddle River, NJ: Prentice Hall.
Seligman, M.E.P. et al., 2005. Positive psychology progress: empirical validation of interventions. *American psychologist*, 60(5), pp.410–421.
Shah, D. et al., 2006. The path to customer centricity. *Journal of Service Research*, 9(2), pp.113–124.
Shah, S., 2000. *Sources and patterns of innovation in a consumer products field: Innovations in sporting equipment. Sloan Working Paper 4105*, Cambridge, MA: Sloan School of Management, Massachusetts Institute of Technology.
Shapiro, B.P., 1988. What the hell is "market oriented"? *Harvard Business Review*, 66(11-12), pp.119–125.
Sharp, B., 1991. Marketing orientation: More than just customer focus. *International Marketing Review*, 8(4), pp.20–25.
Sheehan, J., 2006. Understanding service sector innovation. *Communications of the ACM*, 49(7), pp.43–47.
Sherwin, C.W. & Isenson, R.S., 1969. Project Hindsight: A Defense Department study of the utility of research. *Science*, 156(23 June), pp.1571–1577.
Sheth, J.N. & Parvatiyar, A., 1995. The evolution of relationship marketing. *International Business Review*, 4(4), pp.397–418.
Sheth, J.N., Sisodia, R. & Sharma, A., 2000. The antecedents and consequences of customer-centric marketing. *Academy of Marketing Science*, 28(1), pp.55–66.
Siggelkow, N., 2007. Persuasion with case studies. *Academy of Management Journal*, 50(1), pp.20–24.
Siguaw, J.A., Simpson, P.M. & Enz, C.A., 2006. Conceptualizing innovation orientation: A framework for study and integration of innovation research. *The Journal of Product Innovation Management*, 23(6), pp.556–574.
Slater, S.F. & Narver, J.C., 1998. Customer-led and market-oriented: Let's not confuse the two. *Strategic Management Journal*, 19(10), pp.1001–1006.
Slater, S.F. & Narver, J.C., 1994. Does competitive environment moderate the market orientation - performance relationship? *Journal of marketing*, 58(1), pp.46–55.
Slater, S.F. & Narver, J.C., 1995. Market orientation and the learning organization. *Journal of Marketing*, 59(3), pp.63–74.
Slater, S.F. & Narver, J.C., 2000. The positive effect of a market orientation on business profitability: a balanced replication. *Journal of Business Research*, 48, pp.69–73.
Smith, A., 1776. *An inquiry into the nature and causes of the wealth of nations*, Available at: http://en.wikisource.org [Accessed June 1, 2015].
Smith, K., 2000. Innovation as a systemic phenomenon: Rethinking the role of policy.

*Enterprise & Innovation Management Studies*, 1(1), pp.73–102.
Smits, R. & Kuhlmann, S., 2004. The rise of systemic instruments in innovation policy. *International Journal of Foresight and Innovation Policy*, 1(1/2), pp.4–32.
Stake, R.E., 1994. Case studies. In N. K. Denzin & Y. S. Lincoln, eds. *Handbook of qualitative research*. Thousand Oaks, CA: Sage Publications, pp. 236–247.
Stake, R.E., 1980. *Generalizations. Paper presented at the annual meeting of the American Education Research Association, April 1980, Boston*.
Stake, R.E., 1995. *The art of case study research*, Thousand Oaks, CA: Sage Publications.
Stake, R.E., 2000. The case study method in social inquiry. In R. Gomm, M. Hammersley, & P. Foster, eds. *Case study method*. London, UK: Sage Publications, pp. 19–26.
Stake, R.E., 1978. The case study method in social inquiry. *Educational Researcher*, 7(2), pp.5–8.
Stake, R.E. & Trumbull, D.J., 1982. Naturalistic generalizations. *Review Journal of Philosophy and Social Science*, 7(1), pp.1–12.
Di Stefano, G., Gambardella, A. & Verona, G., 2012. Technology push and demand pull perspectives in innovation studies: Current findings and future research directions. *Research Policy*, 41(8), pp.1283–1295.
Stevenson, H.H. & Amabile, T.M., 1999. Entrepreneurial management: in pursuit of opportunity. In T. K. McCraw & J. L. Cruikshank, eds. *The intellectual venture capitalist: John H. McArthur and the work of the Harvard Business School, 1980-1995*. Boston, MA: Harvard Business School Press, pp. 133–162.
Storbacka, K. & Nenonen, S., 2015. Learning with the market: Facilitating market innovation. *Industrial Marketing Management*, 44, pp.73–82.
Storbacka, K. & Nenonen, S., 2011. Scripting markets: From value propositions to market propositions. *Industrial Marketing Management*, 40(2), pp.255–266.
Storbacka, K. & Pennanen, R., 2014. *Solution Business*, New York, NY: Springer.
Storbacka, K., Strandvik, T. & Grönroos, C., 1994. Managing customer relationships for profit: The dynamics of relationship quality. *International Journal of Service Industry Management*, 5(5), pp.21–38.
Storey, C. & Easingwood, C.J., 1998. The augmented service offering: a conceptualization and study of its impact on new service success. *Journal of Product Innovation Management*, 15, pp.335–351.
Strambach, S., 2001. Innovation processes and the role of Knowledge-Intensive Business Services (KIBS). In K. Koschatzky, M. Kulicke, & A. Zenker, eds. *Innovation networks: concepts and challenges in the European perspective*. Heidelberg, Germany: Physica-Verlag, pp. 53–68.
Strandvik, T. & Heinonen, K., 2015. Essentials of customer dominant logic. In J. Gummerus & C. von Koskull, eds. *The Nordic School - Service marketing and management for the future*. Helsinki, Finland: CERS, Hanken School of Economics, pp. 111–127.
Stuart, T.E., 2000. Interorganizational alliances and the performance of firms: a study of growth and innovation rates in a high-technology industry. *Strategic Management Journal*, 21(8), pp.791–811.
Sundbo, J., 2008. Customer-based innovation of knowledge e-services: The importance of after-innovation. *International Journal of Services, Technology and Management*, 9(3-4), pp.218–233.
Sundbo, J., 1997. Management of innovation in services. *Service Industries Journal*, 17(3), pp.432–455.
Sundbo, J. & Toivonen, M., 2011. Introduction. In J. Sundbo & M. Toivonen, eds. *User-based innovation in services*. Cheltenham, UK: Edward Elgar, pp. 1–21.
Swan, J. & Scarbrough, H., 2005. The politics of networked innovation. *Human Relations*, 58(7), pp.913–943.
Tannenbaum, R., Margulies, N. & Massarik, F., 1985. *Human systems development*, San Francisco, CA: Jossey Bass Business and Management Series.
Teece, D.J., 2010. Business models, business strategy and innovation. *Long Range Planning*, 43(2/3), pp.172–194.
Teece, D.J., 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy*, 15(6),

pp.285–305.
Tekes - The Finnish Funding Agency for Innovation, 2010. Vobabulary of service business. Available at: http://www.tekes.fi/globalassets/julkaisut/palveluliiketoim_sanasto.pdf [Accessed February 23, 2016].
Tidd, J., 2010. From models to the management of diffusion. In J. Tidd, ed. *Gaining momentum: managing the diffusion of innovations. Series on Technology Management: Volume 15*. London, UK: Imperial College Press, pp. 3–45.
Tidd, J., Bessant, J. & Pavitt, K., 2005. *Managing innovation: integrating technological, market and organizational change* 3rd ed., Chichester, UK: John Wiley & Sons.
Tidd, J. & Brem, A., 2012. Summary and future directions. In A. Brem & J. Tidd, eds. *Perspectives on supplier innovation: theories, concepts and empirical insights on open innovation and the integration of suppliers. Series on Technology Management, Vol. 18*. London, UK: Imperial College Press, pp. 677–687.
Toivonen, M., 2010. Different types of innovation processes in services and their organizational implications. In F. Gallouj & F. Djellal, eds. *The handbook of innovation and services: a multi-disciplinary perspective*. Cheltenham, UK: Edward Elgar, pp. 221–249.
Toivonen, M. & Tuominen, T., 2009. Emergence of innovations in services. *Service Industries Journal*, 29(7), pp.887–902.
Trott, P., 2012. *Innovation management and new product development* 5th ed., Harlow, UK: Pearson Education.
Trott, P. & Hartmann, D., 2009. Why "open innovation" is old wine in new bottles. *International Journal of Innovation Management*, 13(4), pp.715–736.
Tse, E., 2002. Grabber–holder dynamics and network effects in technology innovation. *Journal of Economic Dynamics and Control*, 26(9-10), pp.1721–1738.
Tsiotsou, R.H., 2010. Delineating the effect of market orientation on services performance: a component-wise approach. *Service Industries Journal*, 30(3), pp.375–403.
Turunen, T., 2013. *Organizing service operations in manufacturing. Doctoral Dissertations 4/2013*, Espoo, Finland: Aalto University.
Turunen, T., 2011. Users as a development driver in manufacturing: the case of "reverse" servitization. In J. Sundbo & M. Toivonen, eds. *User-based innovation in services*. Cheltenham, UK: Edward Elgar, pp. 177–199.
Ulaga, W. & Reinartz, W.J., 2011. Hybrid offerings: How manufacturing firms combine goods and services successfully. *Journal of Marketing*, 75(6), pp.5–23.
Utterback, J.M., 1974. Innovation in industry and the diffusion of technology. *Science*, 183(15 February), pp.620–626.
Valente, M., 1999. *Evolutionary economics and computer simulation - a model for the evolution of markets. Vol. 1: Consumer behaviour and technological complexity in the evolution of markets. PhD Dissertation*, Denmark: University of Aalborg.
Walsh, V., 1984. Invention and innovation in the chemical industry: demand-pull or discovery-push. *Research Policy*, 13(4), pp.211–234.
Vandenbosch, M. & Dawar, N., 2002. Beyond better products: Capturing value in customer interactions. *MIT Sloan Management Review*, 43(4), pp.35–42.
Vandermerwe, S., 2004. Achieving deep customer focus. *MIT Sloan Management Review*, 45(3), pp.26–34.
Vandermerwe, S. & Rada, J., 1988. Servitization of business: Adding value by adding services. *European Management Journal*, 6(4), pp.314–324.
Vanhaverbeke, W., Chesbrough, H.W. & West, J., 2014. Surfing the new wave of open innovation research. In H. W. Chesbrough, W. Vanhaverbeke, & J. West, eds. *New frontiers in open innovation*. Oxford: Oxford University Press, pp. 281–294.
Vargo, S.L., 2009. Toward a transcending conceptualization of relationship: a service-dominant logic perspective. *Journal of Business & Industrial Marketing*, 24(5/6), pp.373–379.
Vargo, S.L. & Lusch, R.F., 2004. Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), pp.1–17.

Vargo, S.L. & Lusch, R.F., 2014. Inversions of service-dominant logic. *Marketing Theory*, 14(3), pp.239–248.
Vargo, S.L. & Lusch, R.F., 2011. It's all B2B…and beyond: Toward a systems perspective of the market. *Industrial Marketing Management*, 40(2), pp.181–187.
Vargo, S.L. & Lusch, R.F., 2008. Service-dominant logic: Continuing the evolution. *Journal of the Academy of Marketing Science*, 36(1), pp.1–10.
Vargo, S.L. & Lusch, R.F., 2006. Service-dominant logic: What it is, what it is not, what it might be. In R. F. Lusch & S. L. Vargo, eds. *The service-dominant logic of marketing: dialog, debate, and directions*. New York, NY: Routledge, pp. 43–56.
Webster Jr, F.E., 2009. Marketing IS management: The wisdom of Peter Drucker. *Journal of the Academy of Marketing Science*, 37(1), pp.20–27.
Webster Jr, F.E., 1988. The rediscovery of the marketing concept. *Business Horizons*, 31(3), pp.29–39.
Webster Jr, F.E. & Lusch, R.F., 2013. Elevating marketing: marketing is dead! Long live marketing! *Journal of the Academy of Marketing Science*, 41(4), pp.389–399.
Weick, K.E., 2005. Organizing and failures of imagination. *International Public Management Journal*, 8(3), pp.425–438.
Wejnert, B., 2002. Integrating models of diffusion of innovations: a conceptual framework. *Annual Review of Sociology*, 28(1), pp.297–326.
Van de Ven, A.H., 2007. *Engaged scholarship: A guide for organizational and social research*, Oxford, UK: Oxford University Press.
Wernerfelt, B., 1984. A Resource-based view of the firm. *Strategic Management Journal*, 5(2), pp.171–180.
Wernerfelt, B., 1995. The resource-based view of the firm: Ten years after. *Strategic Management Journal*, 16, pp.171–174.
West, J. et al., 2014. Open innovation: The next decade. *Research Policy*, 43(5), pp.805–811.
West, J. & Bogers, M., 2014. Leveraging external sources of innovation: a review of research on open innovation. *Journal of Product Innovation Management*, 31(4), pp.814–831.
West, J., Vanhaverbeke, W. & Chesbrough, H.W., 2006. Open innovation: a research agenda. In *Open innovation: researching a new paradigm*. Oxford, UK: Oxford University Press, pp. 285–307.
Westerlund, M. & Leminen, S., 2011. Managing the challenges of becoming an open innovation company: experiences from Living Labs. *Technology Innovation Management Review*, 1(1), pp.19–25.
Veugelers, R., 2013. Trends, challenges and prospects for manufacturing in Europe. In R. Veugelers, ed. *Manufacturing Europe's future. Bruegel Blueprint Series, Vol. XXI*. Brussels, Belgium: Bruegel, pp. 7–47.
White, A.L., Stoughton, M. & Feng, L., 1999. *Servicizing: the quiet transition to extended product responsibility. Report submitted to US Environmental Protection Agency Office of Solid Waste*, Boston, MA: Tellus Institute.
Wiersema, F., 2013. The B2B Agenda: The current state of B2B marketing and a look ahead. *Industrial Marketing Management*, 42(4), pp.470–488.
Wikström, K. et al., 2010. Business models in project business. *International Journal of Project Management*, 28(8), pp.832–841.
Wilkinson, A., Dainty, A. & Neely, A., 2009. Changing times and changing timescales: the servitization of manufacturing. *International Journal of Operations & Production Management*, 29(5), pp.425–429.
Windahl, C. et al., 2004. Manufacturing firms and integrated solutions: characteristics and implications. *European Journal of Innovation Management*, 7(3), pp.218–228.
Windrum, P. & García-Goñi, M., 2008. A neo-Schumpeterian model of health services innovation. *Research Policy*, 37(4), pp.649–672.
Wise, R. & Baumgartner, P., 1999. Go downstream: The new profit imperative in manufacturing. *Harvard Business Review*, 77(5), pp.133–141.
Wolpert, J.D., 2002. Breaking out of the innovation box. *Harvard Business Review*, 80(8), pp.76–83.

Wong, S.K.S. & Tong, C., 2012. The influence of market orientation on new product success. *European Journal of Innovation Management*, 15(1), pp.99–121.
Wren, B.M., Souder, W.E. & Berkowitz, D., 2000. Market orientation and new product development in global industrial firms. *Industrial Marketing Management*, 29(6), pp.601–611.
de Vries, E.J., 2006. Innovation in services in networks of organizations and in the distribution of services. *Research Policy*, 35(7), pp.1037–1051.
von Wright, G.H., 1971. *Explanation and understanding*, London, UK: Routledge & Kegan Paul.
Wölfl, A., 2005. *The service economy in OECD countries: OECD/Centre d'études prospectives et d'informations internationales (CEPII). OECD Science, Technology and Industry Working Papers 2005/03*, Paris, France: OECD Publishing.
Xu, M. & Walton, J., 2005. Gaining customer knowledge through analytical CRM. *Industrial Management & Data Systems*, 105(7), pp.955–971.
Yin, R.K., 2003. *Case study research: design and methods. Applied Social Research Methods Series, Vol. 5* 3rd ed., London, UK: Sage Publications.
Zahra, S.A., 2003. The practice of management: reflections on Peter F. Drucker's landmark book. *Academy of Management Executive*, 17(3), pp.16–23.
Zhang, Y. & Li, H., 2010. Innovation search of new ventures in a technology cluster: the role of ties with service intermediaries. *Strategic Management Journal*, 31(1), pp.88–109.
Zhou, K.Z., Yim, C.K. & Tse, D.K., 2005. The effects of strategic orientations on technology- and market-based breakthrough innovations. *Journal of Marketing*, 69(2), pp.42–60.
Zott, C., Amit, R. & Massa, L., 2011. The business model: Recent developments and future research. *Journal of Management*, 37(4), pp.1019–1042.
Zysman, J., 2006. The algorithmic revolution - the fourth service transformation. *Communications of the ACM*, 49(7), p.48.
Zysman, J. et al., 2011. The new challenge to economic governance: the digital transformation of services. In A.-V. Anttiroiko, S. J. Bailey, & P. Valkama, eds. *Innovations in public governance*. Amsterdam, The Netherlands: IOS Press, pp. 39–67.

# Appendices: Original publications

# Article I

Korhonen, H.M.E. & Kaarela, I., 2011. Corporate customers' resistance to industrial service innovations. *International Journal of Innovation Management*, 15(3), pp.479–503. Available at:
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# CORPORATE CUSTOMERS' RESISTANCE TO INDUSTRIAL SERVICE INNOVATIONS

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This paper examines the reasons for corporate customers' resistance to adopt industrial service innovations provided by their supplier companies. It is based on work with nine Finnish suppliers of industrial services and their potential customers. We view organizations as networks of individual adopters. We find that organizational sentiment towards adopting an innovation is often ambivalent and that resisting views reveal important drawbacks of an innovation that need to be addressed. The results clarify the effects of utility, cost, emotion and risk aversion in organizational service decisions emphasizing the fit of the service for the customer.

*Keywords*: Innovation resistance; innovation rejection; innovation adoption; industrial service; business-to-business; service innovation; organizational innovation; customer collaboration; customer understanding.

## Introduction

Manufacturers and technology companies in the old industrial countries are innovating more and more in the service domain providing their client companies with integrated product service packages, total solutions and life cycle services rather than traditional products. These are novel kinds of concepts that are often — but not necessarily — enabled by new technology. These concepts can also be seen as business model innovations as they are turning business models of industrial companies towards service logic.

The transformation from product logic towards service logic is seen especially important in the Western developed countries as traditional physical manufacturing

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of industrial goods is facing fierce competition from the fast developing countries, and competition within research and development is also increasing. Due to the increasing competition, advanced companies are extending their innovation efforts to include new areas outside the traditional technology domain or product and production development. Many technology companies have acknowledged the importance of service innovations on the side of technology innovations, which calls for corresponding innovation research. We need more information on creating successful service concepts.

The transformation from product based business logic towards service based business logic is being promoted by a large number of powerful change agents including, e.g., national agencies, universities, and multinational corporations. As a result we are witnessing the growth of a new type of service science that is no longer confined to the traditional service businesses. Instead, it also covers the traditional technology businesses. The issues discussed in this paper are situated in the cross-section of service research and innovation research.

Industrial companies' interest for service innovation is great, especially in Northern parts of Europe. Industrial companies within business-to-business markets often find service business more profitable and faster growing than traditional product business. In some cases service business also seems to be holding up better in recession than product business. Many companies have succeeded extremely well in the transition towards service and they inspire others to follow. According to a benchmark study by Deloitte (2006) services revenues represented an average of more than 25 per cent of the total business of manufacturing companies and in many companies, as for Rolls-Royce plc and Xerox Corporation, the service business contributed 50 per cent or more of total revenues. Service business was especially important for manufacturing companies because the average profitability of the service businesses was more that 75 per cent higher than overall business unit profitability (ibid).

However, we have noticed that many companies aiming to create new service business stumble in their service innovation efforts as their customers are not willing to adopt the new services. A great number of industrial companies also have difficulties persuading customers to take part in joint innovation practices that are seen as beneficial in the development of new services. Some customers adopt new service innovations and collaborative innovation practices eagerly whereas some others are more reluctant to change. The ability of the industrial companies to add new innovative services to their offering is dependent on their clients' acceptance of these new modes of doing business. The new service concepts will never turn into reality and they will never result in income and competitiveness if they are rejected by customers. This is a very important issue as the companies and also the change agents are investing a lot in the transformation towards service business.

The purpose of this paper is to take a closer look at customer companies' resistance to industrial service innovations. We will start by discussing industrial service innovations as a special form of innovation different from, e.g., technological innovation. The nature of industrial service innovations has implications for their diffusion. We will continue by discussing innovation adoption and rejection and the importance of understanding resistance. After that, we will describe our case research about Finnish companies adding industrial services to their offering. We will present the results of our study and discuss their implications for innovation research and companies.

## Industrial Service as Innovation

In line with Tekes (2010), we define industrial services as services that support customer companies' industrial value creation processes or customer companies' use of industrial products. Companies within Finnish machine industry often view service business as a possibility to transform their business model from being machine suppliers into being solutions providers, maintenance partners, performance partners, and value partners (Technology Industries of Finland, 2003). Oliva and Kallenberg (2003) describe the transformation through four phases: consolidating product-related services, entering the installed-base service market, expanding to relationship-based or process-centred services, and taking over the end-user's operations. Some examples of industrial services provided by machine industry are: maintenance, repair, 24-h emergency service, spare part services, operating, machinery refurbishment and re-sale, modernizations, training, process consultation, project engineering, installation and start-up. Industrial services can also be offered by other industries and they can include, e.g., transport and logistics services, manufacturing services, industrial cleaning and property maintenance, waste management and recycling services, and security services.

As innovations, industrial services are typically not totally new to the world. The ideas have often been adapted from other industries or manufacturers of other types of products. What makes industrial services innovations is that they are some how new to the customer or the supplier. Service innovations are a form of organizational innovation involving two or more organizations. Organizational innovation refers to the adoption of an idea or behaviour that is new to the organization (Daft, 1978; Damanpour, 1996).

Often industrial services are about some sort of outsourcing, where the customer company has formerly done the process itself and then it outsources it to a company that provides it as a service. For example the customer may have previously done repairs itself, but it decides to purchase preventive maintenance and repair as a service from a supplier instead. Also the supplier could have previously

priced the maintenance based on the amount of work needed and the new idea within the service innovation could be performance based pricing even though the work content still remains maintenance. If a customer is simply replacing one supplier with another without any changes to what is traded or how the trade is done, we do not consider it an innovation. Instead, when there is a novel change to processes or the way of doing business between the customer and the supplier, there is distinct novelty and we call it an innovation. The degree of novelty can range from incremental to radical within industrial service innovations.

Service science emphasizes customers' role in service innovation and production. This is a consequence of the foundational premise of service-dominant logic stating that the customer is always a co-producer and that value is always co-created (Vargo and Lusch, 2004). Customers are a major source of all types of innovation (Chesbrough, 2003; von Hippel, 1986, 2005). Customer understanding and voice of customer are seen as vital for innovation success and diffusion. Integrating customers in the innovation process is becoming best practice in all businesses. Yet, identifying and responding to customer needs is often seen especially critical for service innovation (de Brentani, 1991, 1995; Edgett, 1994; Alam and Perry, 2002; Alam, 2006).

Earlier research tells us that service innovations diffuse at a lower rate than product innovations (Herbig and Day, 1992). Services differ from products in intangibility, inseparability of production and consumption, heterogeneity and perishability of the services offering (Zeithaml *et al.*, 1985; Lovelock, 1983). These qualities of service make it difficult to communicate the properties and utility of service innovations. Service innovations also frequently cause wide spreading changes in different areas of the customer companies' processes. These issues can be seen to cause services' low rate of diffusion.

## Innovation Adoption and Rejection

### Innovation decision

Adoption or rejection of an innovation follows from an innovation-decision process. Within individual decision settings, innovation-decision can be viewed as a five step process comprised of knowledge, persuasion, decision, implementation and confirmation. Within organizational settings, innovation-decision processes are comprised of agenda-setting, matching, redefining or restructuring, clarifying, and routinizing. Organizational innovation-decisions can be classified as: optional innovation-decisions, where choices are made by an individual independent of the other members of the system; collective innovation-decisions, where choices are made by consensus; authority innovation-decisions, where choices are made by

relatively few people who possess power, high social status or expertise; and contingent innovation-decisions, where choices to adopt or reject can be made only after a prior innovation-decision. (Rogers, 2003).

## Innovation diffusion

Innovations spread as actors decide on adoption or rejection. Innovation diffusion research needs to take into account at least four distinct factor types: factors related to the innovator, factors related to the adopter, factors related to the innovation, and factors related to the environment or context (Gatignon and Robertson, 1985; Wejnert, 2002). Five innovation characteristics explain 49 to 87 per cent of the variance in the rate of adoption of an innovation: relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003; Tidd, 2010). Relative advantage is the degree to which the innovation is perceived as better than what it supersedes; compatibility denotes the degree of perceived consistency with the existing skills, practices, values and norms, past experiences, and needs of potential adopters; complexity is the degree of perceived difficulty to understand or use the innovation; trialability is the degree to which one can experiment with the innovation on a limited basis; and observability is the degree to which the results of an innovation are visible to others (ibid.). Similarly as in the case of consumer innovations, the speed of diffusion in an industrial context is likely to relate positively to relative advantage, compatibility, trialability, and observability and negatively to complexity and perceived risk (Gatignon and Robertson, 1985). Some characteristics of an innovation like relative advantage and compatibility may vary from one adopter to another, being contingent upon the perceptions and context of adopters (Tidd, 2010). Characteristics of an organizational innovation adopter may be issues like size, centralization, formalization, members' attitudes, decision making practices, training, needs etc. Environmental factors include, e.g., economic trends, competitive pressure, market uncertainty, and communication networks.

Day and Herbig (1990) claim that industrial innovations in general diffuse slower than consumer innovations, but have more staying power. However, organizational adoption is much more complex than individual adoption (Ozanne and Churchill, 1971), though the same influencing factors, relative advantage, tolerance to risk, level of aspiration and access to information have been considered (Webster, 1969). Furthermore, as the implementation of service innovations often requires redesigning the value chain (Chesbrough, 2011) and redefining the activities and functions between the customer and the service provider (Vermeulen and van der Aa, 2003), they change the mental models of what organizations do. Therefore these innovations should usually not be considered as mere service or

process innovations, but instead as paradigm innovations described by Tidd *et al.* (2005). These systemic changes almost invariably raise initial resistance. To lower this resistance and to speed up diffusion, service innovation co-development has been suggested (Vermeulen and van der Aa, 2003; Chesbrough, 2011).

Some researchers suggest that organizational innovation adoption itself leads to further accelerating adoption (Brand and Huizingh, 2008; Huizingh and Brand, 2009) by making wider and further utilization of innovative solutions step-wise, at least in the case of technological innovations. This might relate to the previous conclusions of compatibility (Gatignon and Robertson, 1985), access to information on the innovation (Webster, 1969), capacity to adopt and evaluate innovation-related information (Jensen, 1988) or organizational innovativeness in general (Gauvin and Sinha, 1993) having a role in organizational tendency to adopt innovations. Kitchell (1995) addresses the role of corporate culture, whereas Klein and Sorra (1996) underline the importance of values in organizational innovation adoption. However, not only the characteristics of the potential adopter, but also the supplier, should be taken into account — the perceived customizability of the innovation and the marketing strategy of the supplier play an important role in innovation adoption (Frambach *et al.*, 1998). Forward and backward integration of the adopter has also been listed as antecedents for innovation adoption (Boeker and Huo, 1998). The interdependence of some or all of these characteristics is likely but largely unexplored. Although in most of these studies only the adoption of technological innovations is analyzed, organizational adoption of service innovations should share some similarities.

## Innovation resistance

The majority of innovation diffusion research has been done from the standpoint of successful adoption (Rogers, 2003). This is caused by the pro-innovation bias. Innovation resistance needs to be considered as a separate phenomenon from the more studied innovation adoption (Frambach and Schillewaert, 2002), and can be divided into three distinct types: rejection, postponement and opposition (Ram and Sheth, 1989). Tidd (2010) lists four major categories of barriers to adoption: economic barriers, behavioural barriers, organizational barriers, and structural barriers. Rejection and discontinuation of innovation is frequently considered more difficult to study than successful innovation and there is also less funding for this type of research. Therefore resistance is most often seen in innovation studies as non-adoption, which does not fully reveal its dynamics. It would be wise to look at rejection and resistance more closely. If the innovation only reaches the early adopters, it will never become a widely adopted success. Taking this

point-of-view, the spread of an innovation is actually determined by the resisting and lagging non-adopters. Tackling the resistance of late majority and laggards creates great potential for increasing adoption. They are also the most rational adopters and the ones with less innovation bias (Tidd, 2010) and therefore can better help improve innovations.

Companies frequently think that customers do not adopt their industrial service innovations since customers simply do not have enough information about the benefits of the innovation. It is true that customers must be made aware of the innovation's advantages in order for adoption to occur. It is also true that customers' perceptions of the innovation can be influenced through deliberate communication. It must be understood however, that there is also real resistance among customers to changes that these innovations bring about. This resistance is a normal human response, and it occurs also in an organizational context (Mirvis *et al.*, 1991; Cutcher, 2009; Zwick, 2002). Individual as well as organizational customers may resist innovations that cause changes in their behavioural patterns, norms, habits and traditions. They often also resist innovations that cause psychological conflicts or problems. Customer perceived value is imperative for innovation adoption. Novelty, radicalism and complexity are related to resistance whereas familiarity and compatibility are linked to adoption. People in general do not desire changes when they are satisfied (Judge *et al.*, 1999; Wanberg and Banas, 2000) or close to their aspiration level (Greve, 1998). They also try to avoid risks related to innovation adoption. The degree of perceived risk is highly negatively related to the rate of diffusion (Herbig and Day, 1992), and its influence has been shown to be great also in the context of organizational buying (Johnston and Lewin, 1996). Though the innovation non-adoption is not a symmetrical opposite process of adoption, the antecedents for it are likely to be related to the barriers of adoption. To put it shortly, the innovation will not be adopted if it is considered too challenging to adopt or if it is not considered useful (MacVaugh and Schiavone, 2010).

Innovation resistance is an example of resistance to change. Organizational resistance to innovation is organizational behaviour that serves to prevent a firm from purchasing an innovation. Resistance is not a negative concept in general, since change is not inherently beneficial for organizations (Pardo del Val and Fuentes, 2003). It is also common that there is ambivalence in response to a change proposal (Piderit, 2000). The customer may experience the innovation simultaneously positively and negatively.

Although consumer resistance to innovations has been explained to some extent, little is known of innovation resistance among organizational buyers (Bao, 2009). The process for adoption of innovation is more complicated for organizations than for individual consumers. An organization consists of multiple actors,

each of them having different views about the innovation and different kind of influence in the innovation-decision process. Functional roles influence perception on the factors that affect innovation diffusion (Häggman, 2009), and the collective decision on adoption is done in an interactive process. Individual actors can gate or advance the process towards adoption (ibid). Employees' change resistance is a complex phenomenon not yet fully understood (Cutcher, 2009). Many explanations have been suggested, including the sunken costs related to past human capital investments (Zwick, 2002), psychological defence mechanisms (Bovey and Hede, 2001), as well as the organizational culture (Mirvis *et al.*, 1991) and personal identity in and out of workplace (Cutcher, 2009).

To successfully implement a service innovation, it is of utmost importance to overcome this resistance on both the organizational and individual levels. In the case of technological innovation a distinction between the organization and the employees adopting an innovation might be reasonable (Gallivan, 2001), but in the case of service innovation it is less so. Gallivan (2001) points out, that as important as employees may be in the successful implementation of an organizational innovation, they are ultimately often not the decision makers in the adoption of a technological innovation. However, as service value is always co-created (Vargo and Lusch, 2004) industrial service performance is typically highly affected by the actions of customer companies' employees. Industrial services — especially paradigmatic service innovations — often comprise such large operational areas that employees' opinions need to be taken into account. Organizational changes should always be thoroughly communicated internally (Schweiger and DeNisi, 1991). Commercial success of a service innovation is not possible without employees that readily adopt the new innovation.

## Methodology

### Research approach

This research aims to understand corporate customers' resistance to adopt industrial service innovations. As research on resistance of service innovations within organizational settings is limited, we found an explorative case study an appropriate methodology. Case studies are particularly useful for increasing understanding of topics that are previously underinvestigated (Gummesson, 2000). They are well suited for studying complex organizational processes in real life context (Yin, 1994). They shed light on the detail of social processes in their appropriate context (Hartley, 1994) studying the particularity and complexity of each case (Stake, 1995). The case study was carried out within Finnish industrial companies and it was combined with a literature study.

## Case companies

There were nine supplier companies providing industrial services within the study. They were not directly competing with each other and they came from different industrial fields. Their sizes ranged from small companies to large corporations, as shown in Table 1. The smallest ones were operating mainly in domestic markets whereas the larger ones were clearly global companies. The maturity of these supplier companies as service providers varied from highly advanced to beginners. Each supplier company was asked to name one to three interesting customer companies. Also the customers came from many different industries and their size as well as their level of internationalization varied. Altogether 13 customer companies were interviewed. These companies are listed in Table 2.

## Data collection and analysis

The case data comes from a research project that focused on understanding customers that buy industrial services. The data was collected through qualitative interviews and a series of round table and results workshops. The research project started in June 2008 and ended in February 2010. The semi-structured interviews were made between autumn 2008 and summer 2009. They typically lasted between an hour and two hours. The interviews were conducted by four researchers each being responsible for certain suppliers and their customers. The interviews were recorded and also notes were taken during them. Five conversational round table workshops of about three hours each were held between summer 2008 and winter 2009. Nine interactive results workshops typically lasting between three and four hours each were held during winter 2009–2010. The

Table 1. The industries, the numbers of employees and of interviewed people in each interviewed supplier company.

| Service provider company | Industry | Number of employees | Number of interviewed people |
|---|---|---|---|
| S1 | Machine building | 10 000 – 50 000 | 3 |
| S2 | Machine building | 10 000 – 50 000 | 4 |
| S3 | Mining | 1 000 – 5 000 | 3 |
| S4 | Material handling and logistics | 10 000 – 50 000 | 3 |
| S5 | Automation | 100 – 500 | 4 |
| S6 | Electrical | <100 | 2 |
| S7 | Technical trade | <100 | 2 |
| S8 | Environmental management | 5 000 – 10 000 | 4 |
| S9 | Shipping | 500 – 1 000 | 3 |

Table 2. The industries, the numbers of employees and of interviewed people in each interviewed customer company.

| Client company | Industry | Number of employees | Number of interviewed people |
|---|---|---|---|
| C1 | Mining | 10 000 – 50 000 | 1 |
| C2 | Metal | 1 000 – 5 000 | 1 |
| C3 | Energy | 10 000 – 50 000 | 1 |
| C4 | Chemical | 5 000 – 10 000 | 1 |
| C5 | Petroleum | 5 000 – 10 000 | 1 |
| C6 | Real estate | <100 | 1 |
| C7 | Forest | 10 000 – 50 000 | 3 |
| C8 | Forest | 100 – 500 | 1 |
| C9 | Material handling and logistics | 10 000 – 50 000 | 1 |
| C10 | Transportation equipment | 1 000 – 5 000 | 1 |
| C11 | Machine building | 10 000 – 50 000 | 1 |
| C12 | Medical | 1 000 – 5 000 | 1 |
| C13 | Medical | 1 000 – 5 000 | 2 |

researchers took part in the workshops together with the supplier companies discussing and taking notes.

Both companies trying to sell industrial service innovations and companies that represented the potential adopters of industrial service innovations were contacted during data collection. The research team interviewed 28 chosen employees from nine industrial case companies that wanted to add new innovative services to their offering. The employees represented various organizational roles, but some very typical roles were Service Director, Service Manager, Sales and Marketing Director, Sales Manager, and Customer Manager. Then 16 chosen representatives from their customer companies were interviewed. Common organizational roles in the customer companies were Sourcing Director, Sourcing Manager, and different management positions related to production. Altogether 44 people in key positions were interviewed in the supplier and customer organizations. Gaining the perspective of both sides and varying organizational roles increases the validity of the study. Customers were selected so that they represented varying situations in regard to adoption. Some had adopted an industrial service innovation, some had rejected one while others were potential customers not yet aware of any innovation. This brings into being a more vivid picture of resistance.

The first interviews were done within the supplier companies and our research created knowledge for them about their customers. The supplier and customer companies formed pairs so that the suppliers named customer companies that were especially interesting for them. Then the supplier companies contacted the

customer companies asking for permission for the researchers to go and interview them. Some customers did not agree to being interviewed and we can only try and guess the factors behind their resistance based on the interviews of their suppliers. Most customers however were willing to take part in the study and reacted positively to the interviews.

The main focus of the semi-structured interviews was on customer organizations' buying behaviour in the context of industrial services. We use this data to study the factors influencing buying and rejection decisions of new service innovations as we see that innovation adoption or rejection is in its plainest manifested in the decision to buy or not to buy. Within diffusion research adoption is usually considered to be the decision to do or acquire something (Tidd, 2010).

The supplier companies were asked to describe how they view the service buying behaviour of their customers in general and the service buying behaviour of these specific customers. They were also asked to choose a specific industrial service from their offering that they considered novel and potentially strategic to their customers, and to describe their customers' buying behaviour of this type of services. Then the customer companies were asked how they generally perceive their own buying behaviour of new services. They were also asked about their business relations and buying related to the specific supplier taking part in the study and related to the specific novel industrial service named by the supplier.

The conversational round table workshops were organized overlapping with the interviews. The nine service provider companies gathered together with each others and the researchers to discuss industrial service business development and customers' buying behaviour. The joint view about the phenomenon grew during these discussions and notes were taken.

Throughout the project the researchers also arranged internal project meetings to discuss the content of the interviews and refine their understanding on customer companies' buying of industrial services. The results were presented to the nine participating service provider companies in the end of the research project in company specific results workshops. These workshops were interactive with personnel from the supplier companies commenting the results. The purpose was not only to present the results, but also to discuss and validate them with a wide participation from the companies providing an opportunity for people to ask questions and correct or expand on issues raised. The employees taking part in the results workshops were typically people working in the customer front line and people working in the service development.

No emphasis was made on either adoption or rejection in the actual interviews and the focus of the research project was customer understanding and buying behaviour of industrial services. The results have been analysed from the point of view of rejection and resistance for the purposes of this paper.

## Findings

Both customers and service providers told us that the decision to buy industrial services is to a high degree dependent on the perceived utility and expenses of the service. Organizational buyers look for services that enhance their companies' performance. They appreciate high return on capital, high profits and low expenses. There is resistance to paying. In many cases they would not like to pay anything for the services, instead they would often like to receive services as free giveaways on the side of the physical product.

Taken the price sensitivity of many customers, one has to ask, does the utility of the service innovations offered actually outweigh the expenses attached to them and have the service providers been able to correctly assess the utility and expenses of their offering from the customer's point of view. The provider companies may have developed their services to cater for the technically sophisticated and risk taking customers whereas a large part of customers may actually be more price sensitive and risk averse. It may be that some service providers are so occupied with the high quality features of their service innovations that they do not fully notice that the service does not meet the needs of the majority of customers.

The benefits, expenses and risks of a novel service were seen differently by different customers depending on the customer company itself, on the environmental context, on the service innovation, and on the supplier company. We view that there is a need for a fit between these elements in order for the adoption of an industrial service to occur. In this chapter we discuss the influence of the fit of an industrial service innovation from four different angles: customers' business environment, the customers themselves, the supplier, and the innovation.

### Influence of customers' business environment

The interviews were carried out in 2008–2009, right in the middle of a great recession that was preceded by a high market boom. The significance of the general economy on service innovation adoption was clearly evident.

During the boom the Finnish industry had full order logs causing delivery times to peak. This forced companies to outsource and look for service solutions that would enable them to keep up with the rapid market growth. New market opportunities were created for both simple basic services and for more sophisticated services like knowledge intensive or performance-based services.

As the downturn hit and substantially impeded the flow of capital, it simultaneously advanced and hindered adoption of industrial service innovations and partially changed the type of services that customers were willing to adopt. Clients that would normally have invested in new production equipment became very

interested in services in the areas of maintenance and modernization of old equipment in order to avoid large capital investments. As long as customers' factories were not closed down, they needed services supporting production. This is epitomized by the statement: "*The finance crisis can not be seen in maintenance business — yet — as production sites haven't been shut down. But we are loosing business quickly in project type services, especially in larger projects. Old sites are being modernized instead*". As order levels declined, clients started to think that it was quite acceptable for them to have process interruptions and slow and ineffective production in their factories. For this reason, clients lost their interest in preventive maintenance, and repair services were used instead if necessary.

As the overall demand declined, there was less need for all kinds of supply. Customers lost their interest for the resource freeing services that had been developed for the boom market. Instead, they were doing as much as possible in-house in order to arrange work for own employees. Customers were also looking for possibilities to downscale the level of services bought.

Cash management became the most important business issue, much more important than long term and even short term profitability. The situation clearly inhibited the adoption of profitable service innovations that otherwise would have been adopted. Many people expressed a social pressure: they were afraid of being seen as professionally incompetent by their colleagues had they suggested any kind of new investments, even very profitable ones. The level of bureaucracy concerning expenses was raised. Even very small costs had to be approved very high up in organizations. One supplier described the sentiment saying: "*The focus is on savings. This is really not a time for ideation*".

Competitive pressure also seems to be able to both advance and hinder the adoption of industrial service innovations. Fierce rivalry forces companies to seek new solutions for gaining competitive advantage. This may increase clients' interest for such innovations that they perceive to solve their immediate problems. Yet it may decrease clients' interest for innovations for which they do not see the need as acute. Companies that have a difficult competitive situation must consider carefully where to invest their money. They may seek for a novel solution just as well either upscaling or downscaling services. For instance one customer operating in a highly competitive business found it very important to strengthen its own technical know-how and to divide outsourced services into small segments that could be bought based on an hourly cost. Another customer operating in a very similar business had a totally opposite strategy. They wanted to reduce the number of own technical personnel and to outsource large service entities with a fixed price.

The interviews also included views stating that some customers that had an outstanding market position and financial situation did not seem to be very

interested in the improvements that service innovations would bring about. Supplier companies' sales people felt that these customers often did not feel the urge to strive. Even some customers themselves admitted that they had it so easy before the downturn that they did not really need to think about efficiency improving services. Companies operating close to their aspiration level may not value the utility of a performance improving service as high as companies that have a greater gap between their performance level and aspiration level.

### Influence of characteristics related to customers

The perceived needs varied to a great deal in some very similar customer companies competing in same markets, producing products of the same kind and having similar size organizations. What differed in these companies was the deeper structure of their business model: what did they consider as their core competence, what was their outsourcing and purchasing strategy, and how were they planning to compete and make profit.

A classic example of service innovation resistance that we have seen in many companies is when the service is too close to the core business of the customer company. Suppliers often either ignore this important issue or they are simply not aware of the confines of customer's core business. Many customers do not even want to publicly announce their core business. In these cases the supplier's offering may actually be somehow better than what the customer is already doing, yet it is not appealing to the customer. Customers do not wish their suppliers to take over their business. Attempts to do so will easily result in strong opposition and even defensive attack.

The willingness to adopt an innovation requires that the customer feels some sort of need or want that leads the customer to an action for adoption. This may take the form of a gap between the organization's expectations and its actual performance. Expectations can often be raised and a problem created by presenting a beneficial solution. This is not always that easy though. Companies that feel that they are already doing fine seem to be less interested in taking the risks and making the effort associated with adopting a service innovation.

The business customs, culture and knowledge level of the customer also has an effect on how attractive a service innovation seems. There are, e.g., differences between developed countries and the developing countries in understanding the significance of preventive maintenance making it difficult to sell this kind of service innovations to developing countries. Business habits and culture are changing though as more and more corporate managers from developing countries are educated in the western countries and as the amount of foreign, globally operating companies is growing in the developing countries.

Different customer companies have different practices of decision making that lead to differences in their adoption of service innovations. For example some companies give a lot of decision power to centralized purchasing organizations whereas in some other companies production units make their own purchasing decisions independently. Purchasing organizations and production units often have different views and attitudes concerning the novel industrial services. Suppliers eagerly innovate to serve the efficiency improvement needs of customers' operations. These innovations are easily rejected if they do not conform to customer's purchasing strategy and the customer has a strong purchasing organization. On the other hand some customer companies have very progressive purchasing departments that may actually favour innovative suppliers. One customer described the difference between the thinking of purchasing department and production site concerning services purchasing as following "*We started global sourcing four years ago. To put it mildly there was a lot of grumbling. One had to fight in every little detail*".

In order for an organization to adopt a service innovation, individuals within that organization also need to adopt the service. Decisions on industrial service innovations often affect a lot of people in different functions and levels of an organization, e.g., operational level and higher management, production, purchasing, and strategic planning. The employee roles and tasks within customer organizations vary and therefore different people experience the service differently. A service innovation that is seen as beneficial in one part of the organization may cause problems and innovation resistance in another part of the same organization. One supplier described this phenomenon as following "*A lot depends on for whom you get to sell. A superintendent will only look at the budget. The fleet director or the CEO may look at total business*".

Service providers often hope to find one decision maker for whom to sell the service and they try to go up the management chain to find one, but often such a person cannot be found. Instead multiple decision makers are typically involved. In most cases the innovation adoption decision is actually the result of a collective sense-making and decision making process within the customer organization. It is rare for even highest management to make authoritarian decisions on issues like complex industrial service without considering the opinion of different affected functions.

This often makes the adoption decision process of an industrial service gradual and iterative. Some parts of the customer organization may be in favour and others against the innovation. Individual people may also simultaneously find both positive and negative aspects in the innovation. The organizational sentiment towards a novel industrial service can be ambivalent and change over time. It is very usual that during the adoption negotiation process the industrial service is

changed, specified and tailored by the supplier to better fit the different expectations in different parts of the customer organization. These changes may be imperative for the adoption of complex industrial services to occur.

The people in customers' organizations have individual emotional experiences of the industrial services offered. These experiences often deal with the professional identity of customers' employees. Issues of division of work and changes in the content, demands and image of work are very emotional and may cause strong opposition to the service innovation. For example the adoption of outsourced maintenance service typically requires that the service provider employs the customers' maintenance people and solves potentially difficult personnel issues.

Adopting industrial service innovations usually requires that someone in the customer organization gets personally involved with the issue, works as a champion and organizes the resources for the adoption and implementation. Personal involvement is a limited resource in today's streamlined organizations. One customer expressed the feeling of many by explaining that he found a lot of potential in industrial services and that there is a lot to be developed together with service providers "*… but time just goes into other things, to the daily work, and I simply can't make it*". Even very profitable proposals can be turned down as they do not surpass the level needed to wake up real interest. One customer described the bar for interest during the busy and lucrative market boom with the words "*A year ago, we were not interested in savings of 100 000 euros*".

If the service innovation does not raise a high level of personal interest within the customer organization it may result in non-adoption despite the benefits as no-one is willing to take the effort. Often the benefits are experienced by a different person than the one who has to put in the effort. This easily leads to innovation resistance. It is quite usual that the adoption of a novel industrial service is opposed by a project manager or a development manager who needs to give his or her team's resources to the specification and implementation process, but who does not get the credit or benefit from the service.

### Influence of characteristics related to the supplier

The service provider company itself, its compatibility with the customer and its credibility have an influence in the adoption of industrial services. Most customers described that they want to minimize the number of suppliers they work with, but on the other hand they do not want to be fully dependent on single sources. Therefore sales of novel services is easier for those suppliers that already have a business relationship with the customer, and that can cater a wide range of the customer's needs.

It is very important that the service provider is credible for delivering what it promises. Credibility is gained through references or through a long term relationship with the customer. Trust and depth of the relationship between the customer and the supplier has an important effect for the adoption of a novel service. The following examples describe how customers saw these issues:

> "There's a risk if the partner doesn't understand the meaning of service. That they are there to support the customer and take responsibility."
> "If human relations work, then the service starts fine."
> "Credibility is not created in the negotiation room, but in what you get done."
> "Credibility comes from experience, financial situation and references."
> "It's easier to do business with people you know."
> "We don't easily replace suppliers that we have good experiences of."

## Influence of characteristics related to the innovation

### Complexity, trialability and observability

Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. Industrial service providers try to develop their services to be easy to use. Often customer companies actually need less technical personnel after adopting an industrial service. However, as industrial services are often paradigmatic innovations or systemic innovations, it is often difficult to assess the actual consequences of adopting them. The threshold of adoption is further raised by common requirements for the customer to change itself.

It is also difficult for service providers to describe the content of their services. Service brochures and net sites are written using fancy marketing terms that do not yet have a common accepted meaning. It is also difficult for the personnel of service companies themselves to understand the content of the services they offer. Therefore sales people do not know how to sell them.

For some customer companies it is clearly difficult to buy anything that is not tangible. "*We don't buy air*", said one of the customers. Another customer's purchasing director was described by a supplier with the words "*It's hard for him to perceive the difference between service and material*". Yet all customers need some services. Customers can be divided into two main categories. Customers in the first category are willing to buy products and services separately and also to pay for service. Customers in the second category agree on buying

products only. They have to pay for the services they need within the price of the products.

In many cases it is difficult and expensive to recall industrial service decisions. Therefore industrial services often have a low level of trialability. The effect of this is reduced by industrial services typically being based on long term relationships between customers and service suppliers. The relationships develop over time as both customers and suppliers learn about each others' capabilities. It is also quite normal that every aspect of an industrial service has not been defined at the time when agreements are made. Industrial services are shaped and moulded throughout service relationships.

Observability of industrial services is limited by the confidentiality of service relationships. It is often also difficult for the partners themselves to measure the benefits of adopting an industrial service. The value of a service is not only dependent on the service itself or the actions of the service provider, but the customer and the environment also have a strong effect on it. It is often difficult to evaluate which part of a performance improvement (or decrease) is the result of adopting an industrial service and which part is due to other factors.

## Relative advantage and compatibility

Relative advantage of an industrial service innovation is the degree to which the service is perceived as being better than the way of operation it supersedes, or possible competing ways of operating. Relative advantage of an industrial service innovation clearly differs depending on the customer and its context. It also differs depending on from whom you ask in the customer organization. The essence of service lies in the customer being the focus of attention and in the service provider being able to come up with a solution that suits each specific customer in its own business context. This does not mean that the service would always have to be tailored differently for each customer, but it means that one has to find the type of service that fits the customer best — the type of service that is relatively advantageous to the customer.

Financial benefits and costs are extremely important in determining the relative advantage of a service innovation for industrial customers. Yet there are other types of issues that also count especially when it comes to innovation resistance. Changes in one's habits or company's practices require efforts that are often seen as heavy and unpleasant. Industrial service innovations often require changes in the customer's organization that may cause innovation resistance. Customers are also concerned about the effect of adopting a service on their professional identity. For example one of the customers explained to us that he used information that he had gained from a service to provide it for his superiors for decision making.

It turned out that the information had been faulty and wrong decisions were made. This made him look bad in front of his superiors and affected his willingness to continue the use of the service. Outsourcing in general often has a strong effect on employees' professional identity that may cause organizational resistance. Many people in management positions explained that thorough investment calculations are needed in order to get a positive decision but also to cover one's back. Customers want to make sure that they do right decisions and that nothing goes wrong, but in case something does go wrong they are able to refer to the calculations for their defence and protect their professional status. Customers also want to enjoy what they are doing. It is always nicer to do business with someone you like, whom you trust and who does not cause you trouble. Reaching for good enough is much more rewarding than slaving for perfection. Often the utility of an industrial service actually comes from decreasing some sort of discomfort or releasing pressure. For instance there are examples where customers have turned into outsourced service because of bad employee relations or other stressful problems. Whether the price of a service is seen as fair also affects customers' willingness to buy, which may cause a problem for those service providers who are trying to raise margins by converting into value based prising.

These issues described above have to do with the emotions of individual people working in the customer organizations. The supplier companies that participated in this study, and very many other Finnish technology companies, believe that emotional issues have a strong influence on organizational acceptance of novel services. When assessing the relative advantage of an industrial service innovation one has to look at the financial utility and costs, but one also has to look at other aspects like how the different parts of customer organization feel about the service or what is their service experience.

Resistance towards service innovations is highly influenced by the perceived risk of adopting them. Both personal risks and organizational risks matter. The risks are minimized and managed, e.g., through careful investment calculations, well considered contracts and the choice of capable and trustworthy partners. Organizational changes are always risky. Industrial service decisions are typically difficult and expensive to recall. The risks associated with utility and expenses of the service are realized on a different time span. The expenses of industrial services are typically realized early and with a certainty whereas the benefits are uncertain and realized with a delay. This can be alleviated through careful design of services. The feeling of risk attached to an otherwise tempting service innovation may cause the customer company to postpone the adoption to the point of rejection.

In addition to the likelihood of a risk, one also has to consider the criticality of a risk. Some risks are tolerable even though their probability is quite high while some others are intolerable even though they have a small probability of

occurrence. Different customers have different profiles in their overall tolerance to risks and to the type of risks they tolerate. This affects the acceptability of the risk level of a service when it is offered, e.g., for a nuclear plant or a paper plant. Also customers' business situation affects their ability to tolerate different risks. The following quotes give an idea of how the customers viewed some of the critical risks related to the industrial services.

> "We can't outsource, because… anyone could learn the job and that could lead to us loosing our competitive edge."
> "We would loose our technological know-how if we were to outsource maintenance."
> "There are big safety and liability issues with running our production. Who would be liable if something happened?"

Suppliers often seem to propose service innovations that offer only limited benefits. Organizations are not willing to use a lot of resources in small improvements. If the service innovation lacks the potential for substantial improvements, it may be reason for rejection.

In the end it all comes down to the issue of compatibility. Summarizing what has been written above about the influence of customer's business environment, of the customer itself, of the supplier, and of the innovation, compatibility or fit of the innovation matters to a very great degree. Compatibility manifests itself in industrial service innovations in very many ways. Compatibility is not just a characteristic of the service itself. It is the compatibility of the service to the customer's organization, to the customer's business situation, to the customer's needs and to the supplier. It is also the compatibility of the customer and the service provider to each other. Resistance may result from the supplier offering a service that is not actually compatible. The supplier may have a wrong initial perception about the need of the customer or how the customer views the costs related to the service.

## Discussion

In this paper, we have contributed to the discussion on innovation diffusion from a perspective that combines issues that are widely accepted to be important — yet less studied. These issues are industrial service business innovation and organizational resistance to innovation.

The study has been conducted within the context of industrial service innovation. Yet we believe that it is of interest in the general context of business-to-business market innovations. The study helps companies that try to avoid the pitfalls of innovation rejection. Innovation rejection can be a problem both

to suppliers and the customers. The results are also interesting for policy makers and change agents promoting the transformation of industry towards service business logic.

The case study within this research included many different types of industrial service providers and many different types of customers, which enriched our view of innovation resistance. The interviews also covered both the customers' and the suppliers' views. Case studies are rich, empirical descriptions of particular instances of a phenomenon (Yin, 1994). Our sample was small so it is not meaningful to use it for statistical hypothesis testing. The strength of our methodology lies in each supplier-customer pair being a distinct rich experiment. Also the use of round table discussions and workshops improves the validity of our results as these meetings allowed for multiple people from different organizations to reflect the results together. However, as innovation-decision process is a very complicated process especially in organizations, we do not assume that we have reached an extensive understanding of the phenomenon. We have merely scratched the surface and call for more research.

In terms of future research we believe that there is a clear need to better understand the dynamics of industrial service business innovations. We believe that there are unaddressed issues in the customer companies' resistance to adopt new innovations offered by suppliers. This resistance is not only important from the point-of-view of supplier organizations. It is also important from the point-of-view of the customer companies themselves as they are struggling to innovate in the global competition.

Despite the growing interest in open innovation and collaboration for innovation, customers' role in innovation is not fully understood. Issues like barriers to users becoming active innovators have remained largely unexplored (Raasch *et al.*, 2008). Collaboration for innovation can be seen as an innovative practice per se. Therefore it is possible to discuss resistance to participate in collaborative working practices as a special case of innovation resistance. It is very possible that the same kind of issues that cause resistance to service innovations also cause resistance to customers participating in collaboration for innovation.

Our results emphasize that an organization as an adopter is actually a network of individuals and teams having different roles and experiencing the service differently. Even though financial benefits and costs are very important in determining the relative advantage of an industrial service innovation, also other aspects including emotional issues and risk aversion have a strong influence. For these reasons an organization's sentiment towards adopting an innovation is often ambivalent.

Industrial service customers are clearly very different from each other. We find the fit between the service, the customer, the supplier, and the business context

very important for the adoption to occur. Reaching for a fit calls for new ways of segmentation based on customers' needs, organizations, business environments, and business models. Different types of services and service levels can be offered for different customer segments. Development of service customizability helps in doing this efficiently.

Resistance is not simply a negative thing or result of ignorance. Resistance reveals important drawbacks of an innovation that should not be simply ignored or compensated by adding new benefits. We find understanding resistance an important part of managing the art of innovation. When creating new innovative concepts, it is important to know also customers' negative affects, not only the positive ones. It is the total service experience that counts, not the individual service characteristics. Understanding customers' total experience and resistance of new innovations and utilizing that information to the development of services and products will lead to better innovations that not only diffuse rapidly, but even more importantly they serve customers better.

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## References

Alam, I (2006). Removing the fuzziness from the fuzzy front-end of service innovations through customer interactions. *Industrial Marketing Management*, 35, 468–480.

Alam, I and C Perry (2002). A customer-oriented new service development process. *Journal of Services Marketing*, 16(6), 515–534.

Bao, Y (2009). Organizational resistance to performance-enhancing technological innovations: A motivation-threat-ability framework. *Journal of Business and Industrial Marketing*, 24(2), 119–130.

Boeker, W and YP Huo (1998). Innovation adoption by established firms: Unresolved issues. *The Journal of High Technology Management Research*, 9(1), 115–130.

Bovey, WH and A Hede (2001). Resistance to organizational change: The role of defence mechanisms. *Journal of Managerial Psychology*, 16(7), 534–548.

Brand, MJ and E Huizingh (2008). Into the drivers of innovation adoption: What is the impact of the current level of adoption? *European Journal of Innovation Management*, 11(1), 5–24.

Chesbrough, H (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.

Chesbrough, H (2011). *Open Services Innovation: Rethinking Your Business to Grow and Compete in the New Era*, 1st edn. San Francisco: Jossey-Bass, Wiley.

Cutcher, L (2009). Resisting change from within and without the organization. *Journal of Organizational Change Management*, 22(3), 275–289.

Daft, RL (1978). A dual-core model of organizational innovation. *The Academy of Management Review*, 21(2), 193–210.

Damanpour, F (1996). Organizational complexity and innovation: Developing and testing multiple contingency models. *Management Science*, 42(5), 693–716.

Day, RL and PA Herbig (1990). How the diffusion of industrial innovations is different from new retail products. *Industrial Marketing Management*, 19(3), 261–266.

de Brentani, U (1991). Success factors in developing new business services. *European Journal of Marketing*, 25(2), 33–59.

de Brentani, U (1995). New industrial service development: Scenarios for success and failure. *Journal of Business Research*, 32, 93–103.

Deloitte (2006). *The Service Revolution in Global Manufacturing Industries*. New York: Deloitte Research.

Edgett, S (1994). The traits of successful new service development. *Journal of Services Marketing*, 8(3), 40–49.

Frambach, RT, HG Barkema, B Nooteboom and M Wedel (1998). Adoption of a service innovation in the business market: An empirical test of supply-side variables. *Journal of Business Research*, 41(2), 161–174.

Frambach, RT and N Schillewaert (2002). Organizational innovation adoption: A multi-level framework of determinants and opportunities for future research. *Journal of Business Research*, 55(2), 163–176.

Gallivan, MJ (2001). Organizational adoption and assimilation of complex technological innovations: Development and application of a new framework. *The Data Base for Advances in Information Systems*, 32(2), 51–85.

Gatignon, H and TS Robertson (1985). A propositional inventory for new diffusion research. *The Journal of Consumer Research*, 11(4), 849–867.

Gauvin, S and RK Sinha (1993). Innovativeness in industrial organizations: A two-stage model of adoption. *International Journal of Research in Marketing*, 10(2), 165–183.

Greve, HR (1998). Performance, aspirations, and risky organizational change. *Administrative Science Quarterly*, 43(1), 58–86.

Gummesson, E (2000). *Qualitative Methods in Management Research*. Thousand Oaks: Sage Publications.

Häggman, SK (2009). Functional actors and perceptions of innovation attributes: Influence on innovation adoption. *European Journal of Innovation Management*, 12(3), 386–407.

Hartley, JF (1994). Case studies in organizational research. In Catherine, C and G Symon (eds.). *Qualitative Methods in Organizational Research*. London: Sage Publications.

Herbig, PA and RL Day (1992). Customer acceptance: The key to successful introductions of innovations. *Marketing Intelligence and Planning*, 10(1), 4–15.

Huizingh, EKRE and MJ Brand (2009). Stepwise innovation adoption: A neglected concept in innovation research. *International Journal of Technology Management*, 45(3–4), 267–281.

Jensen, R (1988). Information capacity and innovation adoption. *International Journal of Industrial Organization*, 6(3), 335–350.

Johnston, WJ and JE Lewin (1996). Organizational buying behaviour: Toward and integrative framework. *Journal of Business Research*, 35, 1–15.

Judge, TA, CJ Thoresen, V Pucik and TM Welbourne (1999). Managerial coping with organizational change: A dispositional perspective. *Journal of Applied Psychology*, 84(1), 107–122.

Kitchell, S (1995). Corporate culture, environmental adaptation, and innovation adoption: A qualitative/quantitative approach. *Journal of the Academy of Marketing Science*, 23(3), 195–205.

Klein, KJ and JS Sorra (1996). The challenge of innovation implementation. *The Academy of Management Review*, 21(4), 1055–1080.

Lovelock, CH (1983). Classifying services to gain strategic marketing insights. *Journal of Marketing*, 47(Summer), 9–20.

MacVaugh, J and F Schiavone (2010). Limits to the diffusion of innovation: A literature review and integrative model. *European Journal of Innovation Management*, 13(2), 197–221.

Mirvis, PH, AL Sales and EJ Hackett (1991). The implementation and adoption of new technology in organizations: The impact on work, people, and culture. *Human Resource Management*, 30(1), 113–139.

Oliva, R and R Kallenberg (2003). Managing the transition from products to services. *International Journal of Service Industry Management*, 14(2), 160–172.

Pardo del Val, M and CM Fuentes (2003). Resistance to change: A literature review and empirical study. *Management Decision*, 41(2), 148–155.

Piderit, SK (2000). Rethinking resistance and recognizing ambivalence: A multidimensional view of attitudes toward an organizational change. *Academy of Management Review*, 25(4), 783–794.

Raasch, C, C Herstatt and P Lock (2008). The dynamics of user innovation: Drivers and impediments of innovation activities. *International Journal of Innovation Management*, 12(3), 377–398.

Ram, S and JN Sheth (1989). Consumer resistance to innovations: The marketing problem and its solutions. *The Journal of Consumer Marketing*, 6(2), 5–14.

Rogers, EM (2003). *Diffusion of Innovations*, 5th edn. New York: Free Press.

Schweiger, DM and AS DeNisi (1991). Communication with employees following a merger: A longitudinal field experiment. *The Academy of Management Journal*, 34(1), 110–135.

Stake, RE (1995). *The Art of Case Study Research*. Thousand Oaks, California: Sage Publications.

Technology Industries of Finland (2003). *BestServ Feasibility Study Final Report*. Helsinki: Technology Industries of Finland.

Tekes (2010). *Palveluliiketoiminnan sanasto — Vocabulary of Service Business*. Downloaded from website of Tekes — The Finnish Funding Agency for Technology and Innovation, http://www.tekes.fi/fi/community/Julkaisut_ja_uutiskirjeet/333/Julkaisut/1367, accessed November 2010.

Tidd, J (2010). From models to the management of diffusion. In Tidd, J (ed.) *Gaining Momentum*: *Managing the Diffusion of Innovations*. London: Imperial College Press.

Tidd, J, J Bessant and K Pavitt (2005). *Managing Innovation: Integrating Technological, Market and Organizational Change*, 3rd edn. Chichester: John Wiley and Sons.

Vargo, SL and RF Lusch (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68, 1–17.

Vermeulen, P and W van der Aa (2003). Organizing innovation in services, In Tidd, J and FM Hull (eds.) *Service Innovation: Organizational Responses to Technological Opportunities and Market Imperatives*. London: Imperial College Press.

von Hippel, E (1986). Lead users: A source of novel product concepts. *Management Science*, 32(7), 791–805.

von Hippel, E (2005). *Democratizing Innovation*. Cambridge, MA: The MIT Press.

Wanberg, CR and JT Banas (2000). Predictors and outcomes of openness to changes in a reorganizing workplace. *Journal of Applied Psychology*, 85(1), 132–142.

Webster, FE Jr. (1969). New product adoption in industrial markets: A framework for analysis. *The Journal of Marketing*, 33(3), 35–39.

Wejnert, B (2002). Integrating models of diffusion of innovations: A conceptual framework. *Annual Review of Sociology*, 28(2), 297–326.

Yin, RK (1994). *Case Study Research: Design and Methods*, 2nd edn. Newbury Park, CA: Sage Publications.

Zeithaml, VA, A Parasuranam and LL Berry (1985). Problems and strategies in services marketing. *Journal of Marketing*, 49(2), 33–46.

Zwick, T (2002). Employee resistance against innovations. *International Journal of Manpower*, 23(6), 542–552.

# Article II

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# Organizational Needs: A Co-Creation and Human Systems Perspective

Heidi Korhonen

**Abstract:** The concept of need is embedded in economic systems. Since the concept originates in individual psychology, it is not well understood at the organizational level and other higher systemic levels. We address this gap by drawing on research on human needs, on organizations, and on value co-creation in nested human systems. We present a framework that summarizes essentials of well-being, behavior and the change dynamics of needs at individual, organizational, and ecosystemic levels of human systems of value co-creation. We argue that needs are co-created in nested human systems and that organizational needs are bridging meso level needs that mediate between the needs of different actors. It is important to re-think needs in this way as it allows us to search for new ways to increase the value creation and well-being of actors. We conclude our paper with academic and managerial implications and suggestions for further research.

**Keywords:** Organizational Need· Co-Creation· Systems Theory· Service-Dominant Logic· Actor-to-Actor· Well-being· Behavior· Ecosystems

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## Introduction

The concept of need is embedded in economic systems, especially in their marketing and development functions. The very purpose of economy, markets and innovation can be argued to be the fulfilment of human needs. Recognizing and understanding customers' needs and how they change provides important opportunities for innovation, sales growth, competitiveness and profits, both in consumer markets and in business markets. Needs can be seen at different levels of nested human systems, for example individuals, groups, organizations, business ecosystems, industries, countries, and society. Consumer need has been studied a great deal, but since the concept of need originates in individual psychology, it is less understood at the organizational level and other higher systemic levels.

The purpose of this paper is to clarify the concept of organizational need as nested in human systems of value co-creation and to draw research and managerial implications. Service-dominant logic (Vargo and Lusch 2004, 2008) is an approach that describes value co-creation between economic actors. It can be used for studying many social phenomena, and recently it has aimed to build a bridge between individual, organizational, and market levels (Gummesson 2011; Vargo and Lusch 2011). Therefore we find the service-dominant logic (SDL) of particular use for our purpose of taking the step from individual needs to organizational needs.

We address the gap of organizational need by drawing on research on human needs, on organizations, and on value co-creation in systems of actors (SDL). On the basis of this background, we posit the following research questions:

RQ. What is an organizational need when viewed as co-created and "nested", and why is it important to re-think needs as they exist within systems? What kinds of research and managerial implications emerge based on such a systemic view of needs?

The rest of this paper is structured as follows. We start by analyzing the basic nature and change dynamics of human needs. Thereafter, we analyze organizations as different kinds of systems: rational, natural and open (Scott, 2003[1981]). In the next section, we discuss the contribution of SDL to the deepening of the systemic view on needs. Based on these conceptual considerations, we then present a new framework, namely organizational needs as co-created in nested human systems. We end our paper with a concluding discussion in which we summarize our contribution, point out academic and managerial implications and suggest avenues for further research.

## Human needs

In this section, we ask what are human needs and how are they formed. For this we analyze theories on human needs from two viewpoints: what is the primary nature of needs and what are their change dynamics. Table 1 summarizes some main references on these issues.

**Table 1:** Primary nature, change dynamics and characterizations of needs: main references

| Primary nature of needs | Change dynamics of needs | Characterization of needs | Main references |
|---|---|---|---|
| Needs are primarily seen as factors explicating goal-directed behavior | Needs are innate | Action is driven by primary physiological needs as the body works to maintain a homeostatic balance. An imbalance gives rise to tension that needs to be reduced. Behavior that reduces these needs is repeated, as learning occurs through conditioning and reinforcement. | (Hull 1943) |
| | | Needs can be organized in a hierarchical order so that higher order needs must be satisfied before others: physiological needs, safety, love and belonging, esteem, self-actualization, self-transcendence. | (Maslow 1978[1954]) |
| | | Higher order needs can be pursued simultaneously with lower order needs. Needs can be grouped into needs for existence, relatedness and growth (ERG). | (Alderfer 1969) |
| | Needs are acquired | Needs explain motivation and direction of behavior. They are learned and activated by the environment, psychological rather than physiological. There are individual differences in the importance of various needs for different people, leading to unique personalities. | (Murray 1938) |
| | | Needs are shaped by experiences and they can be classified into needs for achievement, affiliation and power. | (McClelland 1961) |
| Needs are primarily seen as fundamental essentials of well-being | Needs are innate | Humans are intrinsically motivated proactive organisms that are naturally inclined to engage in activities that interest them. Their behavior does not have to be aimed at need satisfaction. However, satisfaction of the needs of competence, autonomy, and relatedness is a necessary condition for psychological well-being. | (Deci and Ryan 1985, 2000) |
| | Fundamental needs are universal but their satisfiers change across cultures and through time | The fundamental and constant needs are subsistence, protection, affection, understanding, participation, leisure, creation, identity and freedom. Satisfiers include for instance forms of organization, social practices, values and norms. Lack of resources in satisfying a fundamental need reveals a kind of poverty. | (Max-Neef 1991) |
| | | All humans share a fundamental goal to participate in a form of social life of their choice. The preconditions for any individual action in any culture – physical health and autonomy – need to be satisfied to some degree before actors can effectively participate in their form of life so as to achieve any other valued goals. These, therefore, are the most basic human needs. Intermediate needs are characteristics of needs satisfiers that universally contribute to improved physical health and autonomy. They can be regarded as goals for which specific satisfiers can act as the means. | (Doyal and Gough 1991) |

### Needs as factors explicating goal-directed behavior and needs as essentials for well-being

There are two fundamentally distinct traditions concerning the view of the primary nature of needs: needs as factors explicating goal-directed behavior and needs as fundamental essentials of well-being. This distinction is shown in the first column of Table 1. Need theories of the first tradition are essentially drive theories based on an underlying philosophy assuming that human behavior is rather deterministic. The other stream of theories of human needs is aimed at explaining what is needed for people to flourish and achieve well-being. These theories try to describe desired states that we should aim at in order to be able to reach what is seen as human flourishing. Behavior may or may not be driven to these states. In other words, human beings may or may not behave in ways that are good for them. As opposed to determinism, these more recent theories emphasize importance of issues such as autonomy, freedom and choice in human behavior. Needs as fundamental essentials of well-being are of a different nature than needs as factors explicating goal directed behavior.

The study of human well-being and flourishing has made great advances in the wave of positive psychology. Here, psychological well-being is seen as dependent on positive emotional experiences and an overall sense of purpose (Fredrickson 1998; Fredrickson and Joiner 2002; Seligman et al. 2005). This research stream is important from the viewpoint of the present paper because it has also been influential in organizational psychology; researchers have suggested that positive emotions produce upward spirals in organizational dynamics (Fredrickson 2003) and support more generative organizational change processes (Bushe 2007).

Both pleasure and purpose have been argued to be essential in employee well-being (Robertson and Cooper 2010). There seems to be a strong connection between the pleasurable experience of fulfillment of needs and well-being, but well-being is not only about hedonic experiences and survival. It also seems to be linked to intrinsic motivation, purpose and the capability and freedom to do things that one values.

Based on the discussion above, we outline a first research proposition:

P1. Needs can be understood either as fundamental essentials of actors' well-being or as factors explicating goal-directed behavior.

### Change dynamics of human needs

Another issue where theories of human needs differ greatly is the view of the change dynamics of needs which is shown in the second column of Table 1. Basically, needs can be seen as either acquired or as innate. Innate needs are considered to be constant human characteristics common to all people, whereas acquired needs are considered to change during the course of people's lives. It is quite evident, however, that even if fundamental human needs were to be considered constant and common, there is something related to needs that changes over time and across different

cultures. This ambiguity can be solved by making a distinction between needs of a more general nature and their specific manifestations at certain moments in time (cf. Max-Neef 1991; Doyal and Gough 1991). Also, a distinction can be made between needs and their satisfiers, considering needs as constant and their satisfiers as changing. The change processes of needs, their manifestations and their satisfiers are social phenomena taking place as people interact with other people in social systems (Doyal and Gough 1991).

One way of addressing the issue of changing needs has been to view needs as hierarchical in relation to each other. The best-known theory of human needs, Maslow's (1987[1954]) hierarchy of needs, is a drive theory claiming that unsatisfied needs motivate people to act, and that certain needs must be satisfied before others. His hierarchical list of needs shown in Table 1 can still be seen as a good list of different kinds of needs, but the idea of satisfying needs in a stepwise manner is no longer considered to be valid (Sheldon 2004). Instead, it is more common to view needs and their satisfaction as characterized by simultaneity, complementarity and trade-offs. Certain needs, or certain specific manifestations of needs, may be regarded as more important than others either at specific times or for specific people. This varying relative importance can also be seen to be affected by social interaction.

Based on the discussion above, we outline a second research proposition:

P2. The specific manifestations and satisfiers of needs change in social processes through interaction.

The interaction through which the manifestations and satisfiers of needs change, takes place between actors of different levels, for instance individuals, groups and organizations. Needs themselves can also be seen at higher systemic levels above the individual, such as organizations. In the following section, we address the issue of organizations.

## Organizations as rational, natural and open systems

Our main argument in this paper is that organizational needs are co-created in nested human systems. In order to open up and justify this argument, we have to take a closer look at the nature of organizations. We start this analysis by utilizing Scott's (2003[1981]) categorization that recognizes three distinct perspectives on organizations:

1. Organizations as rational systems – highly formalized social structures that are instruments for pursuing relatively specific and predetermined goals
2. Organizations as natural systems – collectivities and social groups strongly influenced by the informal structure of relationships, whose participants pursue multiple interests, both disparate and common
3. Organizations as open systems – aggregations of flows and activities that link shifting coalitions of participants embedded in wider environments.

In what follows, we combine our review on the nature of individual needs and their change dynamics with Scott's categorization on three organizational systems. The combination is presented in Table 2.

**Table 2:** Aspects of needs in different organizational perspectives (cf. Scott, 2003 [1981])

| | **Organizations as rational systems** | **Organizations as natural systems** | **Organizations as open systems** |
|---|---|---|---|
| **Needs as fundamental essentials of well-being** | Organizations need to survive. Other goals are expressed in formal representations such as key figures and strategy. | Organizations have the need to survive as a social group. They rely on employees' willingness to make contributions. | Organizations are dependent on flows of personnel, resources, and information from the outside. |
| **Needs as factors explicating goal-directed behavior** | The behavior of organizations is aimed at accomplishing their goals in an optimizing way. Behavior emerges from formal decision processes. | Behavior is guided by the informal organizational structure. It emerges from the multiple motives, values, feelings and sentiments of employees. There are both common and individual agendas. | Behavior emerges from loosely coupled semi-autonomous parts such as teams, departments etc. |
| **Change dynamics of needs** | Goals are predetermined. | Individuals and coalitions choose organizational goals through negotiations and the interests of some parties are often favored over those of others. | Organizations are capable of double-loop learning and self-maintenance. The setting of goals is also influenced by stakeholders outside the organization. |

From the rational systems perspective, organizations are primarily instruments for attaining predetermined goals (ibid). Therefore, we can think of their fundamental needs as fulfilling the basic purpose of the organization. In the context of private companies, the rational perspective usually assumes that the purpose of a company is to optimize net financial value for the organization or its shareholders. This purpose does not change.

Rational organizations also need to survive. Other manifestations of needs are expressed in formal representations, such as key figures, formal goals, expressed strategy, etc. Organizational behavior emerges through planned and formal decision processes in a way that optimizes value creation. Ultimately, it is top management who decide what the organization needs and who control organizational behavior. (Ibid.)

Within the natural perspective, organizations are fundamentally social groups attempting to adapt and survive in their particular circumstances. They have a need for survival as social groups. It is the members of the organization that choose the goals of an organization based on their multiple common and individual agendas. Individuals are not just roles as in the rational models, and they do not behave as rational economic actors. Instead, the behavior of an organization is based on its employees' human behavior and emerges from employees' multiple motives, values, feelings and sentiments. Employees often exhibit loyalties to colleagues and the social group that

are stronger than their individual self-interest. Organizations rely on their willingness to make contributions. (Ibid.)

A system is defined by the boundary between it and its infinitely complex environment. Complexity is reduced at the system boundary. In essence, the difference between a closed and an open system resides in the extent of interaction between the system and its environment. The open system perspective views organizations as strongly influenced by and dependent on their environment. This makes open systems more complex than closed systems. The issue of needs is also more complex in open systems than in closed systems. Organizational behavior emerges from loosely coupled semi-autonomous parts, which reduces the effect of the complexity (ibid.). Organizations learn from their interaction with the environment, and their goals are also influenced by stakeholders outside the organization (ibid.).

We note that the change from a rational to a natural perspective is a change in how we view system behavior, and the change from a closed to an open perspective is a change in how we view the complexity and nestedness of the system. Based on this and from the above discussion, we outline a third research proposition:

P3. The formation of the manifestations and satisfiers of actors' needs turns from a linear mechanistic process based on actors' formal roles to a non-linear recursive activity based on human nature, as the perspective on system behavior changes from rational to natural and as the system complexity and nestedness increases.

## Contribution of SDL to the deepening of the systemic view on needs

In this section, we first discuss the connection of SDL to the natural and open systems views presented in the previous section, and then deepen the systemic view of needs by drawing from the SDL view of markets as nested systems of value co-creation.

SDL views all economic actors as resource integrators participating in value co-creation through service-for-service exchange (Vargo and Lusch 2004, 2008). It presents a contrast to the prevailing goods-dominant logic inherited from economics that views economic actors as focusing on making units of output (products and services) embedded with utility (ibid.). We draw a parallel between economic actors focusing on making units of output and rational organizations mechanistically accomplishing their predetermined goals. Similarly, a parallel can be drawn between service-for-service exchange and the way that individuals in natural organizations make coalitions and negotiate in order to carry out their individual and common agendas with the help of others. This reveals the nature of SDL as a natural perspective. The same is visible also in the emphasis that SDL places on human experience and the phenomenological nature of value (see e.g. Vargo and Lusch 2008; Ramaswamy 2011; Helkkula et al. 2012a, 2012b).

The influence of the open systems paradigm is also clearly evident in SDL. Service-dominant logic views markets as complex adaptive systems (Lusch and Vargo 2006). Over time, the discussion on openness has only grown, and several authors have proposed an overarching approach connecting the individual, organizational and market levels in the study of nested actor-to-actor value co-creation (see Gummeson and Polese 2009; Gummesson 2011; Vargo and Lusch 2011). This would be of use, since actors can improve value creation by designing for internal and external configurational fit in these nested structures (cf. Nenonen and Storbacka 2010). Value co-creation in these nested structures is seen as dynamic and spontaneously sensing and responding (Vargo and Lusch 2010). This improves the adaptability and survivability of actors (Vargo et al. 2008). We think of SDL as a nested open natural systems view of dynamically organizing economic and social exchange in order to co-create value.

Needs as essentials for well-being are intrinsic to service-dominant logic, as the discussion on SDL puts high emphasis on value, benefit and well-being. From the theoretical SDL viewpoint, markets can be seen as institutional solutions of how resources are applied to solve human problems or needs (cf. Vargo 2009). These institutions are formed as individuals first form dyads of micro level activity, and then these dyads generate higher meso and macro level structures of groups, organizations, industries and societies (Chandler and Vargo 2011; Akaka et al. 2012). Therefore, needs are also visible at several system levels above the individual.

Based on the above, we outline a fourth research proposal:

P4. Satisfaction of needs of different systemic levels takes place through the application of resources in nested value co-creation.

Recent views further point out that value should be understood as a part of a social context in which actors adopt social positions and roles so as to interact and create social structures (Edvardsson and Tronvoll 2013). How resources are assessed for value co-creation depends on the social context (Edvardsson et al. 2011). Our previous discussion on recent theories on human needs reveals that this participation in social life through value co-creation is a fundamental goal for all humans, giving rise to human needs. Further, the meaning that motivates human action emerges from social interaction, which is at the heart of social change processes in which people use their environment in order to actively create self and society (Flint 2006). Resources can only be turned to value when an actor enjoys their benefits (Gummesson and Mele 2010). It is during interactions that actors can influence how value is created (Grönroos and Ravald 2011). Through this interaction, and situated in context, needs also emerge.

Based on the above, we outline a fifth research proposal:

P5. Manifestations and satisfiers of needs emerge from the context of actors participating in value co-creation.

## A new framework: organizational needs as co-created in nested human systems

In this section, we build on the discussion and research proposals in the earlier sections and put forward an entirely new framework of organizational needs as co-created in nested human systems. Since this is a model of nested structures, it also includes the lower system level of individual needs, the higher system level of ecosystemic needs, and an overarching meta level assessment of needs. Ecosystems refer here to human systems of actors dependent on each other through value co-creation such as service ecosystems or business ecosystems. The framework is summarized in Table 3.

Our framework presents organizational needs as bridging meso level needs that mediate between the needs of different actors both at same level and at different levels. A meta level assessment across the micro, meso and macro levels in our framework shows that, not only are organizational needs co-created in nested human systems, but that human needs are nested in organizational structures. Needs are co-created across different system levels. The meta level assessment further reveals that the well-being of human systems is dependent on their capability to facilitate the efficiency and sustainability of actor-to-actor value co-creation.

Our framework is grounded on the idea that value co-creation through resource integration is a natural human activity and a way of participating in social life. Recent theories of human needs that view needs as essentials of well-being as described above in Table 1, emphasize the proactive behavior of humans in participating in forms of social life of their choice, and issues such as their capability, freedom or autonomy to do so. This accentuates the importance of access to resources leading to the idea that the individual's well-being is dependent on the willingness and capability of other individuals and higher level systemic actors to provide them with access to resources.

Organizations as meso level structures facilitate actors' access to each other's resources. As all levels of actors are ultimately dependent on human agency in order to access each other's resources, organizations as actors are dependent on the willingness and capability of their members and of the stakeholders in their environment to provide them with access to resources. Therefore the well-being of organizations involves issues far beyond mere organizational survival and profit-making. It is intrinsically intertwined with human well-being and the sustainability of actor-to-actor value co-creation throughout the ecosystem.

Ecosystems as macro level systems of actors dependent on each other through value co-creation contain feed-back loops leading to network effects. Network effects create powerful forces that affect the well-being of the ecosystem as a whole and the different level actors within it. They can create stability in the system or accelerate its change substantially.

**Table 3:** Framework of organizational needs as co-created in nested human systems

| **Meta level** | Organizational needs are bridging meso level needs that mediate between the needs of different actors both at same level (e.g. individual-individual) and at different levels (e.g. micro-macro).<br>Human needs are nested in organizational structures.<br>Needs are co-created across different system levels.<br>The well-being of human systems is dependent on their capability to facilitate the efficiency and sustainability of actor-to-actor value co-creation. | | |
|---|---|---|---|
| | **Individual needs**<br>**Micro level** | **Organizational needs**<br>**Meso level** | **Ecosystemic needs**<br>**Macro level** |
| **Needs as fundamental essentials of well-being** | An individual's well-being is dependent on the capability, freedom and autonomy to integrate resources in ways that one values or needs if one so wishes.<br>Therefore individuals' well-being is also dependent on the willingness and capability of the other individuals and higher level systemic actors to provide them access to resources. | Organizing allows actors access to each other's resources.<br>Organizations as actors are dependent on the willingness and capability of their members and of the stakeholders in their ecosystem to provide them access to resources.<br>The well-being of an organization, its members, the stakeholders in its ecosystem and its ecosystem as a whole are mutually dependent. | An ecosystem is a system of actors dependent on each other through value co-creation.<br>The well-being of an ecosystem is dependent on the efficiency and sustainability of actor-to-actor value co-creation.<br>Actors' interdependencies caused by mutual value co-creation form feed-back loops leading to network effects. These feed-back loops have important effects on the well-being of the ecosystem and the actors within it. |
| **Needs as factors explicating goal-directed behavior** | Humans participate in the social life of their choice through the process of co-creation in which they integrate available resources in ways that they value. | The behavior of an organization emerges partly from its formal structure, but it is also affected by the agency of different level actors within and outside the organization. | The behavior of an ecosystem emerges from the behaviors of the actors within the ecosystem and is affected by feed-back loops. |
| **Change dynamics of needs** | Manifestations and satisfiers of needs emerge from the individual's context of value co-creation. They change as the context changes as a result of actor-to-actor interaction. | Manifestations and satisfiers of needs emerge from the organization's context of value co-creation with its members and stakeholders. They change as the context changes as a result of actor-to-actor interaction. Larger coalitions can have a bigger impact than individual people. | Manifestations and satisfiers of an ecosystem's needs are based on the manifestations and satisfiers of the needs of the actors within the ecosystem.<br>Feed-back loops and network effects of value co-creation have an important impact on change dynamics. They can create stability or accelerate change substantially. |

Not only do system structures change, but also the manifestations and satisfiers of needs at different system levels. The specific manifestations and satisfiers of needs emerge from the specific context of each actor's value co-creation. The context of

value co-creation changes as a result of actor-to-actor interaction. Therefore, the manifestations and satisfiers of needs also change as a result of this social process. Uncoordinated actions of individuals change the context, but large coordinated coalitions create a much bigger impact. Network effects can lead to rapid changes with great momentum.

## Concluding discussion

The aim of this article has been to clarify the concept of organizational need as nested in human systems of value co-creation and to draw research and managerial implications. In order to address the gap of organizational need we have posited the following research questions: What is an organizational need when viewed as co-created and "nested", and why is it important to re-think needs as they exist within systems? What kinds of research and managerial implications emerge based on such a systemic view of needs? The novelty and main contribution of our paper lies in presenting a framework of organizational needs as co-created in nested human systems. The framework also reveals how human needs are nested in organizational structures. We now discuss this contribution by addressing our research questions, academic and managerial implications, and further research areas.

Organizational needs as co-created in nested human systems are bridging meso level needs that mediate between the needs of different actors. Organizations can be seen as a means for satisfying the needs of individuals and societies. Scarce resources need to be allocated in ways that are efficient and that balance the conflicting needs of different individuals or coalitions. Organizational needs are formed as people engage in organizing in order to co-create value, increase the efficiency of resource allocation, and negotiate in order to balance their conflicting needs. The outcome of this organizing is not necessarily optimal, which results in a kind of poverty of neediness and in a reduction of contribution to value co-creation in society by poor people. Organizational needs are also dynamic, changing over time in open-ended ways. It is important to re-think needs as co-created in nested human systems, because this allows us to search for new ways to increase the value creation and well-being of actors of all systemic levels, including individuals, groups, organizations, industries, countries, and society.

Despite the strong lineage of research on organizational buying (Peters et al. 2013), the academic issue of understanding organizational needs and behavior is far from resolved (Hadjikhani and LaPlaca 2013). There is a strong demand for a better understanding of the mutating and emerging needs of organizations and their buying behavior (Wiersema 2013). Our framework has important academic implications as it addresses the mechanisms through which the manifestations and satisfiers of needs emerge and change. We would also like to emphasize the significance of feed-back loops in nested systems of value co-creation as they have pronounced effects on the functioning of these systems and the emergence of needs. In addition, we advise academics to strive to better recognize the legacy of rationality assumption and closed systems paradigms in their thinking. As an example, the rationality assumption has a

tendency to hide the difference between what is truly valuable to actors and what drives their behavior.

Managers can use our framework as a perspective-widening tool so as to understand the different aspects of need and new opportunities for value co-creation. It especially unveils new opportunities emerging from human nature of needs and from the change processes of the manifestations and satisfiers of needs. Needs can be affected at least to some extent through interaction. Customers' mental image of their needs changes as their situation and possibilities change. One aspect of affecting customers' needs is to help them understand what is possible and to help them recognize new attractive and reachable futures. Another important part of this is coping with structural inertia through a careful consideration of the feedback loops affecting actors' behavior.

Understanding organizational or systemic needs is a challenging task due to the complexity of the issue. A fundamental question calling for further research is how to organize or facilitate the organizing of actors for the efficient and sustainable allocation of resources for needs satisfaction and value co-creation in nested systems. This question is essential to organizations of all sizes and to society as whole. Its importance is further stressed by the major societal challenges and the demand for sustainability. Another interesting research area is the feed-back loops of value co-creation in nested systems. We further call for research on the change processes of nested systems and needs in particular. A better understanding of them could for instance open up new views of innovation. All of these research areas would benefit both from theoretical development and empirical case studies. We also invite studies further developing our framework and implementing it in practice.

**References**

Akaka, M.A., Vargo, S.L. and Lusch, R.F. (2012), "An exploration of networks in value co-creation: A service ecosystems view," Review of Marketing Research, 9, 13-50.

Alderfer, C.P. (1969), "An empirical test of a new theory of human needs," Organizational Behaviour and Human Performance, 4(2), 142-175.

Bushe, G.R. (2007), "Appreciative inquiry is not (just) about the positive," OD Practitioner, 39(4), 30-35.

Chandler, J.D. and Vargo, S.L. (2011), "Contextualization and value-in-context: How context frames exchange," Marketing Theory, 11(1), 35-49.

Deci, E.L. and Ryan, R.M. (1985), Intrinsic motivation and self-determination in human behavior. New York: Plenum.

--- and Ryan, R.M. (2000), "The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior," Psychological Inquiry, 11(4), 227-268.

Doyal, L. and Gough, I. (1991), A theory of human need. London: The Macmillan Press Ltd.

Edvardsson, B. and Tronvoll, B. (2013), "A new conceptualization of service innovation grounded in S-D logic and service systems," International Journal of Quality and Service Sciences, 5(1), 19-31.

---, Tronvoll, B. and Gruber, T. (2011), “Expanding understanding of service exchange and value co-creation: a social construction approach,” Journal of the Academy of Marketing Science, 39, 327-339.

Flint, D.J. (2006), “Innovation, symbolic interaction and customer valuing: thoughts stemming from a service-dominant logic of marketing,” Marketing Theory, 6(3), 349-362.

Fredrickson, B.L. (1998), “What good are positive emotions?,” Review of General Psychology, 2(3), 300-319.

--- (2003), “Positive emotions and upward spirals in organizations,” in Positive organizational scholarship, Cameron, K.S., Dutton, J.E., and Quinn, R.E., eds. San Francisco: Berret-Koehler, 163-175.

--- and Joiner, T. (2002), “Positive emotions trigger upward spirals toward emotional well-being,” Psychological Science, 13(2), 172-175.

Gummesson, E. (2011), “2B or not 2B: That is the question,” Industrial Marketing Management, 40, 190-192.

--- and Mele, C. (2010), “Marketing as value co-creation through network interaction and resource integration,” Journal of Business Marketing Management, 4, 181-198.

--- and Polese, F. (2009), “B2B is not an island,” Journal of Business and Industrial Marketing, 24(5/6), 337-350.

Grönroos, C. and Ravald, A. (2011), “Service as business logic: implications for value creation and marketing,” Journal of Service Management, 22(1), 5-22.

Hadjikhani, A. and LaPlaca, P. (2013), “Development of B2B marketing theory,” Industrial Marketing Management, 42, 294-305.

Helkkula, A., Kelleher, C. and Pihlstrom, M. (2012a), ”Characterizing value as an experience: implications for service researchers and managers,” Journal of Service Research, 15(1), 59-75.

---, Kelleher, C. and Pihlstrom, M. (2012b), ”Practices and experiences: challenges and opportunities for value research,” Journal of Service Management, 23(4), 554-570.

Hull, C.L. (1943), Principles of behavior: An introduction to behavior theory. New York: Appleton-Century-Crofts.

Lusch, R.F. and Vargo, S.L. (2006), “Service dominant logic: reactions, reflections, refinements,” Marketing Theory, 6(3), 281-288.

Maslow, A.H. (1987[1954]), Motivation and personality. 3rd ed., New York: Harper & Row Publishers, Inc.

Max-Neef, M.A. (1991), Human scale development: Conception, application and further reflections. New York: The Apex Press.

McClelland, D.C. (1961), The achieving society. New York: D. Van Nostrand Company, Inc.

Murray, H.A. (1938), Explorations in Personality. New York: Oxford University Press.

Nenonen, S. and Storbacka, K. (2010), ”Business model design: conceptualizing networked value co-creation,” International Journal of Quality and Service Sciences, 2(1), 43-59.

Peters, L.D., Pressey, A.D., Vanharanta, M. and Johnston, W.J. (2013), "Theoretical developments in industrial marketing management: Multidisciplinary perspectives," Industrial Marketing Management, 42, 275-282.

Ramaswamy, V. (2011), "It's about human experiences… and beyond, to co-creation," Industrial Marketing Management, 40, 195-196.

Robertson, I.T. and Cooper, C.L. (2010), "Full engagement: The integration of employee engagement and psychological well-being," Leadership and Organization Development Journal, 31(4), 324-336.

Scott, W.R. (2003[1981]), Organizations: rational, natural, and open systems. 5th edition, Upper Saddle River, NJ: Prentice Hall.

Seligman, M.E.P., Steen, T.A., Park, N. and Peterson, C. (2005), "Positive psychology progress: Empirical validation of interventions," American Psychologist, 60(5), 410-421.

Sheldon, K.M. (2004), Optimal human being: An integrated multi-level perspective. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Vargo, S.L. (2009), "Toward a transcending conceptualization of relationship: a service-dominant logic perspective," Journal of Business & Industrial Marketing, 24(5/6), 373-379.

--- and Lusch, R.F. (2004), "Evolving to a New Dominant Logic for Marketing," Journal of Marketing, 86(1), 1-17.

--- and Lusch, R.F. (2008), "Service-dominant logic: Continuing the evolution," Journal of the Academy of Marketing Science, 1(36), 1-10.

--- and Lusch, R.F. (2010), "From repeat patronage to value co-creation in service ecosystems: a transcending conceptualization of relationship," Journal of Business Marketing Management, 4, 169-179.

--- and Lusch, R.F. (2011), "It's all B2B and beyond… : Toward a systems perspective of the market," Industrial Marketing Management, 40(2), 181-187.

---, Maglio, P.P. and Akaka, M.A. (2008) "On value and value co-creation: A service systems and service logic perspective," European Management Journal, 26(3), 145-152.

Wiersema, F. (2013), "The B2B agenda: The current state of B2B marketing and a look ahead," Industrial Marketing Management, 42, 470-488.

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# Article III

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# Practices for Involving Organizational Customers in Service Innovation

**Heidi M.E. Korhonen and Ilari Kaarela**

**Abstract** It is not clear what kind of customer involvement leads to optimal service innovation. An integrative approach is needed so as to link the practices of how a firm involves customers in service innovation to the advantages it is seeking. We apply previous research into service-dominant (S-D) logic and open innovation in order to study the practices for involving organizational customers in service innovation. Our empirical research is based on case studies on six globally operating technology companies known for their innovativeness and service-oriented business with their organizational customers. We describe customer involvement practices based on their openness as *in-house development and supplier co-operation*, *development based on customer insight*, *co-development with customers*, and *development by customers*. We find that, in addition to obtaining information, ideas, and development partners, these customer involvement practices are used for *shaping the context of value co-creation, fostering network effects, living with contingency*, and *engaging in business with meaning*. We also contribute by bringing the research streams of S-D logic and open innovation closer together.

**Keywords** Service innovation · Open innovation · Customer involvement · Service-dominant (S-D) logic · Practices · Business to business (B2B)

## 1 Introduction

Our study aims to increase understanding of the practices of service co-innovation with customers and users. We focus on service innovation in the business to business (B2B) context, whereas the previous literature has mainly analyzed

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individual users or communities of devoted users. We seek answers to the following questions: *why do companies involve organizational customers in service innovation, and how do they utilize different practices in achieving these goals*. That is, we examine how the various practices differ in their aims, and how customer involvement practices are implemented.

As our theoretical background, we apply service literature which highlights value-in-context and value co-creation, together with open innovation (OI) literature that emphasizes open systems, inter-organizational knowledge flows, and joint innovation. Our contribution is to link together the research streams of service-dominant (S-D) logic (Vargo and Lusch 2004, 2008) and open innovation (Chesbrough 2003). By positioning ourselves between the practice-oriented view of OI and customer involvement and the more theory-oriented S-D logic we hope to gain insight into customer involvement practices and their goals. Our empirical research is based on six cases of technology companies from California and Finland that have developed service-oriented business.

We start by introducing our theoretical background, innovation in the light of S-D logic, and the paradigm of OI and customer involvement. We explain our methodology and describe our case companies. Then we start outlining our findings and describe the customer involvement practices by structuring them based on the nature of their openness. We then continue our findings by explaining the new insight we have gained from the point of view of S-D logic into customer involvement in these companies, what they use customer involvement for. Finally, we conclude our paper by discussing our findings and their theoretical and practical implications.

## 2 Innovation in the Light of Service-Dominant Logic

In order to understand the customer involvement practices companies choose to use in their service innovation, we need clear definitions of both 'service' and 'service innovation'. In this section, we highlight important previous research in the area of service innovation and service development, and present how we understand the concepts of 'service' and 'service innovation'.

### *2.1 From Innovation in Products and Services to Service Innovation*

Increasing interest in services and service innovation has sparked numerous reviews of past research into service innovation (cf. Droege et al. 2009; Gallouj and Savona 2009; Toivonen and Tuominen 2009). As proposed by these writers, there have been multiple attempts to define service innovation. These attempts are frequently divided into the perspectives of: technologist, assimilation, demarcation, and

synthesis (Droege et al. 2009). The technologist perspective puts great emphasis on technology. New technologies lead to process innovations that enable improvements in services or even totally new services (Barras 1986). The perspective of assimilation views service development as similar to product development, and proposes that transferring innovation practices from product development to service development is fairly straightforward (Drejer 2004; Nijssen et al. 2006). This is in stark contrast to the demarcation perspective, which proposes a clear distinction between product and service development. Those who share the demarcation view believe that there is a need for autonomous concepts and separate understanding for service innovation (cf. de Brentani 1995; Edvardsson and Olsson 1996; Sundbo 1997).

The newest and most promising interpretations of the nature of service innovation are from the synthesis perspective (cf. Gallouj and Savona 2009). From this perspective, the study of product and service innovation can complement each other; the phenomena of product and service innovations have shared characteristics, but also qualities that differentiate them. The study of product innovations can bring fresh insights into the study of service innovations, and vice versa. Of special importance is the great emphasis on customer involvement in service development.

Moreover, there are characteristics of service innovation that are relevant when trying to understand companies' choice of practices. For example, in many service companies dedicated R&D departments or resources are difficult to identify, and there may even be no deliberate service innovation activity taking place. Instead, service innovations are often emergent changes carried out directly in the process of service provision, and are not recognized as innovations before implementation. As such, service innovations are difficult to detect. Additionally, service innovations can rarely be classified meaningfully into product, process or organizational innovations, as they almost always reflect aspects of each of these classes. Instead of viewing service innovation as a clearly defined process of taking an idea into operation through predetermined development steps, service innovation should be considered to be a more fuzzy process that can also begin by an observed change in operations, or a rapidly applied idea that is later developed further with practical experience. (Toivonen and Tuominen 2009)

As Toivonen and Tuominen have so aptly summarized the definition of service innovation presented in Sundbo's (1997) classic article: "*A service innovation is a new service or such a renewal of an existing service which is put into practice and which provides benefit to the organization that has developed it; the benefit usually derives from the added value that the renewal provides the customers. In addition, to be an innovation the renewal must be new not only to its developer, but in a broader context, and it must involve some element that can be repeated in new situations, i.e. it must show some generalizable feature(s). A service innovation process is the process through which the renewals described are achieved.*" (Toivonen and Tuominen 2009, p. 893)

So as to further develop this definition, we broaden the concept of service by adopting that given by Vargo and Lusch (2004, 2008). In their service-dominant (S-D) logic, service is conceptually distinct from services. They define service as

the application of resources for the benefit of another (ibid.). Benefit is seen as value-in-use, or more recently value-in-context (Vargo 2009; Chandler and Vargo 2011). This value is always uniquely and phenomenologically determined by the beneficiary, and is thus "idiosyncratic, experiential, contextual, and meaning laden" (Vargo and Lusch 2008). By choosing to use this definition, the definition of service innovation above is further enriched with the contextuality of the actors and their reciprocal relationship. Instead of discussing innovation in services, we should be discussing innovation in service, innovation in co-created value, or even innovation in the co-creation of value itself.

Value refers here to the total perceived tangible and intangible benefits and costs. Intrinsic value occurs when something is appreciated for its own sake as an end in itself—whereas extrinsic (or instrumental) value occurs when something is appreciated as means of achieving something else (Holbrook 1999; von Wright 1963). Goods and services can be seen as means to ends and this kind of value-in-use approach accentuates extrinsic value. However, it can be argued that only an experience can be appreciated as an end in itself, for its intrinsic value (Holbrook 1999). Discussion in S-D logic has also emphasized that goods and services are essentially experiences for both individuals and organizations (Schembri 2006). Therefore the experiential nature of value has been included in the most central core of S-D logic (Vargo and Lusch 2008; Vargo 2013).

It is easy and fairly common to mistake value co-creation for co-development of service offerings. In S-D logic, value co-creation refers to the interactional and contextual nature of the process, where value is extracted from the service. All social and economic actors integrate resources to create value for themselves and for others (Vargo and Lusch 2008). This way value is co-created in a network of interacting and resource integrating actors.

## *2.2 Innovating New Forms of Value Co-creation*

When we select the fairly abstract definition of service that Vargo and Lusch (2004, 2008) propose, what then are the outcomes and practical implications for service innovation and business development? Lusch et al. (2007) claim that S-D logic can bring competitive advantage to companies by helping them distinguish between value delivery and value creation, and between embedded value and the co-creation of value. They also propose that S-D logic has to do with viewing employees, partners, and customers as collaborators who co-create value together (ibid.). Thus, they argue that adopting S-D logic thinking makes a company better at grasping the subjective views of the customer on the value of an offering, and better at acting on changes in these views, which ultimately results in competitive advantage (ibid.). Moreover, adopting S-D logic allows companies to focus on innovating customers and with customers, rather than merely coming up with new service offerings (Rubalcaba et al. 2012). Grönroos and Voima (2013) also propose that, with direct interaction, the service provider can influence a customer's value creation.

If we look at service innovation as innovation in the application of resources for the benefit of another, that means we can simultaneously innovate the application of resources (the offering) and the benefit of another (the need to be fulfilled and the beneficiary). Innovating becomes an activity that, on the one hand, is bound by constraints in access to resources and the interests of the possible beneficiaries, but, on the other hand, offers significant freedom of choice. The actors participating in value co-creation can imagine and shape the future together which leads to business ecosystem evolution.

An important phenomenon guiding the evolution of business ecosystems, i.e. value co-creation systems, is network effect. Network effect makes an offering more valuable when more people use it (Katz and Shapiro 1985). Direct network effects occur through direct physical effects, whereas indirect network effects are mediated by the market, as when there is better availability of complementary goods or services (Katz and Shapiro 1994). Theories on network effect suggest that it is not the attractiveness of the value proposition of a single focal actor per se that leads to successful innovation, but how the focal actor is able to obtain support from other actors so as to co-create an attractive total value proposition (cf. Tse 2002).

## 3 Open Innovation and Customer Involvement

In this section we describe how the view of innovation has developed from a closed producers' model into an open model, and how this has led to an understanding of the significance of customer involvement in innovation practice. We then explain that companies' innovation practices can be categorized in many ways, and we present a typology of customer involvement practices based on how open or closed they are.

### *3.1 From In-House Innovation to Collaborative Innovation*

Schumpeter, the father of the idea of creative destruction, first emphasized the importance of entrepreneurial spirit, and later the importance of large companies' resources and capital for innovation. Following his legacy, most innovation studies used to assume a producers' model as the dominant mode of innovation, and concentrated on the internal organizing of companies' R&D processes. Furthermore, the majority of these studies concentrated on technological innovation, even though Schumpeter had a wider view on innovation, including, e.g., product, process, and organizational innovation. He defined development as new combinations of new or existing knowledge, resources, equipment, etc. (Schumpeter 1934).

Knowledge and resources that are required for innovation are not always found within the boundaries of a single organization. Instead, they are frequently combined from different sources, such as suppliers, research institutions, partners,

investors, even competitors. The logic of OI, popularized by Chesbrough (2003), emphasizes that organizations need to open up their innovation processes and manage network connections and relationships in order to search outside their boundaries, trading knowledge both into the company as well as out from the company. This enhances knowledge flows in and out of the company, enables a wider scale of knowledge combinations, and improves the efficiency of knowledge utilization.

Von Hippel (1988) identified users, manufacturers, and suppliers as important sources of useful knowledge and noticed that the locus of innovation varies; it is often the users who innovate. This is because users benefit directly from innovations and possess the richest needs information (von Hippel 2005). This realization brought to the fore user-driven innovation, where users can be innovators themselves or can feed ideas and improvements into companies' innovation processes. More specifically, users can be defined as firms or individual consumers that expect to benefit directly from using a new offering (Baldwin and von Hippel 2011).

## *3.2 Changing Innovation Practices*

Companies are not simply just open or closed innovators; instead, their OI practices vary. We are still lacking systematic evidence of OI practices and their impact on performance (Ebersberger et al. 2012). Even though the OI model describes why a firm acquires valuable resources from external firms and shares internal resources in interfirm collaboration, the model does not answer the question how a firm does this (Hsieh and Tidd 2012). We need an integrative approach that would link the practices of how a firm involves customers in innovation into the advantages it is seeking.

There have been many approaches and typologies to open innovation practices varying in their specificity, attention to detail, and conceptual view of the innovation process and its goals. In the context of this book chapter, we find especially interesting the typologies that describe how open or closed customer involvement is. Kaulio (1998) looked at different methods of involving customers in product development, and created a framework for analyzing the methods based on the phase of the new product development (NPD) process and the role of the customer in the process. Most methods he studied were used in several phases of the NPD process. He described the role of the customer or the openness of the involvement as designing *for*, designing *with*, and design *by*. When designing *for* customers, customer data is an input of the design process; when designing *with* customers, customers are allowed to select, reject or in other ways react to proposed solutions; when design is done *by* customers, customers are active participants in the design process (ibid.). Others have used similar frameworks, e.g., Desouza et al. (2008) describe the design *for* type as customer-focused and closed innovation, the design *with* type as customer-centered and open innovation, where customers are allowed to be involved in the process at specific points in time, and the design *by* type as

customer-driven and open innovation, where the customer engagement is dynamic, providing ideas anytime and anywhere. Westerlund and Leminen (2011) identify four types: *producer-driven closed*, where development is led by the producer and is closed; *user-centric closed*, where the role of users is more visible, as the producer and its suppliers collect information on users; *user-centric open*, where development is somewhat led by users but each user individual is only involved in the process once; and *user-driven*, where development is truly led by users.

There are also other kinds of typologies describing customer involvement practices. As companies typically regard the innovation process as a stage-gate process with specific phases, customer involvement practices are often described based on the phases in which they can be used (cf. Russo-Spena and Mele 2012). Another way to analyze OI practices is to look at the role the firm itself takes in the OI process, whether it is utilizing the incoming or outgoing knowledge flows, or both, or being an intermediary (cf. Gianiodis et al. 2010). Also the role of the customer can be seen as the correspondent, the tester, the reflective practitioner or the dreamer (Edvardsson et al. 2012). These typologies have been summarized in Table 1.

**Table 1** Typologies describing customer involvement and open innovation practices

| Dimension | Categories | Reference |
|---|---|---|
| Role of the customer in the company's innovation process | designing for customers, designing with customers, design by customers | Kaulio (1998) |
| | customer-focused (for customers), | Desouza et al. (2008) |
| | customer-centered (with customers), | |
| | customer-driven (by customers) | |
| | producer-driven closed (users as buyers), | Westerlund and Leminen (2011) |
| | user-centric closed (users as sources of ideas), | |
| | user-centric open (users as important but disposable sources of information), | |
| | user-driven (users as long term collaborators) | |
| | correspondent, tester, reflective practitioner, dreamer | Edvardsson et al. (2012) |
| Role of the company in an open innovation process with stakeholders | utilizes incoming knowledge flows, | Gianiodis et al. (2010) |
| | utilizes outgoing knowledge flows, | |
| | utilizes both knowledge flows, | |
| | intermediating role | |
| Innovation process phase | co-ideation, co-evaluation, co-design, co-test, co-launch | Russo-Spena and Mele (2012) |

Even when we recognize more and more ways and dimensions in which a company is an open innovator, we should not just accept without proof the idea that the more open an innovation process is, the better it is. We need to better understand the mechanisms through which companies gain advantages from different customer involvement practices.

Users are seen to benefit from user-oriented service development through a better end result, but also directly from the process (Edvardsson 1997; Grönroos 1990). Service providers are seen to benefit from user involvement through better served customers, and through the ideas and knowledge that customers bring. But user involvement can also benefit service providers if it speeds up the innovation process, such as in rapid application (Toivonen 2010), and if it increases the adoption of the service due to the role that users have in the stage at which an innovation is put to use (Sundbo and Toivonen 2011). Mustak et al. (2013) describe the value outcomes of customer involvement for sellers as, for example, economic value, better customer relationships, facilitation of development and innovation activities, and negative outcomes such as customers becoming competitors through knowledge spillover. They also describe the value outcomes for customers as, for example, better fitting offering, improved perceived quality and greater perceived value, economic value, and enhanced skills of creating value from the offering (ibid.).

It has also been suggested that the critical condition for successful innovation is not the openness per se, but the generative potential of relationships to induce changes in the way participants see their world, act in it and give rise to new entities (Lane and Maxfield 1996; Swan and Scarborough 2005; Hopkins et al. 2011; Remneland-Wikhamn et al. 2011; Hsieh and Tidd 2012).

## 4 Methodology

In this section, we first discuss our research approach and its trustworthiness. We then continue by explaining how we have collected and analyzed our data and give brief descriptions of our case companies.

### *4.1 Research Approach and Trustworthiness*

Our empirical research is based on qualitative case studies that investigate technology companies' service innovation practices with their organizational customers. As Yin (2003) explains, the case study approach should be considered when a 'how' or 'why' question is being asked. Case studies allow us to study the particularity, complexity, and contextuality of each case (Stake 1995).

To assess the trustworthiness of our research, we adopt an alternative terminology brought forward by Guba and Lincoln as the quality criteria for qualitative research: credibility instead of internal validity; transferability instead of

generalizability; dependability instead of reliability; confirmability instead of objectivity (Guba 1981; Guba and Lincoln 1994).

In order to strengthen our credibility, we have included elements of peer debriefing, and the findings were frequently discussed with colleagues within our own organization as well as peers from partner organizations. The interviews were all recorded. Three of the companies were actively involved in commenting on and assessing the conclusions drawn from all the data collected, not only the data from their interviews.

So as to strengthen transferability, we have endeavored to collect rich contextual data. Also, we selected companies generally known as innovative from different industries so as to maximize the range of data collected. So as to ensure dependability, we looked into the public information available on the case companies. Moreover, the researchers analyzed the data individually before moving on to comparing and combining the findings. When assessing the interpretations that we can actually make based on the data, we have to take into account the fact that the views we have gathered are the views of the interviewees and not of the companies. In large organizations, different or even conflicting viewpoints could have been found.

## *4.2 Data Collection and Analysis*

The case companies were interviewed about their OI practices, emphasizing customer collaboration. The interviews were conducted between 2011 and 2013. Material from research meetings and publicly available information were also studied. Initial analysis was conducted by looking for things that could be seen as a practice or an aim, a positive or negative outcome of open or closed innovation or customer involvement. Further analysis was conducted by (i) categorizing the practices based on the openness of customer involvement, and discussing why companies used a certain level of openness, and (ii) studying the companies' aims related to innovation in the light of S-D logic and describing the practices from the viewpoint of these aims.

The case companies all operate globally and are stock exchange-listed technology companies that are known for their innovativeness and have developed service-oriented business. In Table 2 below we present basic data on these companies. The interviewees worked in senior executive, managerial or expert positions in areas of strategy, sales and marketing, and customer service.

*Autodesk* is the world leader in 3D design, engineering, and entertainment software and services. It develops solutions for the design process. It serves business customers in the fields of architecture, engineering and construction, civil infrastructure, education, media and entertainment, natural resources, product design and manufacturing. Autodesk helps its customers imagine, design, and create a better world.

**Table 2** Basic information on the case companies

| Company | Revenue 2011 | Country of headquarters | Line of business | Strategic quote from interview or web site |
|---|---|---|---|---|
| Autodesk | USD 1.95 bn | USA | 3D design software | Imagine. Design. Create. |
| Interface | USD 1.05 bn | USA | Modular carpet | Design with purpose |
| Nokia | EUR 38.7 bn | Finland | Mobile phones | Connecting people |
| Ixonos | EUR 81.4 m | Finland | Mobile solutions | Dream-Design-Deliver |
| Vaisala | EUR 273.5 m | Finland | Environmental and industrial measurement | Observations for a better world |
| TeliaSonera | SEK 104.8 bn | Sweden (interviews in Finland) | Network access and telecommunication services | Offerings based on deep understanding |

*Interface* is the world's largest designer and maker of carpet tiles. They describe themselves as Design with Purpose and are known as a pioneer of sustainability. They manufacture and sell modular carpets to commercial environments including corporate, healthcare, education, retail, hospitality, and government.

*Nokia* is a mobile products manufacturer and its mission is: Connecting People. Having dominated the mobile world for over a decade, Nokia has faced a tough challenge as the industry has shifted to a war of ecosystems. As we are in this article interested in involving organizational customers in service innovation, we have interviewed Nokia regarding the development of logistics and supply chain services and its cooperation with its operator customers. In the end of 2013, it was announced that Nokia mobile phone business would be acquired by Microsoft.

*Ixonos* is one of the world's leading developers of mobile devices, mobile software, and mobile internet services. It positions itself as an experimental solutions provider helping its customers to very quickly innovate solutions to business problems or market opportunities that are often fuzzy or changing in this volatile market.

*Vaisala* is a global leader in environmental and industrial measurement. It helps its customer groups—meteorology services, airports, roads and rail, defence, new weather markets, life science, and targeted industrial applications—to better understand and influence their environment and reduce uncertainty with well-informed decisions.

*TeliaSonera* is a telecom operator that holds strong positions in the Nordic and Baltic countries, Eurasia, and Spain. It provides network access and telecommunication services for both the consumer sector and the business sector. It is a future-oriented company that is proud of being a pioneer in the telecom industry.

## 5 Findings

In this section, we first categorize the customer involvement practices based on the nature of their openness and then discuss the purpose of customer involvement based on new insight on innovation gained from S-D logic.

### *5.1 Practices for Customer Involvement in Service Business Development*

In order to describe customer involvement practices based on the level of their openness, we apply a categorization that resembles the ones used by Kaulio (1998), Desouza et al. (2008), and Westerlund and Leminen (2011). We start with *In-house development and supplier co-operation*, where customers are not directly involved. *Development based on customer insight* can be described as closed innovation, where special emphasis is put on understanding customers. *Co-development with customers* is understood as mutual co-operation, where both the company and its customer are active participants. *Development by customers* means a very strong customer involvement. It is notable that companies use different types of customer involvement in different situations, with different customers, at different times, and for different purposes.

### *5.2 In-House Development and Supplier Cooperation*

When a company intentionally does not involve its customers in service development, but instead prefers to conduct in-house development or supplier co-operation, this can also be seen as a practice of customer involvement. For example, *Nokia* has a lot of strong capabilities, such as their logistics know-how, that can be used for developing attractive value propositions. They find it important to get the 'base line' ready in-house. Only appropriate customers are interesting partners for developing things above the base line. Very small companies do not have the resources to take part in co-development, and it is not profitable to tailor offerings for them. *Vaisala* develops its internal service processes in-house, but involves customers in the development of those processes that are directly visible to customers.

It is natural to involve in service development those internal functions that operate in the customer interface. For example, sales and marketing departments often take part in service development, while technology development is typically carried on in R&D departments. When in-house development of services is carried on in several places within an organization, it is important that these departments co-operate closely. *Ixonos* accentuates the importance of bringing together many different kinds of people in-house regardless of the level of customer involvement.

However, there is no one right way to work together. Ixonos expects its people to continuously look for new ways to co-operate.

*Autodesk* conducts a lot of internal development, but it is also continuously looking for interesting companies to acquire. Because of these acquisitions, Autodesk has development work going on in various locations around the world, which needs to be coordinated and facilitated together.

Collaboration within a global organization is also an important issue for *Interface*. They would like to utilize the knowledge of local units globally. They feel that they need to have strong technological know-how and ability to do things by themselves, because they are too small to rely on acquisitions. However, some acquisitions have been done in the past in order to get access to new regions and product categories. Interface also finds it important to observe and collaborate with SMEs as their innovations would otherwise easily go unnoticed. Innovations made by large suppliers are usually offered to Interface directly.

### 5.2.1 Development Based on Customer Insight

In the business to business (B2B) sector, sales and customer interface are typically the most important sources of customer insight. Combining development based on customer insight with in-house technology development is currently a very common way for companies to operate. For *Vaisala*, development based on customer insight is the main type of customer involvement. *Interface* also makes very clear the importance of customer insight. The carpets they make must suit the customer needs or they will not sell. *Nokia* strives to understand how purchasing varies with different customers and to develop appropriate services for different kinds of customer. For *Ixonos*, the methods for gaining insight on the customers are included in the Dream-Design-Deliver approach they use.

User communities can be an important tool for gaining customer insight. *Autodesk* works with user communities for this purpose. It does not use user communities to make customers ideate or design new offerings or features, but instead gathers information on how Autodesk products are used by customers. *TeliaSonera* also utilizes user communities in the same way to learn about customers and to spark discussion. It also emphasizes the importance of effective utilization of customer knowledge within the company. Customer insight needs to be operationalized, documented, and shared with the right people.

There are reasons to keep customer involvement at the level of insight instead of actual co-development. One major reason in b2b markets is the importance of each individual customer relationship. Service providers often do not want to take the risk that customers' expectations may rise above the level they are willing to provide. This can easily happen in a co-development relationship. Another obvious reason is the risk of undesired knowledge spillover. In-house development and development based on customer insight enables much better protection of intellectual property than co-development. Furthermore, co-development is very resource-intensive.

Both the company and its customers typically lack time and resources for co-development. Because of this, many companies must settle for development based on customer insight.

### 5.2.2 Co-development with Customers

Co-development is development cooperation where both parties are actively involved in the development work. It is mutual co-operation in which all the participants can impact the outcome and process of the development. Co-development is especially useful in situations where several parties need to dream together, where information from several different parties needs to be combined in order to create something new, and where there is a need for synchronized changes or actions. When involving customers in this way, a high level of commitment is required for active and beneficial participation. The customer organizations need to see a clear benefit in committing resources to this work. It is up to the supplier company to make such benefits visible to the customer, and to find ways to motivate them. Also, it is important for the supplier company to consider the costs of co-development. These processes are resource-intensive at both ends.

*Vaisala* suggests that especially large packaged services should be co-developed closely together with customers for whom these service packages are designed. When customers take part in development work, customer needs can be better satisfied, the customer is thoroughly informed of the service and better understands the service agreement it is planning to enter with Vaisala. Incremental improvements to services are not as often explicitly co-developed. Instead, a higher level of radicalness is sought in co-development.

*Nokia* sees that co-development is clearly different in business markets than in consumer markets. Co-development campaigns with consumers usually demonstrate a tendency towards marketing communication, whereas in B2B markets co-development has to be more fact-based; there has to be a clearly defined problem and a proposition on how to structurally solve it. According to Nokia, customers expect benefits from co-development either through increasing sales or cutting costs. Radicalness is not often sought in co-development projects, as 'larger goals are usually tied to operative work'. The greatest benefits of co-development are manifested in how fast and how broadly improvements are implemented.

At *Ixonos*, co-development is a central part of their Dream-Design-Deliver development approach. The customer is brought into participate at an early stage so as to dream new solutions with dedicated designers. The stages of design, which involve actual design work, and delivery, which stands for the technical solution behind the service being developed, are conducted in parallel to the dreaming stage. In this way, Ixonos can guarantee that the dreams can actually be realized as service solutions promptly and accurately.

According to Ixonos, it is less risky to involve consumers than business customers. This is because individual business customers are inherently more valuable, as each customer represents a large part of the whole market. Also, organizational

customers are always busy, and the necessity for their participation and resource commitment needs to be clearly argued.

When *TeliaSonera* co-develops with its large customers, it helps them understand their needs and imagine what is possible. TeliaSonera finds it important to get into an open discussion and beyond the normal role expectations with the customer. It stresses the use of techniques that help to find even latent needs.

Each company strives to shape the context of value co-creation in a way that allows for continuing operation and profitable business. This dictates what a company wants to develop openly and what it wants to develop in-house. For example *Autodesk* does not want to develop its software code as open source because Autodesk is a software company that draws revenues from code.

### 5.2.3 Development by Customers

A company can also provide platforms and incentives that guide customers to conduct development work for the company's benefit. This development work can be directed towards improving a solution that the company currently provides, or to develop something new so as to complement existing solutions. Customers can develop their own product or a third party's offering that supports the company through network effects. It is noteworthy that, when development is taken forward by customers, the company might not have complete power over the direction the development work takes. Customers may end up developing solutions that the company finds harmful.

The case of *Nokia* demonstrates that customers are willing to increase their efforts and take a more active role when they have a personal interest in the development work. It can be seen as a spark of enthusiasm that motivates customers to take an active stand and start thinking and creating for themselves.

According to *Ixonos*, many companies previously thought that ideation could be outsourced to customers or users by utilizing, for example, crowdsourcing methods. However, they soon came to the conclusion that nothing particularly special could be found this way. Truly great ideas are rare, and the minority of great ideas might be overrun by the majority of the crowd. Instead, you need to identify the right group of people and give them resources to take ideas further. Large crowds have a different role; they bring momentum to development. Ixonos illustrates this with an African proverb: "If you want to go fast, go alone. If you want to go far, go together."

*Autodesk* has been following open source software development for a long time. To their initial surprise, they noticed that open source software is not innovative. Instead, development by a large crowd seems to result in steadiness and robustness.

The customers of Autodesk use Autodesk programs for design purposes. All design work done with these products strengthen its market position, as network effects are so apparent. Its customers are free to build new functionalities and add-ins to existing programs. Autodesk is eager to learn about and support new ways for customers to use their products.

## 5.3 The Use of Customer Involvement Practices

The existing literature highlights the role of customers as sources of information and ideas and as partners in development processes. However, alternative goals for customer involvement came up in our cases as we approached innovation from the viewpoint of S-D logic. These lesser known goals are presented in this section. We start with *shaping* the context of value co-creation, which describes well the core idea of innovation in the light of S-D logic. We continue with *fostering* network externalities, which gives momentum to the first goal. We then move on to *living* with contingency arising from the uncontrollability of unexpected changes in the context of value co-creation, and conclude with the purpose of *engaging* in business with meaning, which we believe to be the recipe to involving customers.

### 5.3.1 Shaping the Context of Value Co-creation

Many of our case companies talked about dreaming and imagining, about finding out what the value could be, about helping customers understand what is possible, about identifying latent needs, about finding solutions that would benefit both parties, and about creating a better world. This kind of thinking implies that value co-creation and value itself is changing, and that it is possible to tap into this change or even shape it.

*Autodesk* has an exceptional view to the design world, and they see a profound change in an increasing overlap between the roles and phases around design where things are imagined and actually created. Technology will allow people to imagine and create new and better possibilities in a way that has never before been possible. This will be an important force that will change the world.

*Ixonos* has this kind of overlapping Dream-Design-Deliver approach. Together with their customers they dream new kinds of end-user experiences and businesses these experiences could create. At the same time, they are closely connected to the know-how about how to actually deliver the intended dream. *Nokia* also highlights that the purpose of co-development is to find mutual value in a new solution. They also bring up the potential of lean thinking. According to lean philosophy, service should be focused only on the elements that generate customer value. Other elements should be eliminated or simplified.

Similarly, *Vaisala* is not that interested in co-development when doing incremental service development. Instead it wants to involve customers in co-development when trying to accomplish something novel.

*TeliaSonera* wants to help its customers always take a step further. It has recognized that it has an important role in influencing the market, but it also recognizes that it is itself influenced by the rapid changes in the market and by its customers. This multidirectional influencing takes place as TeliaSonera interacts with different actors and stakeholders.

*Interface* is interested in everything that moves the value co-creation towards sustainability. This is because it differentiates itself through sustainability. The original value proposition of Interface was a plastic-backed carpet cut into squares that was twice as expensive as regular carpet. That is a very tough sell, unless you are able to change what your customers view as the problem to be solved and shape the context of value co-creation. Interface also reminds us that you cannot go too far ahead of the customer; you need to be aware of how big a step your customer is willing and able to take. Shaping the context of value co-creation is typically like a dance, where the customer and the service provider need to be very close to one another and follow each other's moves.

### 5.3.2 Fostering Network Effects

Several of our case companies discussed the importance of network effects on the evolution of value co-creation. It seems that fostering network effects is an important area for applying customer involvement.

*Autodesk* is a de facto standard in the design profession. Design projects are carried out together with other people with whom you need to share the same tools. Because Autodesk is so strong, there are plenty of people doing third party development work for it. This work strengthens Autodesk's ecosystem, so it is in their interest to support it. Developers sign up to the Autodesk developer community and receive technical support from Autodesk. The community creates scale and momentum for the ecosystem. In order to motivate others to support your ecosystem and to develop innovations for it, you need to offer possibilities for profit.

*Nokia*, on the other hand, is in a challenging position in an ecosystem war. In order to recover from its hardships, it needs support from other actors in the industry. It can get this support if the other parties find it beneficial. Therefore, it is essential that Nokia is able to offer interesting value propositions also to parties other than consumers, for example, operators and other actors in the Windows ecosystem. *Ixonos* discussed network effects amongst bird-watchers, for whom it had just developed a new service together with *National Geographic*.

### 5.3.3 Living with Contingency

In practice, companies' possibilities to influence the changes in the context of value co-creation are limited. No company can control the formation of value co-creation networks, nor even forecast it. That is why, especially in volatile markets, it is important to learn to cope with contingency. Contingency is further increased by the complexity of these networks. Companies can apply customer involvement so as to increase their flexibility and ability to live with contingency.

An example of this is *Autodesk*. The founders originally developed AutoCAD as a side project for an assumed niche market, because it was possible to get the

product to market quickly. As they were unfamiliar with the market, they did not know what to develop. Instead, they built a platform with basic functionality and let third parties develop special functionality on top of it. Later, Autodesk bought some of those companies and incorporated that capability into the product line. Subsequently, Autodesk set up a developer network. Nowadays the market is still in a state of flux. The user communities and the developer network help Autodesk to understand new ways for customers to utilize its offering and to develop new functionality in a volatile market.

*Interface* cannot acquire as many new companies as larger companies can, but because of their reputation as a forerunner of innovation and sustainability, they get a lot of ideas pitched to them first. This view of the development work done within SMEs is very valuable for living with contingency.

*Nokia* describes its business environment as extremely volatile. Market situations and customers' needs change very fast. New service needs pop up quickly and require extreme pace from service development processes. The only way to meet these demands is to develop together with customers. Nokia finds it important to understand the problem the customer wants to solve and the change that is taking place. The value of collaboration for both Nokia and its customers is underlined in a volatile market.

*Ixonos'* Dream-Design-Deliver approach also increases flexibility and speed in the development work. The fuzzy picture of the market is made clear and extra work is removed by involving a variety of stakeholders. However, ideation and development is not outsourced.

Also *TeliaSonera* involves a wide range of stakeholders at multiple levels in the process of learning so as to understand the contextual needs and motivations. It utilizes an advanced questioning technique that also reveals new stakeholders who need to be involved in the process.

### 5.3.4 Engaging in Business with Meaning

We believe that the secret to involving customers lies in engaging them in business with meaning. An offering being developed needs to create meaningful experiences in order to be valuable to the customer. When people feel that something has meaning for them, they are motivated and ready to commit themselves to the development process and its outcome at a deeper level. Customer involvement can be utilized to find out what is meaningful for customers, but also to simultaneously create such meaning.

*Interface* declares it is Design with Purpose. It boldly aims to change the world towards sustainability. Some customers are extremely interested in sustainability, but less willing to pay for it. They might not even be ready to change their buying habits so as to buy something of equal price. What Interface's customers really care about is 'better', not greenness. Things need to be sold first as 'better' and next as sustainable. If people like the offering anyway and discover an interesting

sustainability story, customer loyalty ensues. But it is hard to get someone to switch because of greenness.

Interface's mission creates commitment and energy that drives its innovation. The sustainability goal has opened the eyes of both Interface and its customers to new solutions that have brought additional benefits for both. Green innovations have led, for example, to cost reductions, functional improvements and a special fit to certain markets. Interface sees that involving customers in the innovation process is a way to commit them to sustainability.

*Autodesk* links itself to the meaningful experiences of its customers by helping them imagine, design, and create a better world. It is not trying to convince its customers what that better world consists of, but if the people themselves have the motivation, Autodesk wants to offer them the means to accomplish their goals.

Green values are important also for *Vaisala's* customers, as it is in the business of environmental and industrial measurement. In Vaisala's business, better service is something that has an overarching positive effect. It is a win–win–win that benefits Vaisala, the customer, and the environment.

Several companies, like *TeliaSonera, Ixonos, Vaisala* and *Nokia* talk about the importance of trust and finding out what customers really value, what is meaningful to them. A certain level of trust is needed before co-development can reveal deeper meaning. On the other hand, trust is built and meaning is influenced in the collaborative process. Meaning evokes the motivation of individual people. If motivation is lacking, co-development will not take off.

### *5.4 Summary of Findings*

The case findings presented in this section are summarized in the following Tables 3 and 4. The practices and activities reported here are exemplary; all companies are likely to utilize many other practices of customer involvement in addition to these.

## 6 Discussion

Our article aims to fill an apparent research gap in understanding the practice of involving organizational customers in the creation of service innovations. We have done this by studying the reason and depth of customer involvement. We have applied previous research on service-dominant (S-D) logic and open innovation as our theoretical background, and have deepened the cross-disciplinary discussion between these converging research streams.

**Table 3** Examples of case companies' customer involvement practices

| | In-house development and supplier co-operation | Development based on customer insight | Co-development with customers | Development by customers |
|---|---|---|---|---|
| Autodesk | Acquiring companies | Gathering information on customer and user behavior from user communities | | Allowing customers design new functionalities and add-ins |
| Interface | Co-operating internally | Collecting customer feedback and surveys to gain understanding on customer needs | | |
| | Building internal capabilities | | | |
| Nokia | Building internal capabilities | Open discussions with customers on needs and challenges | Improving existing processes | Focusing on specific customers with personal interest in development work |
| | | | Showing customers visible benefits to get them involved | |
| Ixonos | Co-operating internally | Utilizing the dream-design-deliver approach | Ideation in the early stages of innovation, dreaming | Identifying key customers |
| | | | | Handpicking focus groups |
| | | Open discussion with customers | | Crowdsourcing not preferred |
| Vaisala | Developing internal processes (to make services more efficient) | Collecting customer feedback | Customizing large service packages for large individual customers, especially valuable in radically novel projects | |
| | | Open discussion on customer needs | | |
| TeliaSonera | | Gathering information on customers from user communities | Understanding customer needs | |
| | | | Helping customers understand what is possible | |

**Table 4** Examples of case companies' use of customer involvement practices

| | Shaping the context of value co-creation | Fostering network effects | Living with contingency | Engaging in business with meaning |
|---|---|---|---|---|
| Autodesk | Assisting people to imagine and create new and better possibilities | Offering a de facto standard that facilitates collaboration<br>Supporting third party development work | Building a platform with basic functionality and letting third party developers develop special functionality<br>Cooperating with user communities to understand new user needs | Helping customers imagine, design and create a better world<br>Offering customers means to accomplish their goals |
| Interface | Changing how customers view the problem<br>Keeping synchronous pace with customers, like when dancing | | Learning about the front-end of development through pitches | Building customer loyalty by selling things first as better and next as sustainable with an interesting story<br>Creating commitment and energy with a mission<br>Committing customers to sustainability by involving them in the innovation process |
| Nokia | Finding mutual value in new solutions<br>Eliminating elements that do not generate value | Making interesting value propositions to stakeholders in the ecosystem | Speeding up development process with close customer involvement | Finding out what is meaningful to customers and creating offerings based on meaning |
| Ixonos | Dreaming new kinds of businesses and end-user experiences with customers | Offering a collaboration platform for end-users | Making the phases of dream, design and delivery overlap in order to speed up the development process and increase flexibility | Finding out what is meaningful to customers and creating offerings based on meaning |

(continued)

**Table 4** (continued)

| | Shaping the context of value co-creation | Fostering network effects | Living with contingency | Engaging in business with meaning |
|---|---|---|---|---|
| Vaisala | Accomplishing something novel | | | Finding a win-win-win benefiting Vaisala, the customer, and the environment—an overarching positive effect |
| | | | | Finding out what is meaningful to customers and creating offerings based on meaning |
| TeliaSonera | Helping customers take a step further | | Understanding contextual needs through the involvement of a wide range of stakeholders | Finding out what is meaningful to customers and creating offerings based on meaning |
| | Participating in multidirectional influencing | | Revealing important stakeholders with an advanced questioning technique | |

## 6.1 Theoretical Implications

We see that there is great potential in increasing understanding of innovation by combining knowledge from the research areas of S-D logic, service innovation, and OI. Research into OI could greatly benefit from looking at innovation in the light of S-D logic. OI and user-driven innovation emphasize knowledge flows in the legacy of Chesbrough and von Hippel. We would like to extend this discussion to issues related to value co-creation, especially to shaping the context of value co-creation and to engaging in business with meaning.

An S-D logic-based view on innovation is emerging. Research into innovation in services has in many ways followed a goods-dominant (G-D) logic, whereas research in S-D logic has only lately, within the ecosystems view, been able to address the dynamics of innovation. The development of an S-D logic-based view of innovation could greatly benefit from previous research into OI. We emphasize that the structures of value co-creation are in a state of dynamic flux, and that it is possible to take an active role in shaping the context of value co-creation and in fostering network effects. OI practices can also help in coping with contingency. As S-D logic has been criticized for being too metaphorical in its view of value co-creation (Grönroos and Voima 2013), and not being able to analytically specify the roles of customers and providers in a way that would lead to practical implications, we hope that cross-fertilization with the more practice-oriented OI discussion and the introduction of different levels of customer involvement leads to fresh insights into the practice of innovation based on S-D logic.

Both S-D logic and OI are very symmetrical approaches, where either service or knowledge flows in multiple directions. This symmetry is highlighted in network effects, where support is needed from lots of stakeholders in order to ensure the viability of the offering. Therefore, we would like to say that there may be more actors involved in service innovation in the role of "service beneficiaries" than the obvious customers.

In light of our research, customer involvement differs in B2B and business to commerce (B2C) contexts. In the B2B context, the share of each individual customer of the total market is relatively large. This increases the risk related to each customership. This risk constrains co-development, as co-development easily leads to increased customer expectations that the company might not be willing to fulfill. The commercial interest that both parties have in a business context is different from the use interest of a consumer. The commercial interest limits willingness to expose information in an open manner. Different kinds of benefits, costs and resource constraints are relevant from the viewpoints of businesses and consumers. This is why the style of interaction with business customers and consumers is so different, and business customers' motivation for co-operation is often addressed more formally. Business customers are also more complex to understand, as they can be seen as networks of actors in different contexts.

### 6.2 Practical Implications

It is important for practitioners to understand the possibilities and limitations of customer involvement. It is possible to benefit from customer involvement in many more ways than just the gathering of ideas and information. We emphasize shaping the context of value co-creation, fostering network effects, living with contingency, and engaging in business with meaning. The service developer needs support from a variety of actors. In order to get this support it needs to understand the underlying motivation of each actor and to create mutually beneficial solutions.

Based on the goals of customer involvement, available resources, and the motivation of both parties, there are several levels of customer involvement to choose from. Some issues are best developed in-house or with suppliers; some are best developed based on customer insight. Sometimes development with customers is the best option, and sometimes development by customers. Companies typically use several approaches simultaneously in different situations, with different customers or in different phases of the development work. There are indications that co-development is evolving in a direction where the stages and roles of imagining, designing, and creating are merging, and this will require the development of new competencies.

Concerning new idea generation and the actual development work, it is necessary to consider who and how many actors to involve. Co-development with customers and multiple stakeholders seems to be beneficial for understanding and dreaming the value and value co-creation, and for creating momentum, robustness and network effects. Increasing the number of cooperating parties may, however, slow down the development process, kill radical or bright ideas, and increase the costs of development.

## 7 Conclusion

### 7.1 Limitations and Further Research

We have addressed a rather large issue through six company cases based on interviews with individual representatives of these companies. Our work does not provide a comprehensive picture of customer involvement practices in these companies, not to mention the practices of companies in general. However, our research does create a novel understanding of the practices of organizational customer involvement in service innovation.

We encourage further research into service innovation in the light of S-D logic, focusing especially on innovation practices. We believe that combining the research streams of S-D logic and OI is a fruitful approach for this research, especially when carried out with a discussion on the nature of value. Research on innovation can greatly benefit from a wide view to innovation, as in innovating co-created value. Such an approach calls for a better understanding of the phenomena of value and value co-creation.

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## References

Baldwin C, von Hippel E (2011) Modeling a paradigm shift: from producer innovation to user and open collaborative innovation. Organ Sci 22(6):1399–1417

Barras R (1986) Towards a theory of innovation in services. Res Pol 15(4):161–173

Chandler JD, Vargo SL (2011) Contextualization and value-in-context: how context frames exchange. Market Theor 11(1):35–49

Chesbrough H (2003) Open Innovation: the new imperative for creating and profiting from technology. Harvard Business School Press, Boston

de Brentani U (1995) New industrial service development—scenarios for success and failure. J Bus Res 32(2):93–103

Desouza KC, Awazu Y, Jha S, Dombrowski C, Papagari S, Baloh P, Kim JY (2008) Customer-driven innovation. Res Tech Manage 51(3):35–44

Drejer I (2004) Identifying innovation in surveys of services: a Schumpeterian perspective. Res Pol 33(3):551–562

Droege H, Hildebrand D, Forcada MAH (2009) Innovation in services: present findings, and future pathways. J Serv Manag 20(2):131–155

Ebersberger B, Bloch C, Herstad SJ, van de Velde E (2012) Open innovation practices and their effect on innovation performance. Int J Innovat Tech Manage 9(6):1–23

Edvardsson B (1997) Quality in new service development: key concepts and a frame of reference. Int J Prod Econ 52(1–2):31–46

Edvardsson B, Olsson J (1996) Key concepts for new service development. Serv Indust J 16 (2):140–164

Edvardsson B, Kristensson P, Magnusson P, Sundström E (2012) Customer integration within service development—a review of methods and an analysis of insitu and exsitu contributions. Technovation 32(7–8):419–429

Gallouj F, Savona M (2009) Innovation in services: a review of the debate and a research agenda. J Evol Econ 19(2):149–172

Gianiodis P, Ellis SC, Secchi E (2010) Advancing a typology of open innovation. Int J Innovat Manag 14(4):531–572

Grönroos C (1990) Service management and marketing: managing the moments of truth in service competition. Lexington Books, Lexington

Grönroos C, Voima P (2013) Critical service logic: making sense of value creation and co-creation. J Acad Market Sci 41(2):133–150

Guba EG (1981) Criteria for assessing the trustworthiness of naturalistic inquiries. Educ Comm Tech J 29(2):75–91

Guba EG, Lincoln YS (1994) Competing Paradigms in Qualitative Research. In: Denzin NK, Lincoln YS (eds) Handbook of qualitative research. Sage, Thousand Oaks, pp 105–117

Holbrook MB (1999) Introduction to consumer value. In: Holbrook MB (ed) Consumer value: a framework for analysis and research. Routledge, London

Hopkins MM, Tidd J, Nightingale P, Miller R (2011) Generative and degenerative interactions: positive and negative dynamics of open, user-centric innovation in technology and engineering consultancies. R&D Manage 41(1):44–60

Hsieh K-N, Tidd J (2012) Open versus closed new service development. Technovation 32 (11):600–608

Katz ML, Shapiro C (1985) Network externalities, competition, and compatibility. Am Econ Rev 75(3):424–440
Katz ML, Shapiro C (1994) Systems competition and network effects. Am Econ Rev 8(2):93–115
Kaulio MA (1998) Customer, consumer and user involvement in product development: a framework and a review of selected methods. Total Qual Manage 9(1):141–149
Lane D, Maxfield R (1996) Strategy under complexity: fostering generative relationships. Long Range Plan 29(2):215–231
Lusch RF, Vargo SL, O'Brien M (2007) Competing through service: insights from service-dominant logic. J Retail 83(1):5–18
Mustak M, Jaakkola E, Halinen A (2013) Customer participation and value creation: a systematic review and research implications. Manage Serv Qual 23(4)
Nijssen EJ, Hillebrand B, Vermeulen PAM, Kemp RGM (2006) Exploring product and service innovation similarities and differences. Int J Res Market 23(3):241–251
Remneland-Wikhamn B, Ljungberg M, Bergqvist M, Kuschel J (2011) Open innovation, generativity and the supplier as peer. Int J Innovat Manage 15(1):205–230
Rubalcaba L, Michel S, Sundbo J, Brown SW, Reynoso J (2012) Shaping, organizing, and rethinking service innovation: a multidimensional framework. J Serv Manage 23(5):696–715
Russo-Spena T, Mele C (2012) "Five co-s" in innovating: a practice based view. J Serv Manage 23 (4):527–553
Schembri S (2006) Rationalizing service logic, or understanding services as experience? Market Theor 6(3):381–392
Schumpeter J (1934) The theory of economic development. Harvard University Press, Cambridge
Stake RE (1995) The art of case study research. Sage, Thousand Oaks
Sundbo J (1997) Management of innovation in services. Serv Indust J 17(3):432–455
Sundbo J, Toivonen M (2011) Introduction. In: Sundbo J, Toivonen M (eds) User-based innovation in services. Edward Elgar, Cheltenham, pp 1–21
Swan J, Scarborough H (2005) The politics of networked innovation. Hum Relat 58(7):913–943
Toivonen M (2010) Different types of innovation processes in services and their organisational implications. In: Gallouj F, Djellal F (eds) The Handbook of innovation and services. Edward Elgar, Cheltenham, pp 221–249
Toivonen M, Tuominen T (2009) Emergence of innovations in services. Serv Indust J 29 (7):887–902
Tse E (2002) Grabber-holder dynamics and network effects in technology innovation. J Econ Dynam Contr 26(9–10):1721–1738
Vargo SL (2009) Toward a transcending conceptualization of relationship: a service-dominant logic perspective. J Bus Ind Market 24(5/6):373–379
Vargo SL (2013) Service-dominant logic reframes (service) innovation. In: Isomursu M, Toivonen M, Kokkala M, Pussinen P (eds) Highlights in service research, VTT Research highlights 6. Espoo, Finland, VTT Technical Research Centre of Finland, pp 7–11
Vargo SL, Lusch RF (2004) Evolving to a new dominant logic for marketing. J Market 86(1):1–17
Vargo SL, Lusch RF (2008) Service-dominant logic: continuing the evolution. J Acad Market Sci 1(36):1–10
von Hippel E (1988) The sources of innovation. Oxford University Press, New York
von Hippel E (2005) Democratizing innovation. The MIT Press, Cambridge
von Wright GH (1963) The varieties of goodness. Routledge, London
Westerlund M, Leminen S (2011) Managing the challenges of becoming an open innovation company: experiences from living labs. Tech Innovat Manage Rev October:19–25
Yin RK (2003) Case study research: design and methods, 3rd edn. Sage, Thousand Oaks

# Article IV

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# Widening the Perspective on Industrial Innovation: A Service-Dominant-Logic Approach

Heidi M. E. Korhonen

> *"Any existing structures and all the conditions of doing business are always in a process of change."*
>
> Joseph Schumpeter (1883–1950)
> Economist and political scientist

The servitization of industry has progressed from services as add-ons to services as solutions. Today, industrial innovation needs an even broader perspective that moves towards service-dominant logic. This logic emphasizes value co-creation in actor-to-actor networks and requires new organizational structures and practices in industry. The article presents the case of a Nordic manufacturer of arc welding equipment that has gone through an extensive development program to become more customer and service oriented. An innovative offering created during the program is analyzed as an example in order to gain deeper insight about the concrete application of service-dominant logic in business. In addition to the outcome perspective, the article discusses the implications of the service-dominant logic for innovation practices. The article illustrates the behaviour of cutting-edge servitizing manufacturers and argues that similar behaviour can be expected to become a necessity in all industrial companies with large structural changes.

## Introduction

There is a constant need for manufacturing to renew itself due to competition. Today, renewals are driven in particular by intangible assets such as human capital, intellectual capacity, and service provision. Since the end of the 1980s, manufacturing companies have added services to their offerings in order to create closer and more long-lasting relationships with their clients. However, it has been common to implement this practice – called "servitization" (Vandermerwe & Rada, 1988; Neely, 2008; Baines et al., 2009) – in a way that has not changed the basic view of the primary role of the provider in the emergence of value. Value has still been seen as something created in production and then delivered to clients (Michel et al., 2008). It was not until Vargo and Lusch (2004, 2008) presented their argument about the necessity of a new service-dominant logic that the central position of customers in value creation began to gain ground. According to service-dominant logic, this position is based on the fact that value is revealed only when goods and services are used and when an individual good or service acquired from a single provider is linked to other goods and services acquired from other providers. The last mentioned process of resource integration is an indispensable part of value creation and is carried out by the user as well as the provider. Consequently, value is always co-created: the provider has to make its best effort to facilitate the emergence of value via purposeful goods and services, but the realization of value takes place in the use context.

Service-dominant logic links the value logic to the production of both goods and services. It considers the reciprocal nature of value creation a more crucial phenomenon than the production outputs in the form of individual goods and services. According to Vargo and Lusch (2004), goods and services are important, but value is not their inherent property; they are first and foremost conveyors of competences for the benefit of another party. Other authors, analyzing the implications of service-dominant logic from managerial viewpoints, have pointed out that this view should not lead to diminishing the importance of goods and services –

# Widening the Perspective on Industrial Innovation: A Service-Dominant-Logic Approach

*Heidi M. E. Korhonen*

they do not go away. Rather, they must be designed around co-creation of human experiences through multi-sided interactions (Ramaswamy, 2009, 2011). In the service context, the formulation of value propositions is of particular importance because they are the entities based on which customers make purchasing decisions (Maglio & Spohrer, 2013). Finding a way to link the views of service-dominant logic with the concrete production outputs is essential for the current development in the servitization of manufacturing.

Although most innovation research has focused on product and process innovations, present discussion calls for a broader notion of innovation (Tidd et al., 2001). This discussion returns back to the definition of innovation by Schumpeter (1934), who laid the ground for studying innovation as a socioeconomic evolutionary process resulting in new combinations of resources. His categorization of innovations is wide and enables the analysis of renewals at different levels: products and methods of production; sources of supply and exploitation of new markets; and methods of organizing business. The service-dominant-logic view on innovation – based on value co-creation practices – has much in common with the Schumpeterian views. In addition to products and services, which manifest value co-creation practices, service-dominant logic advises firms to focus on the overall value-proposition design. This approach can be seen as a systematic search for business model innovation from the provider's perspective (Maglio & Spohrer, 2013).

This article studies: i) how the view of value as co-created can be applied to widen the perspective on industrial innovation and ii) what are the implications of this widening for the development of innovation practice. The study has been carried out as a single-case study of a Nordic welding equipment manufacturer that has gone through an extensive development program to increase its innovative capability in a more customer- and service-oriented direction. The program has led to the development of several offerings that represent a novel type of industrial service business.

To understand the current development in industrial innovation in detail, we will analyze the development of one specific offering in our case company. We will use this example to illustrate the relationships between industrial service innovations as add-ons, solutions-based innovations, and innovations based on service-dominant logic. We will then discuss innovation practices for systematically and efficiently producing innovations consonant with the view of value as co-created.

This article is structured as follows. We first explain the background and theory to better understand innovation as a co-development process and as novel outcomes and practices. We then describe our methodology and case selection. After this, we analyze the new innovative solution and discuss the innovation practices used in its creation. We finish our article by discussing the managerial implications of widening the perspective on industrial innovations.

## Innovation in the Light of Service-Dominant Logic

In the history of manufacturing, innovation was seen primarily as a matter of technological development, and services were regarded as an unavoidable expense. The current synthesis approach suggests that service innovation brings neglected aspects of innovation to the fore (Coombs & Miles, 2000). Service-dominant logic is consistent with the synthesis approach, but it brings novel understanding to the discussion. It can be understood either as an innovation theory or as an approach for leveraging other discussions on innovation. In this article, we take the former viewpoint and point out its implications for the practice of innovation management.

Industrial companies often start servitization by developing services to support products (Oliva & Kallenberg, 2003). However, when their service business matures, they no more consider services as mere add-ons to products, but innovate services supporting customers (Mathieu, 2001). Customer centricity has often led to providing solutions, in other words, individualized and interactively designed offers for complex customer problems (c.f. Evanschitzky et al., 2011). In solutions, products and services are integrated and the relationship between the buyer and the seller is close. Instead of the traditional approach of managing services as a separate function, manufacturers may turn their entire business to service logic (Grönroos & Helle, 2010). The involvement of customers may take place both in the innovation process and in the joint creation of value.

Despite the change, servitization alone does not seem to represent a panacea for manufacturers (Baines et al., 2009). The service-dominant-logic approach includes the ideas of the synthesis perspective and solution business, but it widens the scope of the discussion. In particular, service-dominant logic broadens the view from a provider–customer dyad to a broader system of actors (Vargo & Lusch, 2011) – an approach that has been rare in service innovation research (Carlborg et al., 2013).

## Widening the Perspective on Industrial Innovation: A Service-Dominant-Logic Approach

*Heidi M. E. Korhonen*

Also, in addition to operand resources that require action taken upon them to be valuable, service-dominant logic stresses the primacy of knowledge and technology because they are capable of acting on other resources to contribute to value creation (Vargo & Lusch, 2004). Further, service-dominant logic emphasizes the role of institutions – social rules and norms that both constrain and enable behavior – as resources that are needed for actors to co-create value. Markets can be seen as institutionalized solutions of resource application to human problems or needs. The way in which novelties become stabilized (i.e., institutionalized) in the markets is one of the most interesting issues in innovation according to service-dominant logic. Here, the view is very similar to the current emphasis of general innovation research on the diffusion (not only invention) of innovations.

These new insights are in line with innovation studies that highlight innovation as processes and practices (Gallouj, 2002; Lundvall, 2007). Innovation can be seen as a path dependent co-development process, and its outcomes include the adoption of new practices. We now use the service-dominant-logic theory in order to better understand the wide perspective on innovation from these points of view.

*Innovation as a co-development process*

Service-dominant logic emphasizes social institutions and therefore encourages the study of practices – "embodied, materially mediated arrays of human activity centrally organized around shared practical understanding" (Schatzki, 2005). Value co-creation takes place through the enactment of practices in systems at micro, meso, and macro levels (Akaka et al., 2013). These practices and systems cannot be created from nothing, but are recreated by integrating existing resources in novel ways. As Arthur (2009) puts it, novel technologies arise from existing technologies. In order to better understand the wide concept of innovation, technology should be understood in a broad way, as an operant resource and "as a set of practices and processes, as well as symbols, that contribute to value creation or fulfill a human need" (Akaka & Vargo, 2013). The most enduring and prevalent practices can be referred to as institutions (Giddens, 1984).

Value propositions are made about new practices for value co-creation, but it is in the use phase when the practices are enacted and come to being. Therefore, the resource integration for innovation occurs through both value proposition and value determination phases (Akaka & Vargo, 2013). There are parallels between value proposition and determination in service-dominant-logic theory and invention and innovation adoption in general innovation-diffusion theory (c.f. Rogers, 2003). Service-dominant logic strives to incorporate the issues of contextual value and multiple actors to the phenomenon. In most cases of industrial innovation, both the value proposition and determination involve multiple stakeholders instead of just one and are affected by the institutional landscape.

As has been described above, innovation is not a one-directional development activity by any single actor. Instead, it is co-development between the different actors of the service system. Innovation is a path-dependent and recursive process. It can be understood as mutual learning between actors and as the emergence of corresponding value co-creation systems, again implying that social capital matters – it has an important impact on a company' innovative capability.

In service-dominant logic, one of the most important operant resources is entrepreneurial spirit (Vargo & Lusch, 2006) – the mental capabilities for resource integration characteristic of entrepreneurs. Based on this, and in line with Schumpeter (1934), we accentuate that anyone can act entrepreneurially and stress its meaning for innovation. Innovative activity can be characterized as an actor's entrepreneurial search for new beneficial configurations for resource integration that emphasizes operant resources. Entrepreneurs search for change, respond to it, and exploit it as an opportunity (Drucker, 1964). This process of search and experimentation always involves uncertainty. Therefore, instead of trying to predict uncertain markets, experienced entrepreneurs co-develop novel markets with committed stakeholders (Read et al., 2009).

All humans participate in value co-creation through the repeated reproduction of institutionalized practices in their daily activities whether or not they do it entrepreneurially. The activity of co-development differs from this activity of co-creation. Co-development is proactive search for new actors, resources and configurations, making new kinds of value propositions and reciprocally assessing other actors' novel value propositions. It is a purposive activity aimed at transforming the structure of value co-creation in interaction with others. Actors can appreciate co-development either instrumentally through the appreciation of its aims or intrinsically through the appreciation of participating in the social interaction per se.

# Widening the Perspective on Industrial Innovation: A Service-Dominant-Logic Approach

*Heidi M. E. Korhonen*

*Innovations as novel outcomes*

Scholars that study service-dominant logic are cautious when it comes to discussing innovation outcomes because such an approach easily leads to goods-dominant logic. Yet, goods and services, and activities and processes, still remain (Ramaswamy, 2011). Also, it is the resulting impact that determines whether innovation makes us better off or not. Therefore innovation as resulting novel practices and their concrete manifestations as, for example, products and services should not be ignored.

Edvardsson and Tronvoll (2013) see the results of innovation as new practices. They emphasize structuration (Giddens, 1984) and view innovation in service-dominant logic as changes in social structure that allows actors to co-create value. These changes stem from new configurations of resources or new knowledge of shared rules and norms. We agree with this view and characterize innovative outcomes as new value co-creation practices embedded in social structure. The new practices can either enable customers to attain something or relieve customers from something (Michel et al., 2008). They can address different benefits and even different level benefits than the old practices. The benefits may vary for different stakeholders. New levels of value are addressed, for example, when focus is shifted from efficiency to effectiveness or when the experiential and meaning-laden nature of value is emphasized. Service-dominant logic also stresses that operant resources such as skills and knowledge can be embedded in the offering with the purpose of making customers smarter.

The novel practices are often crystallized in concrete entities such as products, services, or technologies. Humans make observations through their physical senses, and they depend on their bodies as a means to act and participate in any social interaction. They have a limited view of the actions of others and of the consequences of their own actions and the actions of the actor-to-actor network as a whole. Products, services, and technologies are resources that aid humans by extending their senses and capability to act. They always have some physical manifestation that works as a medium enabling the human-to-human interaction for value co-creation. However, only an experience can be appreciated as an end itself (Holbrook, 1999). Therefore, value is not an inherent property of products, services, or technologies. Instead, they are manifestations and enablers of practices: configurations of resource integration that can be further integrated for enhancing value co-creation in social interaction.

All the forms of innovation originally proposed by Schumpeter (1934) can be considered to be *novel value co-creation practices*. Therefore, service-dominant logic as an innovation theory is wide enough to include all innovations, including new markets and reorganization of industries as well as new products and services.

## Methodology and Case Company

Service-dominant logic is young as an innovation theory, and there is a clear need for more practically relevant knowledge about its implications for innovation management. In particular, we want to illustrate how it widens the perspective on industrial innovation and what effect this widening has for the innovation practice in industry. A case study is a suitable methodology for us because it fits especially well with answering "how" or "why" types of questions (Yin, 1994).

We first use our empirical case study to illustrate and concretize how to further widen the abstract idea of an innovation. We analyze the sample offering using service-dominant-logic theory to clarify the resulting innovations as novel value co-creation practices. Then, we further discuss the innovation practices used in creating this type of innovation.

Our case company is a Nordic manufacturer of arc welding equipment and a provider of solutions for highly productive welding. It has gone through an extensive development program to increase its innovative capability and to turn from an equipment company to a more customer- and service-oriented direction. It is an entrepreneurial and innovative company serving the high-end market. It has own offices in 15 countries and a strong dealer network with export to 80 countries. It has about 650 employees and its global revenue totals 120 million euros a year.

The company has developed services previously. We assess the company's earlier level of servitization as mainly a supplier of machines and add-on services, with some solutions for specific uses or user groups. During the development program, the company took clear steps to a more mature solutions-provider phase. These steps include development of customer centricity, incorporation of customers' voice, and the development of a wide range of new integrated product and service offerings focused on supporting customers' value creation processes. Service logic now better encompasses the entire company and proper attention has also been given to customer relationship management. In addition to these qualities of a solutions pro-

# Widening the Perspective on Industrial Innovation: A Service-Dominant-Logic Approach

*Heidi M. E. Korhonen*

vider, the company has been able to develop certain level of preparedness and capabilities necessary for a company that wants to apply service-dominant logic in its innovation efforts.

*Data collection*

Our empirical data was collected from the company's extensive development program taking place during 2011-2013. The author, together with a larger research group, has been involved in the program since its beginning. Case data has been collected from various sources, including meeting notes, slide presentations, memos, process descriptions, conceptual descriptions, web pages, and observations. Every half a year, the author together with colleagues has written a thorough report about the progress of the development program, utilizing detailed material. These reports have also been used as data for study. In addition to the data collected as part of the development program, three company representatives in high management positions and two customer representatives were interviewed. The author has had a dual role in the process. The research group – including scholars in innovation management, service-dominant-logic and strategic renewal – has brought its expertise to the development program together with several other expert groups, and affected the change in the company's business and innovation practices.

## Case Findings

In our theoretical discussion, we ended up with a view of innovations as novel value co-creation practices embedded in social structure. They come into being as customers and other relevant actors accept value propositions and enact them. In order to better understand industrial service innovations from this perspective, we now analyze a new offering created by the case company and then discuss our empirical findings on innovation management.

*Analysis of a systemic industrial service offering*

We find the offering an enabler of new value co-creation practices and summarize the main points of this analysis in Figure 1. The offering is a system for managing quality and productivity of welding work. It links together different modules or sub-offerings that fit together and can be used either together or separately. The modules are complementary, having the potential to become more valuable as more modules and actors are integrated together. The offering includes physical products such as welding machines and barcode readers, and services such as consultation and training, but it is best understood as a systemic, multi-actor value-proposition design capable of assisting customers in their value creation by making them "smarter" through the smart knowledge and connections it contains.

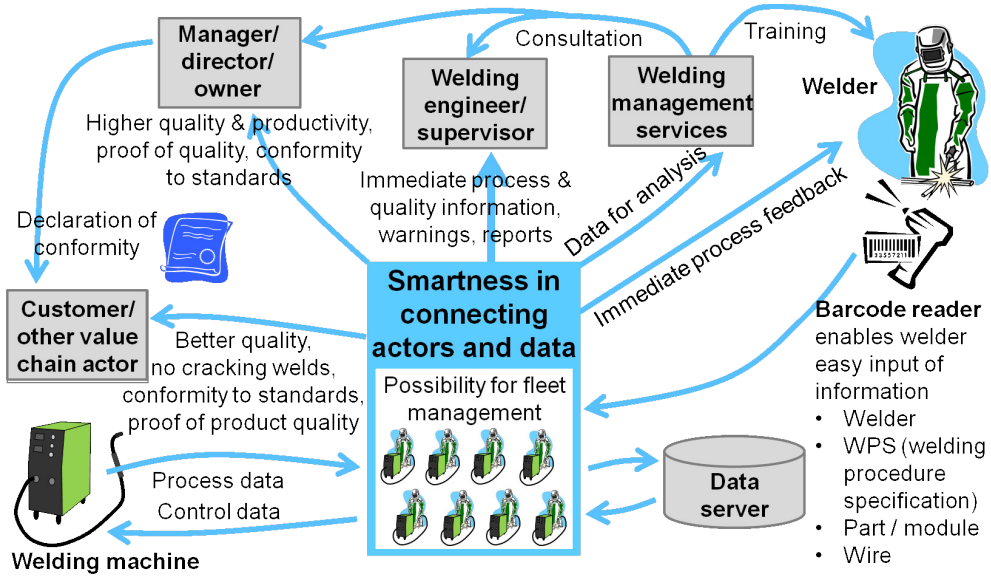


**Figure 1.** A systemic offering as an enabler of new value co-creation practices

## Widening the Perspective on Industrial Innovation: A Service-Dominant-Logic Approach

*Heidi M. E. Korhonen*

We now discuss this value proposition by starting from the lower left corner of Figure 1 and moving counterclockwise. We then further discuss institutions and other aspects of the offering not visible in the figure.

*Welding machines* are a basic product offering of the case company. They are physical manifestations of resource integration practices carried out by the case company. Customers integrate welding machines as resources in their own welding processes. However, value creation in welding work relies heavily on welders' competence and their compliance with welding procedure specifications. Welded joints are often safety critical, yet their metallurgic microstructures cannot be properly studied with non-destructive testing methods.

As a major benefit compared to welding machines alone, the systemic offering can be used to collect all welding data and to monitor compliance with welding procedure specifications for quality control. Because process data is collected and stored in *a data server*, it can be integrated with other information for quality and productivity improvements. An essential enabler of novel practices is *a barcode reader*. It allows *the welder* to easily input important quality parameters into the system. Due to the barcode technology, it is easy for the welder to adopt the new quality-control practices. The system also gives the welder immediate process feedback about their own work.

The data can also be used as a resource for the case company's *welding management services* production, such as training and consultation. The data and the different reports and services are also an important resource for *the welding supervisor* as the system facilitates and automates production management. At the company level, *the owner* benefits through better quality and improved productivity, which lead to reduced costs and higher throughput. For the company, it is also very important that welding quality and conformation to welding procedure specifications can be verified. Quality problems of safety-critical welded parts can cause substantial liabilities. *Customers* of the welding shop can further utilize the declaration of conformity while doing business with final customers. Welded parts and their quality can be tracked throughout the production chain. Naturally, customers also benefit directly through better quality and the resulting safety for people and their value creation processes.

The offering allows for new practices of fleet management on the shop floor, and even globally. It connects together different data resources and actor resources, which enables smart value co-creation practices in a networked business environment. Therefore, it is a systemic value proposition design.

The system draws on many institutionalized practices of welding industry as resources, including arc welding technology and the use of welding procedure specifications. It also utilizes the institutionalized practices of information technology such as barcodes. The servitization of industry is also an important norm and a resource for welding management services.

An especially important institutional change in the welding industry is the rapid spread of quality management practices as an industry norm. Welded seams are safety critical and there is a global trend of emphasis on safety issues. Accidents such as the Gulf of Mexico oil spill have had a major effect on the required safety precautions in many industries and especially in the offshore industry. Europe is adopting new quality standards for welding. CE marking will be required for all steel and aluminum structures sold within the European Economic Area. The offering facilitates conformity to the new standards. The institutional norm for quality management is further intensified by urbanization and the rapid growth of the Chinese market. Due to the high demand, there is a global shortage of well-trained welders. The quality management tools help welding companies to cope with the high demand when there is a shortage of personnel.

Institutional inertia often makes it difficult to induce changes in practices of systemic value co-creation. However, institutions not only constrain behaviour – they also enable it. The offering under study has been designed to meet the demand created by a major change in the institutional landscape of the welding industry. It does not try to fight major institutions, instead it utilizes them. For example, one of the first customers adopted this innovation in order to take proactive development steps, improve operations, and be well prepared for CE marking. Also, many of its large customers required operation almost at the level of the CE marking.

The offering can be viewed as designed around human value co-creation. Products, services, and technologies are an indispensable part of the design as enablers of human-to-human interaction. In this case, the main enabler of higher value creation is information technology that makes actions of the welder as well as functioning of the welding machine visible for other stakeholders across time and space. The offering embeds smart technology that helps each stakeholder utilize this knowledge and act smarter in his role.

## Widening the Perspective on Industrial Innovation: A Service-Dominant-Logic Approach

*Heidi M. E. Korhonen*

As an important difference to the typically dyadic value propositions of solutions business, the novel offering represents a multi-stakeholder value proposition for welders, welding engineers, managers, customers of the welding shop, and the provider of welding management services. The offering supports the interactive value co-creation between the different stakeholders at least as much as it directly supports the value creation of each individual stakeholder.

As the stakeholders accept the value proposition and adopt the new value co-creation practices, an innovation emerges. The innovation is not the offering per se, but the enactment of new practices by the different stakeholders. The offering is an enabler. The new products and services are critical enabling components that need to be created before the innovation as novel practices can take place. However, products, services and technologies as such are not sufficient development targets. Development efforts need to be aimed at systemic value co-creation.

The example represents a gradual shift towards service-dominant logic. The offering differs from typical solutions offerings and resembles a service-dominant-logic offering due to its value proposition that supports joint value co-creation of multiple stakeholders and due to the way it utilizes the systemic market dynamics created by the wider institutional change. It also leverages knowledge and technology the way that is stressed by service-dominant logic.

The analysis of the offering illustrated how the adoption of service-dominant logic widens the perspective on innovation. We will now discuss the innovation practice used in its creation. Our elaboration on it is brief because, as a dynamic capability, it is a sensitive issue.

*Understanding context and searching for win-win-win*

A view of systemic complementarity between multiple actors instead of a provider-customer view becomes obvious in the offering example presented above. The search for such win-win-win is a complex and uncertain task for which theory suggests an entrepreneurial approach. For this search, the company has developed shared organizational capability for understanding customers and proactively utilizing this understanding for new offering development, as the following quotation from a senior manager at the start of the program tells us:

*"It is not enough to know customers' present needs… Customer satisfaction surveys tell us about past and present… we need to go further in thinking and develop a proactive approach."*

A consultative sales model is an important entrepreneurial element of the innovation process that was developed. Sales people learn about customers' different contexts and proactively widen the discussion on possible sources of value in their search for mutually beneficial solutions with customers. They need to have a certain level of consulting capability in order to sell the smart offerings and consulting services. It is not easy for all seasoned sales people to learn the new approach. However, sharing success stories helps sales people learn from each other's experiences and widen their minds to new creative value propositions. Special attention has been given to ensuring that all sales people have proper skills in consultative sales and on developing tools for learning the new skills.

When developing multiple-actor value systems, insight needs to be gained about stakeholders in multiple roles and how they experience value creation and value destruction. In our case these multiple roles include welder, welding engineer, owner, service provider, dealer, and the customer of the welding company. All these actors each have their individual context that has an influence on their service experience. A very important part of this context is the everyday practices of these actors. For example, the case company uses an ethnographic approach that is suitable for studying the everyday practices, contexts, and experiences of the different actors. Also, other methods such as questionnaires are used and integrated into the critical process points of the research, development, and innovation process. The front office is used for searching weak signals. The case company has also organized its innovation process so that it can create a very extensive and deep understanding of its customers on multiple levels, for example, an understanding of customer's people, customer's business, the tools used, and the context.

*Co-developing value co-creation systems*

Firms depend on their relationships with their external environment for innovation. This dependency emphasizes the importance of social capital and long-term relationships with other innovative agents. The case company has built extensive external networks and long-term relationships to support its innovation activity. It has carefully chosen strategic research partners to collaborate with and to tap into important information sources. As an example, the development program involved a multitude of research organizations and companies to provide rich expert knowledge.

# Widening the Perspective on Industrial Innovation: A Service-Dominant-Logic Approach

*Heidi M. E. Korhonen*

The offering enables a change in the value co-creation system. From the provider's view, it can also be seen as a business model innovation. The idea is expressed in the following quotation from a senior manager discussing markets in different cultures:

*"It is not the machines and their use, instead it comes more from business models and the whole system – how you offer support and how you do pricing. The machines are not that radically different and it accentuates contextual circumstances – the whole business model and how you approach through different channels – how the business runs."*

Technology, products, and services are not developed for their own sake; instead, they are developed to fill critical gaps so that value propositions can be made that fit the social context. In order to do this, the development program joined together technology development, business development, customer research, and organizational development. This approach proved to be a very successful research and development concept.

## Conclusion

The servitization of industry has advanced from services as add-ons to services as solutions. The next logical step for industry is to widen its perspective on innovation based on the view of value as being co-created. It is a systemic and human-centered view that sees innovations as new practices in social interaction. First, this approach will be adopted by the advanced companies that want to be in the forefront of development. In the future, however, industry will face large structural changes, partly due to the positive forces of the knowledge society and new technologies such as the Internet of Things, robotics, and additive manufacturing – and partly due to more negative forces such as the coming shortage of resources and the need for a more sustainable economy. In the phase of large structural changes, a wider innovation concept that includes new market structures and the reorganization of industries is a necessity. Service-dominant logic can provide this wider innovation concept.

Companies that wish to adopt service-dominant logic in their innovation activities can start by aiming their innovation efforts at the development of new systemic value co-creation practices. New innovation capabilities are needed for creating a deep insight of multiple-stakeholder situations and an understanding of institutional forces. In addition to these new capabilities, practices of entrepreneurial search and co-development need to be developed. Systemic change can be facilitated by identifying critical gaps of the system and developing technologies, products, and services to fill them. They are important enablers of human-to-human value co-creation and as such remain an integral part of innovation outcomes in service-dominant logic.

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## References

Akaka, M. A., & Vargo, S. L. 2013. Technology as an Operant Resource in Service (Eco)systems. *Information Systems and e-Business Management*, 1–18. http://dx.doi.org/10.1007/s10257-013-0220-5

Akaka, M. A., Vargo, S. L., & Lusch, R. F. 2013. The Complexity of Context: A Service Ecosystems Approach for International Marketing. *Journal of International Marketing*, 21(4): 1–20. http://dx.doi.org/10.1509/jim.13.0032

Arthur, W. B. 2009. *The Nature of Technology: What It Is and How It Evolves.* New York: Free Press.

# Widening the Perspective on Industrial Innovation: A Service-Dominant-Logic Approach

*Heidi M. E. Korhonen*


Baines, T. S., Lightfoot, H. W., Benedettini, O., & Kay, J. M. 2009. The Servitization of Manufacturing: A Review of Literature and Reflection on Future Challenges. *Journal of Manufacturing Technology Management,* 20(5): 547–567. http://dx.doi.org/10.1108/17410380910960984

Carlborg, P., Kindström, D., & Kowalkowski, C. 2014. The Evolution of Service Innovation Research: A Critical Review and Synthesis. *The Service Industries Journal,* 34(5): 373–398. http://dx.doi.org/10.1080/02642069.2013.780044

Coombs, R., & Miles, I. 2000. Innovation, Measurement and Services: The New Problematique. In J. S. Metcalfe & I. Miles (Eds.), *Innovation Systems in the Service Economy:* 85–103. Boston, MA: Springer US.

Drucker, P. F. 1964. *Managing for Results.* New York, NY: HarperBusiness.

Edvardsson, B., & Tronvoll, B. 2013. A New Conceptualization of Service Innovation Grounded in S-D Logic and Service Systems. *International Journal of Quality and Service Sciences,* 5(1): 19–31. http://dx.doi.org/10.1108/17566691311316220

Evanschitzky, H., Wangenheim, F. V., & Woisetschläger, D. M. 2011. Service & Solution Innovation: Overview and Research Agenda. *Industrial Marketing Management,* 40(5): 657–660. http://dx.doi.org/10.1016/j.indmarman.2011.06.004

Gallouj, F. 2002. *Innovation in the Service Economy: The New Wealth of Nations.* Cheltenham, UK: Edward Elgar Pub.

Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration.* Cambridge: Polity.

Grönroos, C., & Helle, P. 2010. Adopting a Service Logic in Manufacturing: Conceptual Foundation and Metrics for Mutual Value Creation. *Journal of Service Management,* 21(5): 564–590. http://dx.doi.org/10.1108/09564231011079057

Holbrook, M. 1999. *Consumer Value: A Framework for Analysis and Research.* London: Routledge.

Lundvall, B.-Å. 2007. Innovation System Research - Where It Came From and Where It Might Go. Globelics Working Paper Series, No. 2007-01.

Maglio, P. P., & Spohrer, J. 2013. A Service Science Perspective on Business Model Innovation. *Industrial Marketing Management,* 42(5): 665–670. http://dx.doi.org/10.1016/j.indmarman.2013.05.007

Mathieu, V. 2001. Product Services: From a Service Supporting the Product to a Service Supporting the Client. *Journal of Business & Industrial Marketing,* 16(1): 39–61. http://dx.doi.org/10.1108/08858620110364873

Michel, S., Brown, S. W., & Gallan, A. S. 2008. Service-Logic Innovations: How to Innovate Customers, Not Products. *California Management Review,* 50(3): 49–65. http://dx.doi.org/10.2307/41166445

Neely, A. 2008. Exploring the Financial Consequences of the Servitization of Manufacturing. *Operations Management Research,* 1(2): 103–118. http://dx.doi.org/10.1007/s12063-009-0015-5

Oliva, R., & Kallenberg, R. 2003. Managing the Transition from Products to Services. *International Journal of Service Industry Management,* 14(2): 160–172. http://dx.doi.org/10.1108/09564230310474138

Ramaswamy, V. 2009. Leading the Transformation to Co-Creation of Value. *Strategy & Leadership,* 37(2): 32–37. http://dx.doi.org/10.1108/10878570910941208

Ramaswamy, V. 2011. It's about Human Experiences… and Beyond, to Co-Creation. *Industrial Marketing Management,* 40(2): 195–196. http://dx.doi.org/10.1016/j.indmarman.2010.06.030

Read, S., Dew, N., Sarasvathy, S. D., Song, M., & Wiltbank, R. 2009. Marketing Under Uncertainty: The Logic of an Effectual Approach. *Journal of Marketing,* 73(3): 1–18. http://dx.doi.org/10.1509/jmkg.73.3.1

Rogers, E. M. 2003. *Diffusion of Innovations* (5th edition). New York: Free Press.

Schatzki. 2005. Introduction. In K. K. Cetina, T. R. Schatzki, & E. von Savigny (Eds.), *The Practice Turn in Contemporary Theory:* 50–63. London: Routledge.

Schumpeter, J. A. 1934. *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle.* New Brunswick, N.J: Transaction Publishers.

Tidd, J., Bessant, J., & Pavitt, K. 2001. *Managing Innovation: Integrating Technological, Market, and Organizational Change,* (Second Edition). Chichester, England: Wiley.

Vandermerwe, S., & Rada, J. 1988. Servitization of Business: Adding Value by Adding Services. *European Management Journal,* 6(4): 314–324. http://dx.doi.org/10.1016/0263-2373(88)90033-3

Vargo, S. L., & Lusch, R. F. 2004. Evolving to a New Dominant Logic for Marketing. *Journal of Marketing,* 68(1): 1–17. http://dx.doi.org/10.1509/jmkg.68.1.1.24036

Vargo, S. L., & Lusch, R. F. 2006. Service-Dominant Logic: What It Is, What It Is Not, What It Might Be. In R. F. Lusch & S. L. Vargo (Eds.), *The Service-Dominant Logic of Marketing: Dialog, Debate, and Directions:* 43–56. New York: M.E. Sharpe.

Vargo, S. L., & Lusch, R. F. 2008. Service-Dominant Logic: Continuing the Evolution. *Journal of the Academy of Marketing Science,* 36(1): 1–10. http://dx.doi.org/10.1007/s11747-007-0069-6

Vargo, S. L., & Lusch, R. F. 2011. It's All B2B…and Beyond: Toward a Systems Perspective of the Market. *Industrial Marketing Management,* 40(2): 181–187. http://dx.doi.org/10.1016/j.indmarman.2010.06.026

Yin, R. K. 1994. *Case Study Research: Design and Methods* (Second Edition). Thousand Oaks: SAGE Publications, Inc.


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Customer orientation is a business approach that emphasizes customer value and satisfaction of customer needs. This dissertation examines customer orientation in the context of industrial service innovation. The understanding on nested customers, business customers' needs, customer involvement, and customer value is deepened.

The dissertation highlights the accelerating transformation of industry. It is suggested that a wider view than the customer-supplier interaction should be taken and that industrial service innovation should be seen as nested systems change. Then innovation not only encompasses products and services but wider ecosystems. Customers and other stakeholders are inherently involved in innovation. The new approach on customer orientation requires a focus on value co-creation at multiple systems levels and in multiple directions. It also requires management of co-development utilizing both open and closed innovation, and creation of favorable dynamics for interactive learning.

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