

Olli Pekkarinen

INDUSTRIAL SOLUTION BUSINESS – TRANSITION FROM PRODUCT TO SOLUTION OFFERING

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Supervisors	Professor Risto T. Salminen School of Industrial Engineering and Management Lappeenranta University of Technology Finland
	Professor Janne Huiskonen School of Industrial Engineering and Management Lappeenranta University of Technology Finland
Reviewers	Professor Tuija Mainela Oulu Business School University of Oulu Finland
	Professor, Docent, Principal Lecturer Jukka Ojasalo Aalto University, Helsinki Laurea University of Applied Sciences, Espoo Finland
Opponent	Professor Tuija Mainela Oulu Business School University of Oulu Finland

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ABSTRACT

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The business logic in the manufacturing industry has changed in the 21st century. In the current industrial market, manufacturers are driven to provide more comprehensive offerings that go beyond the traditional product-orientation by providing capacity and availability for their customers. From incidental merchandise, services have become the core of manufacturers' offerings with long-lasting service agreements over the life-cycles of their products. This change is driven both by the need of providers to grow and gain competitive advantage and by increased customer demand caused by customers' outsourcing trends. The three key drivers for manufacturers' service strategies are outsourcing trends, saturation of the installed base, and commoditization in product markets. Thus, manufacturers focus on providing industrial solutions which are delivered through relational processes with customers by using solution-driven business models. In the management of marketing activities, this can be regarded as closer customer relationships, service-dominant business logic, and collaboration in solving customers' problems. However, there are few studies on comprehensive conceptualizations of a solution offering that include different elements and their roles, especially in the context of capital goods industry. Also the transition process needs further studies in a real life context.

This study explores the transition process of an industrial company from product to solution business and, as an aid to managing the solution business, explicates the structure and management of an industrial solution offering. There are two themes, the industrial transition process and

industrial solution offering. Regarding the industrial transition process, the aim is to understand the supplier view on the process and its execution and to determine the challenges related to the transition process. The industrial solution offering is discussed by its elements and characteristics, as well as management. Furthermore, a special type of build-own-operate-transfer business model is presented and its suitability in the industrial context analyzed.

The study includes findings achieved by qualitative methods and from four case companies. Based on the results, it is tentatively suggested that in the industrial solution business, the transition from product to solution business is not a linear project but an evolving process that varies according to customer needs, which suggests that companies need to possess an ability to develop new business models for different customer needs. The industrial solution offering is dynamic as it evolves in collaboration according to the prevailing and latent customer needs, which suggest restructuring of the organization from a product-centric to a customer-centric one. Furthermore, based on the findings, the concept of industrial solutions is defined as *an ongoing relational process to satisfy a customer's particular business or operational requirements*, and the concept of industrial solution offering as *an entity comprising the customized goods, services, collaboration, and finance needed to fulfill the industrial solution*. Finally, the study offers several managerial implications for industrial managers involved in the transition and management of the solution business and its offering.

Keywords: industrial marketing, solutions marketing, solution business, offering, service business, transition process, service-dominant logic

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My long journey at Lappeenranta University of Technology has reached its grand finale. The academic outcome is team work that could not have been accomplished merely by Finnish “sisu”. Therefore, the time has arrived to express my appreciation to the people who have guided, supported and motivated me during the project.

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I would like to express my deepest gratitude to my co-writers, who have shared their resources with me by contributing to my thesis in a very concrete way. Furthermore, I am deeply grateful to my colleagues in the School of Industrial Engineering and Management, who have provided me with a smooth transition to working life through lively lunch breaks and dynamic conference trips. Special compliments go to Harri, Samuli K, Anne, Minna, Joonas, Samuli P, Juha, Pekka, and Lauri. I also thank the case companies and all the individual managers I had discussions with. Their comments and notions are the empirical evidence without which this thesis would not have been possible. In addition, I would like to thank Sinikka Talonpoika for her invaluable help and flexible schedule in revising the language of my thesis.

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The reasons for orientating towards technical education go back to high school and great classmates. Later, I was honored to become a part of the “Skinnarila spirit”. Annual traditions such as cruises and hockey weekends have given me the strength to carry on despite some occasional setbacks or misfortunes. I would also like to thank my family, especially my mother Irene, father Hannu, and sister Niina for believing in me. Kiitos Anja-mummolle ja edesmenneelle Onni-ukille pyyteettömästä kannustuksesta. You all gave me the tools to go this far, and now it is time for me to take the next step.

Most important, Satu, you have supported and encouraged me, also by your own example. Thank you.

Lappeenranta, 10 November 2013



Olli Pekkarinen

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LIST OF PUBLICATIONS

The thesis has two main parts, an overview (Part I) and four publications (Part II). The publications comprising the second part are listed below, summarizing the contribution of the present author and the acceptance procedure for each paper.

PUBLICATION 1

Pekkarinen, O., Ryyänänen, H. and Salminen, R.T. (2009). Service-related Challenges of Becoming a Solution Provider – A Case Study. Proceedings of the ANZMAC conference, Melbourne 30.11.–2.12.2009

The present author created the research plan, conducted the literature review, and drew the conclusions of the paper. Research interviews and data analysis were conducted in collaboration with the co-authors. The paper was published at a conference after a double-blind review of the full paper.

PUBLICATION 2

Pekkarinen, O., and Ryyänänen, H. (2011). Scrutinizing the challenges during the transition process towards industrial solution business. Earlier version presented at the BMM 2011, International Conference on Business Market Management, 18–20 May 2011, Tampere. *A revised version of the paper, attached to the present thesis, is currently at the 1st review round in the review process of the International Journal of Services and Operations Management.*

The present author created the research plan, conducted the literature review, analyzed the data, and drew the conclusions of the paper. Research interviews were conducted in collaboration with the co-author. The paper was published at a conference after a double-blind review of an extended abstract.

PUBLICATION 3

Pekkarinen, O., and Salminen R. T. (2013). Developing industrial solution offerings: a framework and management guidelines. *Journal of Business Market Management*, Vol. 6, No. 3, pp. 143–70.

The present author created the research plan, conducted the literature review, collected and analyzed the data, and drew the conclusions of the paper. Reviewing the paper was done in collaboration with the co-author. The paper was published in the journal based on a double-blind review of the full paper.

PUBLICATION 4

Pekkarinen, O., Piironen, M. and Salminen, R.T. (2102). BOOT business model in industrial solution business. *International Journal of Business Innovation and Research*, Vol. 6, No. 6, pp. 653–673.

The research plan, literature review, part of the data collection, and preliminary data analysis were made with the co-authors. The present author finished the data analysis and conclusions. The paper was published in the journal based on a double-blind review of the full paper.

PART I: OVERVIEW OF THE THESIS

1 INTRODUCTION

Traditionally, industrial (capital goods) suppliers in developed countries have counted on high engineering skills to provide the best possible machinery for customers. In the near past, the use of services has grown, but the focus of exchange has still been described best with the goods-dominant logic. Only recently, a massive reconfiguration of business-to-business markets and offerings has emerged as customers are becoming more focused on their core business processes and are willing to outsource several functions that were previously considered as an essential part of their business processes. These new offerings, also the focus of this study, are often called solutions, which provide fully customized sets of goods, services, and knowledge to solve the particular problems of customers. Examples of these solutions are e.g., an industrial supplier providing capacity instead of equipment, a trucking company providing mileage instead of trucks, a steel company providing installed frames instead of stainless steel bars, or an instrument company delivering process recommendations instead of humidity sensors.

The topic of this study is highly relevant to the Finnish export industry, where traditional industrial suppliers are continuously seeking for new business opportunities to grow their revenues and share in the increasingly competitive global marketplace in a time where outstanding product quality is no longer the only decisive factor. Large capital-intensive offerings (e.g., turnkey solutions, power plants) are usually delivered through project-oriented business models (Wikström, Artto, Kujala, and Söderlund, 2010). The project business is typically characterized by complex and unique, highly customized offerings, as well as discontinuous business relationships (Mandják and Veres, 1998). There is uniqueness (Cova and Hoskins, 1997) in both the customer demands and the outputs of projects in the project and solution business (Alajoutsijärvi, Mainela, Salminen, and Ulkuniemi, 2012). Because project deliveries do not always include long-term service contracts, project-based companies face challenges in filling the gaps between projects to make their business profitable in the long term. The project business still needs personal relationships to contain constant, systematic and occasional interaction (Mainela and Ulkuniemi, 2013), which is even more important when project-oriented companies transform to solution providers (Jalkala, Cova, Salle, and Salminen, 2010).

Previously, customers purchased equipment to perform a specific process. Today, the same customers are shifting their purchase to the specific capacity or performance of that particular process. Based on these new demands, the service provider has the opportunity to take the

responsibility for manufacturing, delivering, installing, operating, maintaining, and if necessary, upgrading the equipment on behalf of the customer, i.e. providing service-based solutions. By service, I mean a broader viewpoint than with services. Service can be understood as the outcome the supplier provides to the customer, whether it is products, services, or bundles of them. By services, I refer to individual services, e.g., cleaning. Vargo and Lusch (2008a) argue that the singular form of *service*, instead of *services*, is becoming more apparent with increased specialization and outsourcing and that “All economies are *service* economies” (ibid., p. 7).

There are three key drivers for the manufacturers' growing interest in service-based offerings or solutions, comprising outsourcing trends, saturation of the installed base, and commoditization in product markets (e.g. Reinartz and Ulaga, 2008). Thus, manufacturers are focusing their efforts on providing bundled offerings of products and services, described as solutions (Brady, Davies, and Gann, 2005), which are delivered through relational processes with customers (Tuli, Kohli, and Bharadwaj, 2007), by using solution-driven business models (Storbacka, 2011). In the management of marketing activities, this can be regarded as closer customer relationships (Penttinen and Palmer, 2007), service-dominant business logic (Vargo and Lusch, 2008b), and collaboration in solving customers' problems (Cova and Salle, 2008).

1.1 Research gap

Solution business has been studied with different concepts, such as project marketing (e.g., Cova and Salle, 2007); dematerialization (e.g., Dobers and Wolff, 1999); functional products (e.g., Alonso-Rasgado, Thompson, and Elfström, 2004); complex product systems (e.g., Hansen and Rush, 1998); customer solutions (e.g., Tuli et al., 2007); full service contracts (e.g., Stremersch, Wuyts, and Frambach, 2001); integrated solutions (e.g., Wise and Baumgartner, 1999); product-service systems (e.g., Goedkoop, van Halen, te Riele, and Rommens, 1999); product-related services (e.g., Stille, 2003); servitization of manufacturing (e.g., Baines, Lightfoot, Benedettini, and Kay, 2009); service infusion (e.g., Kowalkowski, Witell, and Gustafsson, 2013); performance based contracting, (e.g., Hypko, Tilebein, and Gleich, 2010); and finally hybrid offerings (Ulaga and Reinartz, 2011). Thus, the phenomenon has been studied in various disciplines, around which a variety of literature streams and concepts have been created. However, the existing literature is quite young and still emerging, and the service-based solution business is a dynamic, constantly changing business arena. Antioco et al. (2008) note on the fragmented nature of literature on service business orientations in manufacturing companies. I acknowledge that the research on solution business is not a novel research area. However, despite the booming literature on the service-

dominant (S-D) logic approach, there is little work on its operationalization. Ng et al. (2012) call for studies that demonstrate empirically that S-D logic -based value proposition are possible. Furthermore, Kapletia and Probert (2010) argue for more narrow studies on business solution strategies and solution provider capabilities. The current research has treated solution suppliers as somewhat homogenous, whereas in practice industrial solution providers have a variety of different business strategies to choose from (Helander and Möller, 2007). Alajoutsijärvi, Mainela, Salminen, et al. (2012) synthesize four empirically grounded configurations of organizing logics in project business delivering solutions, based on how unique the projects are and how the work within the supplier companies is coordinated. This reflects the importance of the context when studying project/solution business. I see two aspects that need to be addressed more thoroughly; the transition process from product to solution business, including the management of solution business, and defining the offering in the context of industrial solutions.

First, the transition process from product to solution business has received decent attention from academics lately, as I could find 27 articles studying some aspect of the transition process, but the results are somewhat conflicting. Although some studies show evidence on a certain path model (e.g., Oliva and Kallenberg, 2003; Davies, Brady, and Hobday, 2006), others note that the process is not as linear as the current literature implies (Johnstone, Dainty, and Wilkinson, 2008), change is gradual (Salonen, 2011), or it is described as agile incrementalism lacking clear directions (Kowalkowski, Kindström, Alejandro, Brege, and Biggemann, 2012). Matthysens and Vandenbempt (2010) claim for studies on the effects of the transition towards services for companies' business models as well as managerial guidance on dealing with stress. To understand solution business, it is necessary to understand business models from the marketing perspective. Of the total of 405 articles on business models that Coombes and Nicholson (2013) found published between 1970–2011, only eight articles were published in marketing journals (Morris, Schindehutte, and Allen, 2005; Pauwels and Weiss, 2008; Shin and Park, 2009; Kind, Nilssen, and Sørsgard, 2009; Palo and Tähtinen, 2011; Storbacka, 2011; Sorescu, Frambach, Singh, Rangaswamy, and Bridges, 2011; Mason and Spring, 2011). The industrial marketing discipline has quite low relevance and influence within the academic discussion on business models and Coombes and Nicholson (2013) call for future synthesis between the value co-creation and business model literature. Although this has been reacted upon (Frankenberger, Weiblen, and Gassmann, forthcoming; Maglio and Spohrer, forthcoming; Barquet, de Oliveira, Amigo, Cunha, and Rozenfeld, 2013), I acknowledge the need for further studies on business models in industrial solution business.

Second, despite the booming business transition, companies struggle with the management of their solution offerings, and gaining profit from complex solutions has proved to be quite a challenge (Tuli et al., 2007). Solution providers are struggling to find a balance between unique value propositions to changing customer needs (e.g. Prahalad and Ramaswamy, 2004) and more standardized service operations. It seems to be challenging to construct a solution offering in a manner that supports the core business instead of being a burden. The solution-based business model (Storbacka, 2011) changes a company's offering from one based on selling products with particular specifications to providing solutions that include several service elements which are co-created with the customers. Manufacturers need to learn how to combine various elements into routines and methods of operation in the form of solution offerings (Davies, Brady, and Hobday, 2007). However, the theoretical background for service in a business-to-business context is in its infancy. Ulaga and Reinartz (2011) acknowledge a need for better categorization of services from the business perspective. Wikner and Andersson (2004) offer a more traditional conceptualization for an integrated solution offering by including the elements of product, services and price versus benefits and sacrifices. Brax and Jonsson (2009) divide the solution offering structure into four components that comprise an installed base, a solution system platform, information offerings and service components, which then are adapted and applied in customer-specific conditions as a bundle or a customer solution. However, there are few studies on comprehensive conceptualizations of a solution offering that include different elements and their roles, especially in the context of the capital goods industry.

Several authors (e.g., Neely, 2009; Lefaix-Durand and Kozak, 2010) have pointed out the suppliers' insufficient understanding of customer perception of value. However, it is highly important that the customer value have to be understood (Klanac, 2013). To understand customers' needs and values, industrial solution providers need to engage in close relationships with their customers. Tuli et al. (2007) regard solutions as relational processes between suppliers and customers. The mindset of the employees can be focused on product specifications and price margins with almost zero customer collaboration in the development of new features (e.g. Cornet et al., 2000). Product managers focus on long maintenance intervals while service managers try to sell regular maintenance, which sends mixed signals to customers. In addition to the sales personnel, the whole organization needs to understand the new business logic and have a common mindset to enable coherent collaboration with the customers (Ryynänen, Pekkarinen, and Salminen, 2012). Thus, there is a research gap in the examination of the development and role of various elements in an industrial solution provider's

offering, as well as in the management of the industrial solution business, especially changing the mindset of an organization.

1.2 Purpose of the study and research questions

I draw from the above notions on the research gaps and define the purpose of the study as follows: *to explore the transition process of an industrial company from product to solution business and, as an aid to managing solution business, to explicate the structure and management of an industrial solution offering*. I divide the purpose of the study to the themes of the industrial transition process and industrial solution offering. The industrial transition process has the following two objectives: 1) to understand how the transition process can be executed in industrial solution business, and 2) to determine the challenges related to the transition process. The industrial solution offering is divided into the following four objectives: 1) to determine the needed element in industrial solution offerings, 2) to understand how an industrial solution offering differs from a traditional offering, 3) to provide understanding on managing industrial solution offerings, and 4) to determine the suitability of a type of public-private partnership business model to industrial solution business.

I have followed the suggestion of Antioco et al. (2008) of tackling the fragmented literature by using qualitative methods and conducted a qualitative case study with the aim to build greater understanding of actual product–service integration and delivery in the industrial solution business context. Due to the context-specific nature of solution business, the research questions are exploratory by nature rather than explanatory, with case study strategy to help examine the empirical evidence drawn from four industrial case companies. The research questions and the objectives of the study are shown in Table 1.

The industrial transition process theme is divided to two research questions and it draws from the first two publications included in this thesis. First, the process is reviewed by studying the existing literature on business transition. Furthermore, the views of industrial suppliers on the transition towards solution business are discussed, to understand how the process is executed by practitioners from the first plans of the change to managing solution business. Second, the challenges in the transition process are discussed by drawing insights from two case companies and their empirical experiences.

The industrial solution offering theme is divided to four research questions, and it draws from the last two of the publications. First, I explore the different elements that could be included in an industrial solution offering by using two case companies as the empirical evidence. Second and

third, I identify the special characteristics of an industrial solution offering and analyze the management issues regarding the industrial solution offering with insights derived from two case companies. Fourth, I describe how a build-own-operate-transfer (BOOT) business model could fit in the context of industrial solutions, using a qualitative single case study.

Table 1. Research questions

Research questions	Objectives	Publication
1. How can an industrial supplier transform its operations towards industrial solution business?	To provide understanding on the industrial transition process	1, 2
1.1. <i>How is the transition process to solution business seen by industrial suppliers?</i>	To understand how the transition process can be executed within industrial solution business	1, 2
1.2. <i>What challenges does an industrial supplier face when moving towards solution business?</i>	To determine the challenges related to the transition process	1, 2
2. What is an offering in industrial solution business?	To provide understanding on industrial solution offering	3, 4
2.1. <i>What types of elements should be included in an industrial solution offering?</i>	To determine the needed elements in industrial solution offerings	3, 4
2.2. <i>What are the special characteristics of an industrial solution offering?</i>	To understand how an industrial solution offering differs from a traditional offering	3, 4
2.3. <i>How should an industrial solution offering be managed?</i>	To provide understanding on managing industrial solution offerings	3, 4
2.4. <i>How can a build-own-operate-transfer (BOOT) business model be adapted to the industrial solutions context?</i>	To determine the suitability of a type of public-private partnership business model to industrial solution business	4

1.3 Theoretical and contextual background

To understand the surroundings of the research topic, the theoretical positioning of the thesis is depicted in Figure 1. The central concept is the management of industrial solution business, which is studied in the business-to-business marketing context. Furthermore, the focus is on industrial project and solution supplier companies, i.e., capital goods suppliers that are applying the service-dominant business logic. Theoretically, there is no single tradition to follow, but several intertwined literature streams.

The service-dominant (S-D) logic of economic exchange (Vargo and Lusch, 2004) has challenged the traditional goods-dominant (G-D) logic in the marketing literature by focusing on service as the central process for value creation. The S-D logic changes the overall mindset of suppliers from

offering something to the customer to offering it with the customers, and emphasizes intangible, operant resources as a value provider (Lusch and Vargo, 2006). This mindset change is essential for the industrial suppliers that have traditionally constructed their business around products and technologies with some services, but not service.

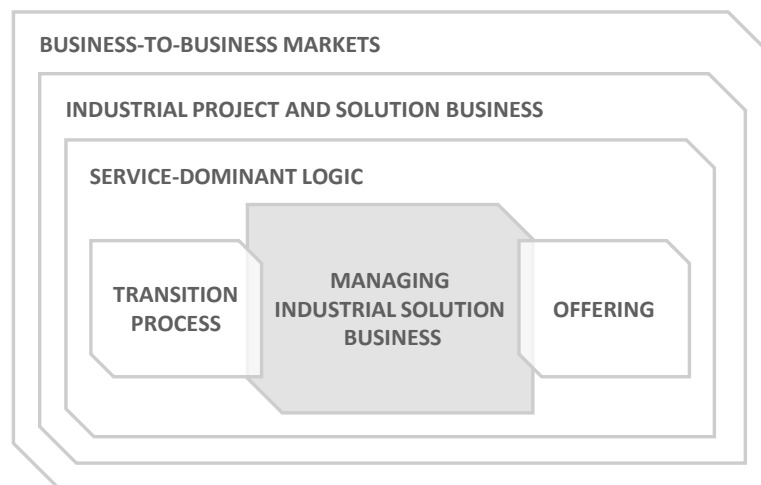


Figure 1. Theoretical positioning of the study

Solution business has been studied with a variety of concepts, including e.g., customer solutions (e.g., Tuli et al., 2007); full service contracts (e.g., Stremersch et al., 2001); integrated solutions (e.g., Wise and Baumgartner, 1999); product-service systems (e.g., Goedkoop et al., 1999); servitization of manufacturing (e.g., Baines, Lightfoot, Benedettini, et al., 2009); and hybrid offerings (Uлага and Reinartz, 2011). Also the literature on project marketing (Cova and Salle, 2007; Jalkala et al., 2010) and project business (Artto, Wikström, Hellström, and Kujala, 2008; Kujala, Artto, Aaltonen, and Turkulainen, 2010) are closely related to describing the phenomenon and context of this study. From this multidisciplinary nature of solution business, this study is built on the relational process view on solution business presented by Tuli et al. (2007) and Storbacka's (2011) solution business model. The central topics in the study within solution business are the transition process (Davies et al., 2006; Jacob and Uлага, 2008; Brax and Jonsson, 2009; Salonen, 2011; Kindström, Kowalkowski, and Nordin, 2012) and the concept of offering (Wikner and Andersson, 2004; Brax and Jonsson, 2009; Shankar, Berry, and Dotzel, 2009; Nordin and Kowalkowski, 2010; Uлага and Reinartz, 2011).

1.4 Structure of the study

The thesis consists of two main parts. The first part presents an overview of the study, divided into five chapters. The second part contains four publications that form the empirical part of the study with the results. The structure of the thesis can be described through the input-output scheme depicted in Figure 2.

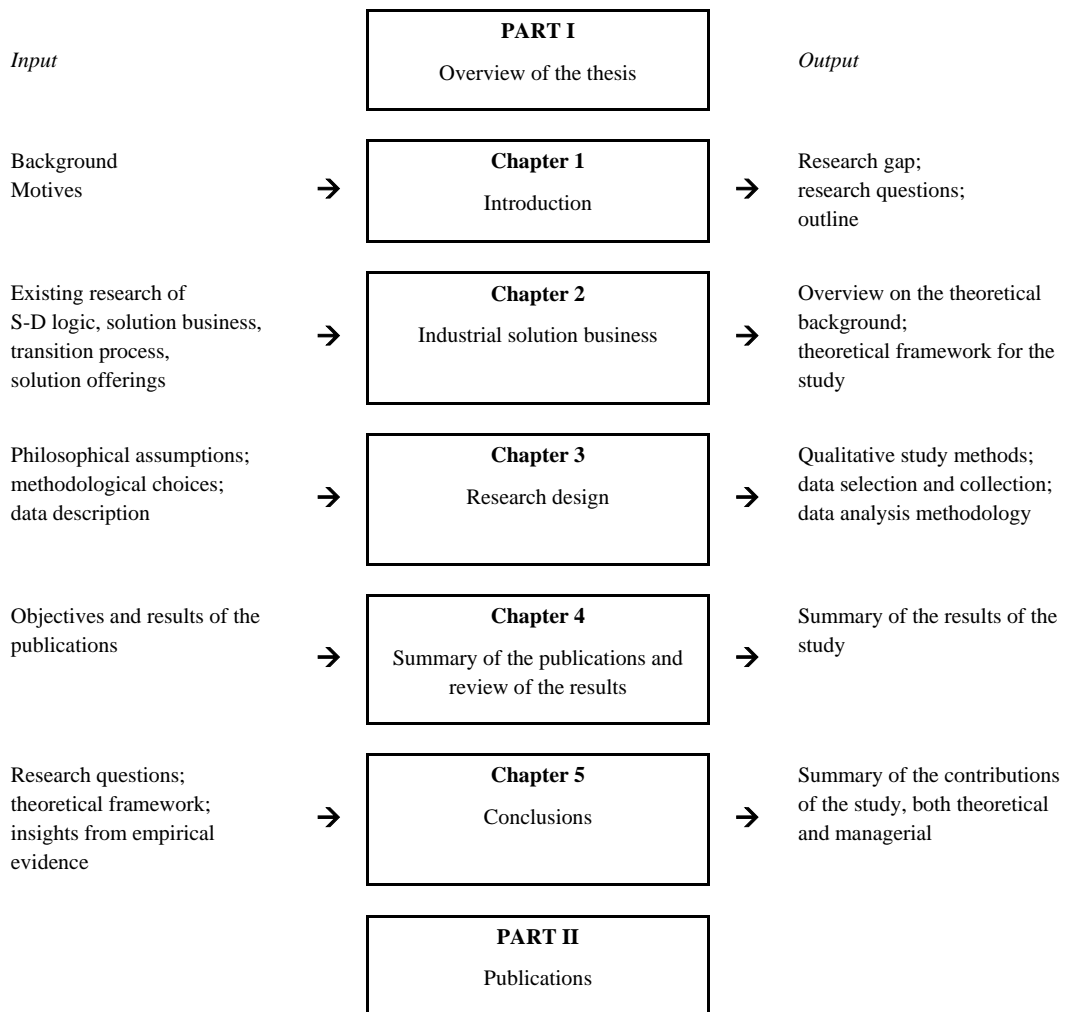


Figure 2. Structure of the thesis

The study begins with a presentation of the overall background, research gap, purpose of the study as well as the research questions, and the main theoretical background in Chapter 1. In Chapter 2, I discuss the theoretical framework in closer detail with the S-D logic, solution business, transition process and solution offering as the main issues. The philosophical assumptions, methodological choices and empirical data description are presented in Chapter 3. I continue with presenting an overview of the separate publications, their objectives and findings in Chapter 4. Finally, I conclude this study by discussing the theoretical and managerial contributions of the study as well as suggestions for future research avenues in Chapter 5. At the end, the second part contains the full length versions of the four separate publications.

2 INDUSTRIAL SOLUTION BUSINESS

In the 20th century, suppliers of technologically complex capital goods often required vertically integrated design, manufacturing and marketing organizations (e.g., Chandler, 1992). Later, these large integrated companies have focused on their core competencies to be able to utilize their competitive advantages fully (Hamel and Prahalad, 1994). Today, the trend seems to be providing solutions for the customer's entire process problems in one deal. In this chapter I discuss the industrial solution business, starting with reviewing the service-dominant logic and value in the marketing literature. Next, I introduce the existing literature on solution business, followed by the concepts of the transition process from product to solution business. Last, I scrutinize the concept of offering in industrial markets. The chapter ends with the conceptual framework of this study.

2.1 Service-dominant logic in industrial markets

The context of this study is traditional industrial suppliers that are in transition towards service-oriented solution business. This service-orientation or service-domination is discussed in the service-dominant (S-D) logic¹ of economic exchange (Vargo and Lusch, 2004) that has challenged the traditional goods-dominant (G-D) logic² in the marketing literature. S-D logic is a “pre-theoretic” lens or perspective that conceptualizes business exchanges from a service-based perspective in the economic and social world (Vargo, 2011). S-D logic changes the overall mindset of suppliers from offering something to the customer to offering it with the customers (Vargo and Lusch, 2004). Furthermore, it emphasizes intangible, operant resources as a value provider and closer cooperation relationships between the supplier and the customer (Lusch and Vargo, 2006). The idea of the increased role of customers is not new, as Drucker (1954, p. 35) stated, “it is the customer who ... determines what a business is, what it produces, and whether it will prosper” and Levitt (1960) continued by emphasizing customer needs instead of selling products. Within S-D logic literature, Lusch et al. (2007) argue that effective competing through service requires the

¹ Service-dominant logic focuses on service as the central process for value creation, where the emphasis is on intangible resources while the goods are a vehicle for service provision (Vargo and Lusch, 2004).

² Goods-dominant logic concentrates on manufacturing and distribution activities and considers value to be created by the company and consumed by customers (Vargo and Lusch, 2004). G-D logic prefers a tangible output while avoiding an intangible output (“service”), as it is difficult to standardize (heterogeneity), produce away from customers (inseparability), and store or keep in inventory (perishability) (Zeithaml, Parasuraman, and Berry, 1985).

whole company to focus on itself and the market with S-D logic³. The bottom line with the service-dominant logic is that marketing exchange shifts from transactional business to interactive value-creating episodes with customers (Ballantyne and Aitken, 2007). Vargo et al. (2010) contrast the five constructs in social and economic exchange (service, value, system, interaction, resources) against the main concepts of G-D and S-D logics to develop appropriate language for S-D logic (see Table 2).

Table 2. Contrasting goods-dominant and service-dominant logic concepts (Vargo et al., 2010)

Core constructs	G-D logic concepts	S-D logic concepts
Service	Goods & services	Serving & experiencing
	Transaction	Relationship & collaboration
System	Supply chain	Value-creation network
	Asymmetric information	Symmetric information flows
Interaction	Promotion/propaganda	Collaborative communication
	Maximizing behavior	Learning via exchange
Resources	Operand resources	Operant resources
	Resource acquisition	Resourcing
Value	Value-added	Value co-creation
	Value-in-exchange	Value-in-context
	Price	Value proposing

Service can be understood as the outcome a supplier provides to the customer, whether it is products, services, or bundles of them. According to Vargo (2009, p. 374), S-D logic defines *service* as: “the process of using one’s competences (knowledge and skills) for the benefit of another party”. Services, on the other hand, are related to a particular type of intangible output (idib.). What is the difference between *services* and *service*? According to Vargo and Lusch (2008a), the singular form of *service* is becoming more apparent with increased specialization and outsourcing. Hence, they have modified one of their original propositions from “All economies are *services* economies” (Vargo and Lusch, 2004, p. 10) to “All economies are *service* economies” (Vargo and Lusch, 2008a, p. 7). There has been discussion on whether the term *service* has too much baggage (e.g., Lehmann, 2006), but in fact it is more a description of the term *services* (Vargo and Lusch, 2006). The focus of S-D logic is collaboration; suppliers serving customers and the

³ Vargo and Lusch (2004, updated 2008a) have suggested the following ten foundational premises for S-D logic: FP1) service is the fundamental basis of exchange; FP2) indirect exchange masks the fundamental basis of exchange; FP3) goods are a distribution mechanism for service provision; FP4) operant resources are the fundamental source of competitive advantage; FP5) all economies are service economies; FP6) the customer is always a co-creator of value; FP7) the enterprise cannot deliver value, but only offer value propositions; FP8) the service-centered view is inherently customer-oriented and relational; FP9) all social and economic actors are resource integrators; and FP10) value is always uniquely and phenomenologically determined by the beneficiary.

customers experiencing, i.e. determining value, making the ownership of the end products insignificant (Vargo et al., 2010).

System refers to “a configuration of people, technologies, and other resources that interact with other service systems to create mutual value” (Maglio, Vargo, Caswell, and Spohrer, 2009, p. 395) and where the “properties and behavior of the configuration is more than the properties and behavior of the individual resources” (ibid., p. 403). Vargo et al. (2010) argue that value creation is a process of integrating, applying and transforming resources, which requires multiple actors and implies networks, instead of a separate processes of value creators (suppliers) and value destroyers (customers). Lusch et al. (2010) argue that value networks, or service ecosystems, have three functions comprising 1) co-producing service offerings; 2) exchanging service offerings, and 3) co-creating value. Furthermore, S-D logic suggests that the actors are relational and equal, meaning that the information should be symmetrical, not asymmetrical.

Interaction and the dynamic aspects of exchange are in the heart of S-D logic (Vargo et al., 2010). Instead of unidirectional messages, the communication in service systems should be collaborative and dynamic, not only between organizations but between all relevant stakeholders, allowing a venue for learning via the exchange process (ibid.). Also financial feedback, i.e., revenue or profit, helps companies to find out how well they are doing.

Resources have a central role in S-D logic. Service systems are dynamic value co-creation configurations of resources: people, technology, organizations, and shared information (Maglio and Spohrer, 2008)⁴. There are two types of resources; operand resources which need to be acted upon (e.g., goods) and operant resources that are able to act upon other resources (e.g., knowledge) (Vargo and Lusch, 2004). S-D logic considers the operant resources of customers, employees and the environment as endogenous, rather than exogenous, to the value-creation process and thus as key components of competitive advantage (Lusch et al., 2007). Resourcing refers to an action where a resource is applied and a specific benefit is created (Vargo et al., 2010).

Value is defined in service science as “improvement in a system, as determined by the system or the system’s ability to adapt to an environment” (Maglio et al., 2009, p. 403). The essence of S-D logic is in concepts that shift the emphasis from the supplier as a sole value creator to co-creation of value. Next, I discuss value and its co-creation in industrial markets in detail.

⁴ Maglio and Spohrer (2008) organize the four categories of resources as follows: resources with rights (people and organizations), resources as property (technology and shared information), physical entities (people and technology), and socially constructed entities (organizations and shared information).

2.1.1 Value in industrial markets

The understanding of customer value is vital to industrial suppliers, which is well acknowledged in the wealth of research attention dedicated to this area (e.g., Payne and Holt, 2001; Lindgreen and Wynstra, 2005; Anderson, Narus, and Van Rossum, 2006; Ulaga, 2011). Evolving from the traditional product-centric view of G-D logic (Vargo and Lusch, 2004), the customer value theory has been shifting towards relational S-D logic, where customer value is co-created in the customer's processes as value-in-use, through managing customer relationships (Vargo and Lusch, 2004; Ulaga and Eggert, 2006). In theory, customer value is agreed to be a trade-off between all the relevant benefits and costs delivered by an offering through its lifetime (Blocker, 2011), but in practice customers and suppliers have often different perceptions about what constitutes value for them (Ulaga and Eggert, 2005; Anderson et al., 2006; Möller, 2006; Corsaro and Snehota, 2010).

Customer value is a unique and context-bound subjective perception, determined by the customer, not by the supplier (Zeithaml, 1988; Corsaro and Snehota, 2010; Parry, Rowley, Jones, and Kupiec-Teahan, 2012) and it is evaluated relative to competitive offerings (Ulaga and Chacour, 2001; Anderson et al., 2006). Ulaga and Eggert (2006) argue that in industrial business relationships, value can be created through three sources. These are illustrated, with their corresponding benefit and cost dimensions, in Table 3.

Table 3. Value drivers in key supplier relationships (Ulaga and Eggert, 2006).

Sources of value creation	Relationship value dimensions	
	Benefits	Costs
Core offering	Product quality	Direct costs
	Delivery performance	
Sourcing process	Service support	Acquisition costs
	Personal interaction	
Customer operations	Supplier know-how	Operation costs
	Time-to-market	

Prior (forthcoming) has identified value proposition characteristics that the customer values presented in the existing industrial marketing literature. These include product or service attributes, pricing, and elements of the delivery process, as well as elements of the business relationship, such as trust, commitment and goal mutuality. However, a majority of the studies exploring the customer's perception of value in industrial markets have focused on companies providing physical goods (Cannon and Homburg, 2001; Ulaga, 2003; Menon, Homburg, and Beutin, 2005; Ulaga and Eggert, 2006). The value of physical goods is often relatively straightforward to assess, unlike

solutions, which are complex and service-intensive by nature, and difficult to assess objectively (Brady et al., 2005; Sawhney, 2006). Customers may benefit from additional value in settings beyond traditional manufacturer-supplier relationships (Ulaga and Eggert, 2005). Furthermore, only few studies discuss value in solution business (Prior, forthcoming). Preliminary research suggests that the value provided by solutions is context-dependent (Worm, Ulaga, and Zitzlsperger, 2009), highlights intangible elements (Lindgreen, Antiocho, Palmer, and Heesch, 2009) as well as irrational processes, such as emotional and social aspects (Prior, forthcoming). In addition to the variety of exchanged products and services, providing solutions requires also constant interaction and reciprocal adaptation (Tuli et al., 2007; Windahl and Lakemond, 2010). Menon et al. (2005) noticed that joint working arrangements will increase the customer's perception of value, which highlights the importance of close co-operation and the customer's active involvement.

2.1.2 Co-creation of value

Several studies in industrial marketing (e.g., Tuli et al., 2007) emphasize the role of the solution provider as a facilitator and co-creator instead of a sole creator of value. However, the academic knowledge in value co-creation is still developing (Woodruff and Flint, 2006; Payne, Storbacka, and Frow, 2008; Aarikka-Stenroos and Jaakkola, 2012). Direct interactions with the customer's value creation processes are dominant when the business is based on the service logic. Value-in-use thinking (e.g., Vargo, Maglio, and Akaka, 2008) puts the focus on the customer's value creation processes and the auxiliary role of services in these. The deeper the aimed partnership in industrial business-to-business environment, the more important is the need for a detailed analysis of the value co-creation process. For example, in industrial maintenance services and solutions, the depth of the partnership may vary from a conventional transaction-based maintenance and repair work to performance partnerships or even to advanced value partnerships and full-service contracts and solutions (e.g., Stremersch et al., 2001). My main interest is in the latter options. In this case the full understanding of customer value creation process is essential but complex. Korkman (2006) argues that the customer uses practices as a set of routinized actions in a relationship. He suggests that the value is inside these practices and that the supplier should build value by improving them,

The value creation process can include co-development of solutions (e.g., Thomke and von Hippel, 2002; Alam, 2002) as well as co-production of the solution (e.g., Brax and Jonsson, 2009). Aarikka-Stenroos and Jaakkola (2012) state that value co-creation happens in dyadic problem solving processes. They have identified five value co-creation activities: diagnosing needs, designing and producing the solution, organizing the process and resources, managing value conflicts, and

implementing the solution (see Figure 3). Aarikka-Stenroos and Jaakkola (ibid.) note that the value co-creation process is not a linear one, but may occur in parallel and in diverse order through a dialogical, hermeneutical process. They acknowledge also the role of customers in the formulation of the value proposition. I understand this as a way to co-create the content of an offering, which highlights the contrast to traditional capital goods where the suppliers had a certain offering available and the customers decided whether or not to purchase it.

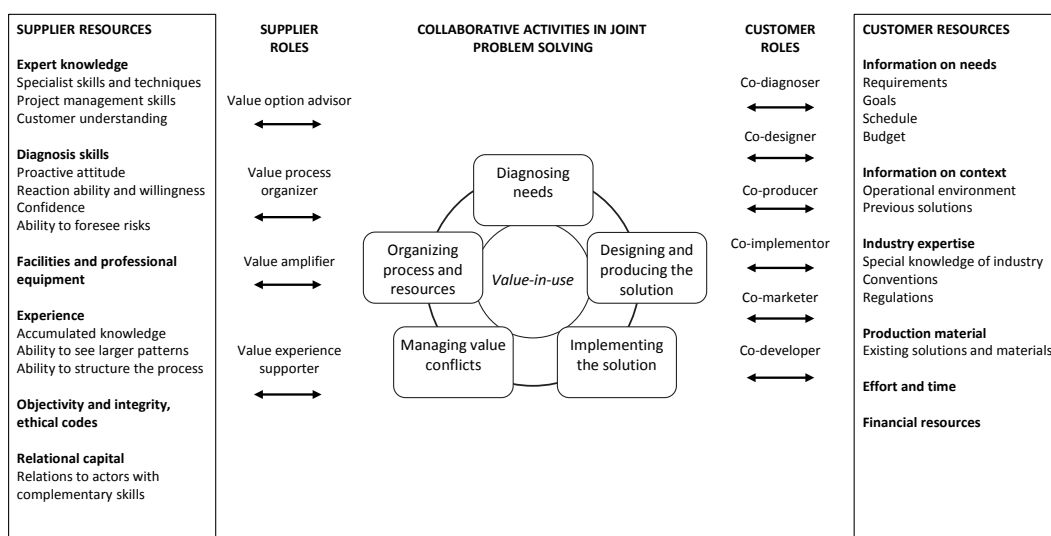


Figure 3. Value co-creation activities (Aarikka-Stenroos and Jaakkola, 2012)

To sum up, the customers should be able to participate in each phase of the customized solution creation, from the *requirements definition* to *postdeployment support* (Tuli et al., 2007) or from *diagnosing needs* to *implementing the solution* (Aarikka-Stenroos and Jaakkola, 2012). This collaboration creates opportunities for mutual learning through dialogue (Ballantyne, 2004). Payne et al. (2008) have constructed a conceptual value co-creation framework with three components: customer value-creating processes, supplier value-creating processes, and encounter processes. This suggests, unlike S-D logic proposes, that not all value creating activities are done in collaboration. For the present study, service-dominant logic has promising arguments that can be used for the research aims. The mindset change from goods to service is a pertinent topic in solution business. Narver and Slater (1990; 2000) found a positive relationship between market orientation and business profitability, which was replicated successfully. Also co-creation and collaboration

between suppliers and customers and the pronounced role of customer relationships are key issues in solution business. Furthermore, the literature on value and value co-creation supports the aims to understand the solution business context better. The enhanced customer participation in the value co-creation process leads to presenting the existing literature on solution business next.

2.2 From system selling to solution business in industrial markets

Solution business has been used particularly in the IT sector as a form to provide added value for the customer (Ceci and Masini, 2011). Today, solution business is booming in the capital goods industry. Cova and Salle (2007) argue that the evolution of solution marketing has gone through the following steps: 1) system selling (differentiated offering), 2) consultative selling (redesign customer's processes), 3) solution selling (complex product services), and finally 4) solution marketing (anticipation and construction of customer needs). Next, the drivers for the transition towards solution business logic are discussed.

2.2.1 Drivers for solution business in industrial markets

The existing literature provides a lot of more or less well-argued drivers for the booming industry transition towards solution business. Three lines of reasoning can be categorized in the manufacturers' urge to service their customers by providing solutions. *Firstly*, there are financial aspects involved. Revenue from an installed base of products with a long life cycle (Potts, 1988; Knecht, Leszinski, and Weber, 1993; Wise and Baumgartner, 1999) is an opportunity that suppliers have begun to realize. The existent installed base gives suppliers access to provide new sets of services to their old customers and provide new sources for revenues to the suppliers. This is tempting because services have usually higher margins than products (Anderson, Fornell, and Rust, 1997) while being less capital-intensive (Ojasalo and Ojasalo, 2008). Services are also a more stable source of revenue with resistance to economic cycles (Quinn, 1992; Alajoutsijärvi, Mainela, Ulkuniemi, and Montell, 2012). *Secondly*, there are marketing-related reasons. There is a growing demand for service as customers are outsourcing their operations (Hamel and Prahalad, 1994; Ojasalo and Ojasalo, 2008). The reasons for outsourcing can vary from concentration on core business to increasing technological complexity. Service business also provides higher customer satisfaction and longer customer relationships (Ojasalo and Ojasalo, 2008). Furthermore, services can strengthen the customer's confidence and the supplier's credibility (Hawes, 1994). *Thirdly*,

several strategic considerations exist. Suppliers are eager to fight commoditization⁵ by boosting and differentiating their basic products. Services are a sustainable source of competitive advantage, because they are less visible, more labor-dependent, and difficult to imitate (Heskett, Sasser Jr, and Schlesinger, 1997; Karmarkar, 2004). Finally, it is increasingly challenging to maintain technological leadership (Grönroos, 1990), while the cost leadership strategy may be unfeasible (Zeithaml and Bitner, 1996).

2.2.2 Multidisciplinary nature of solution business research

The literature on solutions is multidisciplinary with several overlapping concepts⁶ that are employed to describe solution-oriented business, see Table 4. The different definitions are context-dependent and vary depending on the scope of the offering, the type of elements integrated, or type of industries studied (Lay, Schroeter, and Biege, 2009). Furthermore, project business holds significant similarities with solutions (Skaates and Tikkanen, 2003; Cova and Salle, 2007; Jalkala et al., 2010; Alajoutsijärvi, Mainela, Salminen, et al., 2012). Alajoutsijärvi, Mainela, Salminen, et al. (2012) synthesize four empirically grounded configurations of organizing logics in project business, based on how unique the projects are and how the work within supplier companies is coordinated. They use the term solution as the end result of their case companies' projects. This reflects a multitude of different ways to operate, and hence the context of studies becomes an important factor.

Kapletia and Probert (2010) argue that the existing literature on solutions has been divided into two, although considerably overlapping, bodies of literature; “migration from products to solutions” and “management of solutions”. The former includes the service-dominated logic (Vargo and Lusch, 2004), servitization (Vandermerwe and Rada, 1988), strategy and transformation (Bennett, Sharma, and Tipping, 2001), and downstream value migration (Wise and Baumgartner, 1999), while the latter body of literature includes modularizing and repeating solutions (Foote, Galbraith, Hope, and Miller, 2001), companies' capabilities for solution provision (Davies and Brady, 2000), and solution provision and network relationships (Windahl and Lakemond, 2006). On the other hand, Pawar et al. (2009) identify three streams of literature to organize the field of solution research, comprising 1) “product service systems” literature with an objective of environmental sustainability (reducing environmental impact); 2) “integrated solutions” literature with an objective of financial focusing

⁵ Matthyssens and Vandenbempt (2008, p. 317) define commoditization as “a dynamic process that erodes the competitive differentiation potential and consequently deteriorates the financial position of any organization.”

⁶ Some authors have even used different terms for the concept of solution across their articles, for example, Matthyssens and Vandenbempt have used both “value-added solution” (2008) and “integrated solutions” (2010).

(long-term customer value and profit); and 3) “experiential services” literature with an objective of co-creating value (memorable experience). I acknowledge the ideological separation presented by Kapletia and Probert (2010), and consider my study to contribute to both categories. Regarding the work of Pawar et al. (2009), my study builds on the second and third perspective, as long-term customer relationships and co-creation of solutions are the focal issues here, although the use of experiential services does not sound familiar in the context of this thesis.

The above conceptualizations emphasize the nature of a solution through its different elements. The definition of a solution often includes customization and integration of goods and services to address a customer’s business needs (e.g. Sawhney, 2006). However, according to Tuli et al. (2007), customers tend to view solutions as ongoing relational processes in the buyer-seller relationship. Hence, in addition to the variety of exchanged products and services, providing solutions also requires constant interaction and reciprocal adaptation (Tuli et al., 2007; Windahl and Lakemond, 2010). Payne et al. (2008) refer to these relational processes as encounters which must aim at helping the customer utilize their own and the supplier’s resources better. It can therefore be said that strong relationships and cooperation have high relevance in solution business. Despite the well-argued studies of Shankar et al. (2009) and Ulaga and Reinartz (2011), hybrid offerings or solutions have not received much interest as a concept for solution business researchers. One reason for this may be the fact that they have not presented a very different concept and their definition does not add to the existent body of solution research.

Table 4. New business concepts related to solution type of business

Concept	Definition	Citation
Project marketing	"A complex transaction covering a package of products, services and work, specifically designed to create capital assets that produce benefits for a buyer over an extended period of time" (project)	Cova et al. (2002, p. 3)
Dematerialization	"Dematerialization, indicates a focus on functions and needs, and a significant departure from today's practices."	Dobers and Wolff (1999, p. 31)
Functional products	"Functional products, also known as 'total care products', are products that comprise combinations of 'hard' and 'soft' elements."	Alonso-Rasgado et al. (2004, p. 515)
Complex product systems	"High cost, engineering and information technology intensive, customized products having large numbers of tailored subsystems and components."	Hansen and Rush (1998, p. 555)
Customer solutions	A set of "relational processes comprising customer requirements definition, customization and integration of goods and/or services and their deployment, and postdeployment customer support" to address customers' business needs.	Tuli et al. (2007, p. 5)
Full service contracts	"...comprehensive bundles of products and/or services, that fully satisfy the needs and wants of a customer related to a specific event or problem."	Stremersch et al. (2001, p. 1)
Integrated solutions	"A third effective business model is to combine products and services into a seamless offering that addresses a pressing customer need."	Wise and Baumgartner (1999, p. 138)
Product-service systems	"...a marketable set of products and services capable of jointly fulfilling a user's need."	Goedkoop et al. (1999, p. 18)
Product-related services	"...essential component in an integrated package of products designed to meet all the requirements of demanding customers."	Stille (2003, p. 195)
Servitization	A trend to offer "... fuller market packages or "bundles" of customer-focused combinations of goods, services, support, self-service, and knowledge."	Vandermerwe and Rada (1988, p. 314)
Service infusion	"...empirical phenomenon, whose common denominator is the increased importance of service in the offering and organization of manufacturing firms."	Kowalkowski et al. (2013, p. 18)
Performance based contracting	"Performance-based contracting is reshaping service support supply chains in capital-intensive industries ... [and] aims to replace traditionally used fixed-price and cost-plus contracts to improve product availability and reduce the cost of ownership by tying a supplier's compensation to the output value of the product generated by the customer."	Kim et al. (2007, p. 1843)
Hybrid solutions/ offerings	"Hybrid solutions are products and services combined into innovative offerings" "Hybrid offerings in business markets ... combine industrial goods and services."	Shankar et al. (2009, p. 95) Ulaga and Reinartz (2011, p. 5)

2.2.3 Solution business as an industrial business model

Large industrial capital goods projects are usually based on a physical product, e.g. a paper machine. While the required services can be purchased separately (e.g., Ahonen, Reunanen, Pajari, and Ojanen, 2010), solution business has emerged with numerous service elements implemented in various phases of the project life cycle (Artto et al., 2008). These services are the most important constituent of solutions when companies outsource production (Davies et al., 2007). By adding service, Helander and Möller (2008) argue that companies are shifting their role from a machine and spare part supplier to the role of a lifetime partner, from providing maintenance to even running parts of the customer's operations.

In solution business, companies should focus on their customers' businesses by identifying the customers' latent needs (Matthing, Sandén, and Edvardsson, 2004) as a collaborative process with the customers (Tuli et al., 2007). The basic principle in solution business is that the outcome is greater than the mere sum of its parts (e.g., Roegner, Seifert, and Swinford, 2001). This emphasizes the importance of how various elements are combined as a whole, and how customers perceive the value of that combination. Customers' sourcing of services has evolved to being more value-focused (Agndal, Axelsson, Lindberg, and Nordin, 2007). However, customers tend to have a different perception of value than suppliers (Lefaix-Durand and Kozak, 2010). To match a customer's problem precisely, solutions are often co-created, which is a key characteristic of solution business (Sawhney, 2006). This collaboration means that the supplier and customer co-create the solution and further the customer value together. However, Tuli et al. (2007, p. 1) note that the existing literature as well as suppliers regard a solution as "a customized and integrated combination of goods and services for meeting a customer's business needs", whereas customers regard solutions more as a set of processes in a long-term buyer-seller relationship. This creates a disparity between the perceptions of the parties involved, and suggests that suppliers do not understand the required degree of their customers' business environments. Based on their findings, Tuli et al. (2007) propose a four-phase relational solution process model: 1) customer requirements definition; 2) customization and integration of goods and/or services; 3) deployment; and 4) postdeployment customer support. The model has been tested (Naudé et al., 2009), and the importance of relational aspects has been found to be accurate. Payne et al. (2008) define the relational processes as encounters which must aim to help a customer utilize its own and its supplier's resources better. By understanding the relational nature of solutions, suppliers are able to deliver more effective solutions at profitable prices (Tuli et al., 2007). Furthermore, solutions often provide cash flow over a long period of time due to fixed service agreements.

The existing research also suggests that the value provided by solutions varies depending on contextual conditions (Worm et al., 2009). While companies need to develop innovative business models actively to provide new value for their customers (Chesbrough, 2010), solution business models have only lately interested scholars (Storbacka, 2011). With an effective business model, solution business can provide a competitive advantage in global markets when competing against price cuts. Solutions can vary in their completeness. The more complete the solution, the more the supplier controls the customer's business (Penttinen and Palmer, 2007). However, the more complete the solution, the greater the knowledge needed to utilize such a business model (Rhyne, 2009). Hence, solution providers are required to have the ability to acquire new skills.

Coombes and Nicholson (2013) found 405 articles on business models between 1970–2011, the top journal being “Long Range Planning” with 4.4 per cent (18) of the articles published. However, the business model literature has been booming for less than a decade, as 90 per cent (365) of those articles were published in 2001–2011. Furthermore, Coombes and Nicholson (ibid.) acknowledge that only eight articles of the 405 were published in marketing journals (classified by Harvey, Kelly, Morris, and Rowlinson, 2010), and all of them after 2005 (Morris et al., 2005; Pauwels and Weiss, 2008; Shin and Park, 2009; Kind et al., 2009; Palo and Tähtinen, 2011; Storbacka, 2011; Sorescu et al., 2011; Mason and Spring, 2011). This has been reacted upon only recently (Frankenberger et al., forthcoming; Maglio and Spohrer, forthcoming; Barquet et al., 2013). However, the marketing discipline has still quite low relevance and influence within the academic discussion on business models, while the home of business model discussion is in the strategy literature (Zott and Amit, 2008)

As with the solution concept, various definitions for the concept of business model exist (Hedman and Kalling, 2002; Coombes and Nicholson, 2013). Osterwalder and Pigneur (2010, p. 14) state that “a business model describes the rationale of how an organization creates, delivers, and captures value”. Osterwalder, Pigneur, and Tucci (2005) present nine building blocks for a business model: (1) value proposition, (2) target customer, (3) distribution channel, (4) relationship, (5) value configuration, (6) core competency, (7) partner network, (8) cost structure, and (9) revenue model. Regarding service-based business models, this framework is utilized by Barquet et al. (2013). Palo and Tähtinen (2011) argue that the central elements for networked service business models are service and customers. They also emphasize the dynamic nature of the networked business model. Kindström (2010) elaborates on Chesbrough's (2007) framework and utilizes the following elements: (1) value proposition, (2) revenue mechanisms, (3) value chain, (4) value network, (5) competitive strategy, and (6) target market. In solution-specific business models, Kujala et al.

(2010) concentrate on six very similar business model elements. However, compared to Kindström's model, they refer to supplier's capabilities instead of the value chain. Furthermore, Storbacka (2011) identifies, instead of elements, the following three central aspects: (1) process point of view, (2) cross-functionality, and (3) solution specific capabilities. Storbacka emphasizes the commercialization and industrialization of solutions as being highly interdependent and interfunctional processes, in which the customer is deeply integrated. Finally, Mason and Spring (2011) draw from technology and innovation, industrial marketing, operations and service strategy, and evolutionary economics literature to formulate a business model framework. Their framework has three main elements comprising technology, market offering, and network architecture, each containing four distinct dimensions, see Figure 4.

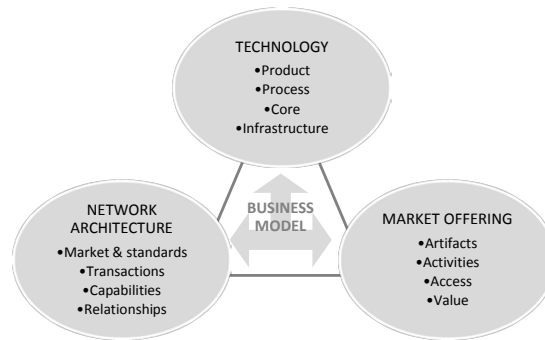


Figure 4. Business model framework (Mason and Spring, 2011)

To conclude this section, the solution offering seems to have a variety of concepts depending heavily on the specific context it has been studied in. The existing literature claims that the solution business model is a process that undergoes constant change in which the customer is heavily integrated. Companies are also expected to be able to manage various capability needs and utilize networks during the solution process. Altogether, there are many drivers to motivate manufacturers to transform their business towards solutions.

2.3 Transition from product to solution business

In Wiersema's (2013) B2B Agenda project, 72 business-to-business executives were interviewed on the future of business-to-business marketing. In the interviews, business change and transitions came up in 80% of the participating companies. Wiersema (ibid.) acknowledges that the transformation of business-to-business marketing remains very much a work-in-progress, while

companies are following different paths and a multitude of approaches on their journeys. This section will focus on the transition, beginning with the drivers of industry transition. This is followed by presentation of existing literature on the transition process, and the section concludes with exploring the challenges the transition process is likely to face.

2.3.1 Different views on transition

The transition of industrial suppliers from product to solution business has received increasing academic interest recently (Davies et al., 2006; Jacob and Ulaga, 2008; Brax and Jonsson, 2009; Salonen, 2011; Kindström et al., 2012). Solution business differs largely from the traditional product-led business models, and to deliver unique value for their customers (e.g. Ballantyne et al., 2011), companies are transforming their businesses from meeting customer needs to identifying their latent needs or creating their needs. I found 27 articles studying some aspect of the transition process from product to solution business, see Table 5. Of these studies, 22 are qualitative single or multiple case studies, two quantitative survey studies, two literature reviews (without empirical evidence), and one statistical analysis on financial data. The first article is from 2003, making it ten years of studies on the transition process. The studies seem to use a variety of solution business concepts, the most popular ones being “solutions” (eight studies) and “integrated solutions” (six).

Nine of the studies present a type of stage or phase model, or discuss the actual transition process (Oliva and Kallenberg, 2003; Davies et al., 2006; Matthyssens and Vandenbempt, 2008, 2010; Kindström and Kowalkowski, 2009; Pawar et al., 2009; Gebauer, Edvardsson, Gustafsson, and Witell, 2010; Salonen, 2011; Kowalkowski et al., 2012). In many cases, the steps are categorized on a 2 X 2 matrix. The authors have chosen the nature of the buyer-seller relationship (transactional-relational) (e.g., Oliva and Kallenberg, 2003; Kapletia and Probert, 2010), product vs. service/process orientation (e.g., Oliva and Kallenberg, 2003; Kapletia and Probert, 2010; Matthyssens and Vandenbempt, 2010), the degree of the completeness of an offering (Penttinen and Palmer, 2007), or the degree of customization (Matthyssens and Vandenbempt, 2010) as the axes for their solution model matrixes. However, the studies note that the process is not as linear as the current literature implies (Johnstone et al., 2008), change is gradual (Salonen, 2011), or it is described as agile incrementalism lacking clear directions (Kowalkowski et al., 2012).

Table 5. Findings on transition in the existing literature

Focus	Used concept	Findings	Industry and methodology	Author(s)
Transition from product manufacturer into service provider	Solution provider mentioned	Transition occurs in the following stages; 1) consolidating product-related services (existing service offering under a single organizational unit), 2) entering the installed base service market, 3) expanding to either relationship-based or process-based services, and 4) taking over the end-user's operation.	Capital goods (machine) manufacturers. Qualitative multiple case study	Oliva and Kallenberg (2003)
Suppliers' value chain changes	Integrated solutions	The provision of integrated solutions attracts traditional manufacturing companies to develop a core capability in systems integration and thus providing operational services, not only a mix of services.	Leading suppliers of high-cost capital goods. Qualitative multiple case study	Davies (2004)
Business-to-business (B2B) services formation	B2B services	Three aspects to align: environment, strategy, and factors of organization.	Information technology (goods). Qualitative multiple case study	Neu and Brown (2005)
Charting a path toward integrated solutions	Integrated solutions	A three-phase capability model for building repeatable solutions: growing the front end, building the back end, and refocusing. Addresses the challenges companies might face.	International companies based on manufacturing and services. Qualitative multiple case study	Davies, Brady, and Hobday (2006)
Finding synergies between the marketing of solutions and project marketing	Integrated solutions	The company must manage four challenges: 1) change in the orientation of the company, 2) need for new capabilities and skills, 3) transformation of the structure and processes within the organization, and 4) implementation of the transformation process within the organization.	Literature review	Cova and Salle (2007)
Transition from product to service in business markets	Service-dominant (S-D) logic of marketing	Presents an agenda for academic inquiry as well as managerial illustration of the challenges during the transition.	Steel industry. Illustrative single case study	Jacob and Ulaga (2008)
Evolution of the sales organization	S-D logic	Traditional product-focused sales organizations are declining while sales automation, customer-focused sales organizations and global account management organizations are increasing. This will change the selection, training, compensation, and sales processes when organizing the sales function.	Literature review	Sheth and Sharma (2008)
Moving from commoditized basic offerings to value-added solutions.	Value-added solutions	Proposes alternative step-by-step strategies for making the transition to service-based solutions, and offers alignment suggestions for overcoming identified barriers. No single best way, two factors to model the change pathway: technical application integration and business process integration.	Electro-technical. Longitudinal qualitative multiple case study	Matthyssens and Vandenbempt (2008)

Focus	Used concept	Findings	Industry and methodology	Author(s)
Effect of service transition strategies on company value	Solutions (customer and integrated solutions mentioned)	The impact of transition to services on company value remains relatively low or even negative until the company reaches a critical mass of service sales (20%–30%), after which there is an increasingly positive effect.	Manufacturing. Statistical analysis of financial data	Fang, Palmatier, and Steenkamp (2008)
Management mechanisms needed in transition toward solution business	System / solution business	System supplier's possible business strategies; a) system suppliers' roles for their customers (1) equipment / material provider, 2) solution provider, and 3) performance provider), b) customers' expectations toward their suppliers' potential roles, and c) how the suppliers can proactively develop their role for the customers.	ICT and engineering industries. Qualitative multiple case study	Helander and Möller (2008)
Exploring P-S strategies, meaning of P-S	"Product-service" (P-S) solution	P-S is applied loosely to a variety of different strategies creating a need for a greater awareness of the different manifestations. P-S strategies and processes are not as linear as the current literature implies.	Aerospace, construction, engineering. Qualitative multiple case study	Johnstone, Dainty, and Wilkinson (2008)
Transition process	Value offerings, integrated solutions	Challenges in change, possible value positions, needed competencies, and network management for co-evolution (also the customer and the customer's customer need to co-evolve).	Steel and metalworking. Qualitative multiple case study	Matthyssens, Vandenbempt, and Weyns (2009)
Configuring internal production and support operations	Servitization	Indicative characteristics for servitized manufacture. A set of theoretical constructs for the delivery of products, P-S bundles and operational services.	High value industrial supplier. Qualitative single case study	Baines, Lightfoot, Peppard, Johnson, Tiwari, Shehab, and Swink (2009)
Organization delivering PSS, product-service organization (PSO)	Product-service systems	There are (from the operations point of view) three stages in designing solutions: defining value, designing value and delivering value.	Large companies, complex PSS providers. Road-mapping, literature review, case study	Pawar, Beltagui, and Riedel (2009)
Service development process	Industrial service offering	A four-stage service offering development framework; 1) market sensing, 2) development, 3) sales, and 4) delivery. Critical aspects of NSD in a manufacturing context are highlighted.	Manufacturers. Qualitative multiple case study	Kindström and Kowalkowski (2009)
Migration from products to solutions	Solutions	Four solution models: (1) product system support, (2) life cycle product system support, (3) functional system support, and (4) enterprise system support.	UK defense industry. Qualitative multiple case study	Kapletia and Probert (2010)
Challenges in transition process	Product-service systems	Five categories of challenges: (1) embedded product-service culture; (2) delivery of integrated offering; (3) internal processes and capabilities; (4) strategic alignment; and (5) supplier relationships.	High value capital equipment manufacturer. Qualitative single case study	Martinez, Bastl, Kingston, and Evans (2010)
Transition process, identification of different service addition paths	Integrated solutions	Four strategy types; 1) after sales service (standardized, mainly products), 2) service partner (standardized, mainly services), 3) solution partner (customized, mainly products), 4) value partner (customized, mainly services).	Machine building and mechatronics. Qualitative multiple case study	Matthyssens and Vandenbempt (2010)

Focus	Used concept	Findings	Industry and methodology	Author(s)
Strategy-structure configurations in manufacturing companies	Integrated solutions	Views transition as steps towards service orientation, which can be translated into different situation-specific service strategies: aftersales service provider, customer support service provider, outsourcing partner, or development partner.	European manufacturing companies. Quantitative survey	Gebauer, Edvardsson, Gustafsson, and Witell (2010)
Solution business model	Solution business	Solution business model framework consisting of four phases (develop solutions, create demand, sell solution, and deliver solution), three groups of cross-functionality issues (commercialization, industrialization, and solution platform), and identifying twelve capability categories.	Ten different industries. Qualitative multiple case study	Storbacka (2011)
Service transition strategies	Solutions	Industrial manufacturers are not abandoning product manufacturing operations, but engage in a range of product-related services, while adopting a solution orientation to create a gradual change in the organizational mindset, capabilities, and processes.	Metal engineering. Qualitative multiple case study	Salonen (2011)
Service differentiation	Service provider	Strong emphasis on service differentiation can lead to customer centricity being less sensitive to increasingly complex customer needs. Companies should focus resources on either product or service innovation; a dual focus does not work well.	Manufacturing companies. Quantitative survey	Gebauer, Gustafsson, and Witell (2011)
Visualization of the offering from the SD logic perspective	S-D logic	11 value-creating activities towards value-in-use. The visualization depicts both the highest possible bundle of benefits for the customer, along with the resources and their costs associated with delivering those bundles.	Defense aerospace. Qualitative single case study	Ng, Parry, Smith, Maull, and Briscoe (2012)
Service infusion process	Service infusion	Service infusion takes place in small steps without clearly directed efforts. Introduces the concept of agile incrementalism.	Materials handling. Qualitative single case study	Kowalkowski, Kindström, Alejandro, Brege, and Biggemann (2012)
Internal communication	Solutions	A framework to overcome eight internal communication challenges in the transition: 1) assembling executors, 2) mindset of executors, 3) mindset of masses, 4) organization structure, 5) supporting technical tools, 6) number of involved actors, 7) internal cooperation, 8) changed customer interface.	Construction and engineering, environmental measurement. Qualitative multiple case study	Ryynänen, Pekkarinen, and Salminen (2012)
Strategic approaches for developing service capabilities	Solutions	Three alternatives for “make-or-buy”; internal, external, and mixed development. Four approaches for suppliers: (1) seller of after-sales services, (2) integrator of aftersales solutions, (3) seller of life-cycle solutions, and (4) orchestrator of total solutions.	17 different manufacturing industries. Qualitative multiple case study	Paiola, Saccani, Perona, and Gebauer (2013)
Service networks in the provision of solutions	Solutions	Identifies four service networks: 1) vertical after-sales service network, 2) horizontal outsourcing service network, 3) vertical life-cycle service network, and 4) horizontal integration service network. Both dynamic and operational capabilities are needed in the formation and utilization of these networks.	17 different manufacturing industries. Qualitative multiple case study	Gebauer, Paiola, and Saccani (2013)

Somewhat intertwined with the above-mentioned transition processes, seven studies explore the possible models or strategies companies can use (Oliva and Kallenberg, 2003; Helander and Möller, 2008; Kapletia and Probert, 2010; Gebauer et al., 2010, 2013; Matthyssens and Vandenbempt, 2010; Paiola et al., 2013). Companies do not always aim to become a sole capacity provider, and these studies provide a continuum of different roles (Helander and Möller, 2008), strategies (Gebauer et al., 2010; Matthyssens and Vandenbempt, 2010), models (Kapletia and Probert, 2010), approaches (Paiola et al., 2013), and networks (Gebauer et al., 2013). Several authors see a variety of challenges relating to the transition, which is discussed in closer detail below.

2.3.2 Challenges during the transition process

Among the articles presented in Table 5, seven studies introduce challenges in the transition process from product to solution business (Davies et al., 2006; Cova and Salle, 2007; Jacob and Ulaga, 2008; Matthyssens and Vandenbempt, 2008; Matthyssens et al., 2009; Martinez et al., 2010; Ryyänänen et al., 2012). The development and management of solution offerings creates challenges for traditional industrial suppliers for three main reasons. *First*, suppliers are accustomed to tendering for customers' contracts within strict specifications. This frequently only leads to price competition between capable suppliers without determining the most valuable approach to satisfying a customer's need. *Second*, suppliers are not accustomed to adapting their offerings to create new solutions for customers. A supplier organization often has strictly defined internal roles, and collaboration between departments is not necessarily at a level capable of providing customized solutions (Ryyänänen et al., 2012). *Third*, suppliers are not accustomed to collaborating with their customers at the level required to co-create something totally unique – an industrial solution (e.g. Tuli et al., 2007). Penttinen and Palmer (2007) suggest that when companies are moving from basic offerings to more complex solutions, the form of buyer-seller interaction also changes from transactional to a relational relationship. Oliva and Kallenberg (2003) see that most challenges are related to the organizational change domain, including e.g., goals, incentives, and change management. This leads to exploring the existing literature on offerings in industrial markets next.

2.4 Offering in industrial markets

Ulaga and Reinartz (2011) argue that services need to be categorized better from a business perspective. Services take the leading role in creating customer-perceived value, but there are scarce studies that examine which types of service are included in solution offerings in the industrial manufacturer context. There is evidence that services form the most important aspect of solutions

when companies outsource production, and the largest proportion of in-house activity is shifting towards service components (Davies et al., 2007). With this in mind, regarding the offerings, the focus of this study is mainly on the service aspects. In the following, several literature streams are drawn from to map the concept of offering in general, and to identify the relevant elements of an industrial solution offering.

2.4.1 The concept of offering

The market offering is defined as “not a physical product, but a way to reconfigure activities and stimulate and enable value creation” (Normann, 2001, p. 119). Mason and Spring (2011, p. 1034) suggest that “the market offering concerns the nature of the producer-user interaction, rather than any essential feature of a particular product or service”, thus ignoring the typical presentation of different elements. However, I am interested also in the elements an offering may possess. Hence, I have explored the literature and found 14 conceptualizations for an offering. Examination of the various definitions for the concept of offering indicates that most authors agree on the obvious role of products and services in an offering. However, depending on the context, there are a number of opinions regarding other elements of an offering that the authors have suggested, such as technology, information, capabilities, financial elements, quality, benefits and sacrifices, risk sharing, and even brand image, to be included in an offering (see Table 6).

Cova and Salle (2007) see that the project marketing and solution marketing approaches have similarities. The context of the present study, capital goods industry, is closely related to project marketing and the actors are familiar with project-type business. Previous project marketing research has identified various approaches to developing an offering (e.g. Cova and Hoskins, 1997). Suppliers can either anticipate and learn to comprehend the competitive arena and the rules of the game (*deterministic approach*), or become actively involved in shaping the competitive arena and the rules of the game (*constructivist approach*). Skaates and Tikkanen (2003) have built on the findings of Bonaccorsi et al. (1996) by going beyond the constructivist approach with a *control approach*, in which a company controls the whole business environment. Furthermore, they term these approaches postures. These three postures, deterministic, constructivist, and control, form the basis of a company’s strategic options in the formulation of a project marketing offering. Cova et al. (2002) employ a concept of creative offering to denote that there is no fixed offering, as suppliers have to be able to build their offerings in accordance with the situation at hand. This reflects well the customized nature of solution offerings.

Table 6. Different concepts for an offering found in the literature

Elements of offering	Context	Authors
Core, facilitating, supporting services surrounded by the service concept, accessibility of the service, interaction, and consumer participation	Service business. Augmented service offering (ASO), the role of technology, service marketing	(Grönroos, 1987, 2000)
Goods, services, risk sharing and risk taking, access to or usage of systems or infrastructure, and information	Consumer business. Risk aspects	(Normann and Ramírez, 1993)
Technological, legal/financial, and socio-political offering	Project marketing, creative offering with proactive anticipation	(Cova, Mazet, and Salle, 1994)
Product quality, salesperson, service and price	Partnering	(MacKenzie and Hardy, 1996)
Product, services, programs, or systems	Market offering. Adding value or reducing cost	(Anderson and Narus, 1999)
Product/service attributes, relationship, and image	Customer value proposition	(Kaplan and Norton, 2000)
Goods/services, information, resources, and capabilities	E-business	(Amit and Zott, 2001)
Technical components, service elements, and financial components as well as specifications and flexibility	Definition of project offer	(Cova et al., 2002)
Product, service, price/cost	E-business	(Hedman and Kalling, 2002)
Advice, product, service, logistics, and adaptation	Business-to-business	(Ford et al., 2002)
Product, services, price vs. benefits and sacrifices	Integrated solutions	(Wikner and Andersson, 2004)
Installed base, solution system platform, information offerings, and service components	Integrated solution, manufacturing industry	(Brax and Jonsson, 2009)
Industrial goods and services combined into innovative bundles	Hybrid offerings in business markets	(Shankar et al., 2009; Ulaga and Reinartz, 2011)
Customization, integration, range, bundle, proactive/reactive, vertical/horizontal, and product/business/partnership	Characteristics of solutions, literature review	(Nordin and Kowalkowski, 2010)

2.4.2 Offering in solution business

An offering describes what value a company can provide to its customers. Thus a supplier has to understand various customer value components when improving its offerings (Klanac, 2013). Customer value has been categorized as having three value drivers that comprise product-based,

service-based, and relationship-based value (Lapierre, 2000; Eggert, Ulaga, and Schultz, 2006). Hence, an industrial solution offering should communicate value for the customer through each of these components. Wikner and Andersson (2004) offer a more traditional conceptualization for an integrated solution offering by including the elements of product, services, and price versus benefits and sacrifices. Brax and Jonsson (2009) divide the solution offering structure into four components that comprise the installed base, solution system platform, information offerings, and service components, which then are adapted and applied in customer-specific conditions as a bundle or a solution. Industrial solution offerings often seem to be based mainly on specific technology/ies, and traditionally, the role of products has been significant. However, while products are usually a necessity, they rarely form the key competitive advantage. Ford et al. (2002, p.122) state that “product itself has no intrinsic value”, it is only a solution to a problem. It is the variety of services that differentiates business-to-business offerings (Stremersch et al., 2001; e.g. Ford et al., 2002).

Mainly due to their intangible nature, it is difficult to classify services universally. Boyt and Harvey (1997, p.294) note the existence of many studies that attempt to classify services; however, “classification of industrial services has not received the same level of attention as has the categorization of consumer services.” Although this notion is somewhat aged, the situation has remained the same (Ulaga and Reinartz, 2011). In project business, there are numerous types of services implemented in various phases of a project life-cycle (Artto et al., 2008) that also apply to solutions. Artto et al. (ibid.) characterize project business services into before, during, or after delivery, according to the phase in which the service is employed. Van der Valk (2008) identifies four types of service on the basis of how the services are employed by a customer, comprising consumption, instrumental, semi-manufactured, and component services. These classifications are not built on the extensive relationship perspective but on the product-centric logic. However, Boyt and Harvey (1997) classify industrial services in three categories according to the extent of buyer-seller interaction. These categories are elementary service (e.g., telephone service), intermediate service (e.g., repair services), and intricate service (e.g., consulting). Although this classification includes buyer-seller interaction, the complexity of solution business requires a more extensive relationship perspective.

Ulaga and Reinartz (2011) classify industrial services for hybrid offerings by employing two dimensions: service recipient (good or process) and the nature of value proposition (input- or output-based). They recognize four types of service: Product life-cycle services (PLS), Process support services (PSS), Asset efficiency services (AES), and Process delegation services (PDS). PLSs and PSSs are individually performed services while AES and PDS are combinations of

different service elements. For this reason, I am interested in the PLS and PSS categories. Oriented to the supplier's product, PLS refers to services that help a customer to operate and maintain the supplier's machinery. Conversely, PSS is oriented to the customer's process by helping the customer improve its business processes. Again, being relatively close to solution marketing, I have reviewed project marketing literature as well. Mathieu (2001) introduces two service categories within project business: Service supporting the supplier's product (SSP) and Service supporting the client's action in relation to the supplier's product (SSC). All of the above categories concern the supplier and the customer. However, a complex industrial solution business often involves a network of actors. For this reason, Cova and Salle (2008) have introduced an offering element termed Services supporting the customer network action (SSCN). This category is less coherent and often polymorphous by nature. However, in networked offerings the supplier may need to provide services to third parties, which justifies the existence of SCCN.

When marketing full-service offerings, the two most important attributes for the buyer are total costs and performance (Stremersch et al., 2001). Customers are interested in for example, how productive the solution is going to be – in process industries, customers usually demand a set of different test periods before the actual guarantee period commences. Although the solution may well surpass the customer's expectations, there is always a risk that something does not go as planned. Normann and Ramirez (1993) include risk sharing and risk taking as a part of their offering concept. In complex environments such as project or solution business, risks are "inherent to any offering" (Normann, 2001). While the management of risks is essential in project business, it also needs to be involved in an industrial solution offering.

Finally, the extent of a solution business offering is found to vary depending on the customer, which can be described as the continuum of completeness of an offering (Penttinen and Palmer, 2007). Penttinen and Palmer present completeness as a concept to describe the extent to which a customer's problem/process is solved/controlled by the solution provider. They also note a continuum in the supplier-customer interactions from transactional to relational. In addition, it is worth mentioning that the needs of customers often evolve over time (see e.g. Burns, Warren, and Assudani, 2010). Tuli et al. (2007) acknowledge that solutions require open-minded customers who understand or at least are willing to consider the benefits of customization and formation of integrated systems. In other words, there are customers that do not fit the solution marketing mold.

2.5 Conceptual framework of the research

Industrial solution business is the context of this study. As the phenomenon has been studied in various disciplines, next is a brief clarification of different concepts discussed above. First, I see that project business is a closely related concept to solution business, but while solution business is about solving a customer's problem in a long perspective, e.g., during a lifecycle of certain machinery, I consider project business focusing on delivering a single package, a project, without extensive lifecycle service. Service is understood here to contain all the activities performed by the supplier within a solution process while services are the separate activities with an intangible output. Finally, I see business model as an umbrella concept for different ways of operation. Here, the focus is on what kinds of business models industrial suppliers could use to provide industrial solutions to their customers.

The conceptual framework of the study is depicted in Figure 5. As the background idea, I acknowledge the literature on service-dominant (S-D) logic of economic exchange (Vargo and Lusch, 2004). S-D logic changes the overall mindset of suppliers from offering something to the customer to offering it with the customers, and emphasizes intangible, operant resources as a value provider (Lusch and Vargo, 2006). This mindset change is essential for the industrial suppliers that have traditionally constructed their business around products and technologies with auxiliary services, but not service in its more profound meaning.

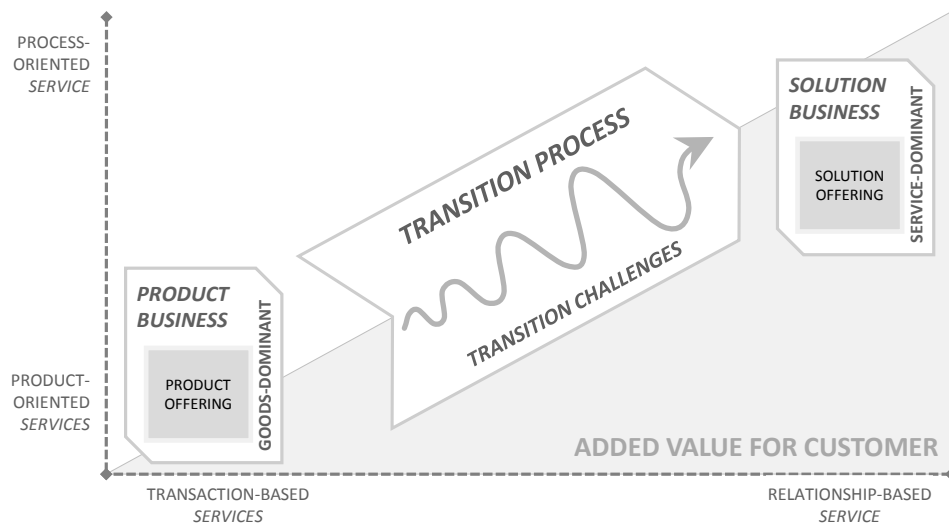


Figure 5. Conceptual framework of the thesis

Solution business has been studied with a variety of concepts, including e.g., customer solutions (e.g., Tuli et al., 2007); full service contracts (e.g., Stremersch et al., 2001); integrated solutions (e.g., Wise and Baumgartner, 1999); product-service systems (e.g., Goedkoop et al., 1999); servitization of manufacturing (e.g., Baines, Lightfoot, Benedettini, et al., 2009); and hybrid offerings (Ulaga and Reinartz, 2011). Also the literature on project marketing (Cova and Salle, 2007; Jalkala et al., 2010) and project business (Artto et al., 2008; Kujala et al., 2010) are closely related to describing the phenomenon and context of this study. From this multidisciplinary nature of solution business, I build my study on the relational process view on solution business by Tuli et al. (2007) and Storbacka's (2011) solution business model.

The central topics around solution business in this study are the transition process (Davies et al., 2006; Jacob and Ulaga, 2008; Salonen, 2011) with its challenges (Martinez et al., 2010; Ryyänen et al., 2012) and the concept of solution offering (Nordin and Kowalkowski, 2010; Ulaga and Reinartz, 2011). Regarding the transition process, I use a type of 2 X 2 matrix in which the transition occurs (e.g., Oliva and Kallenberg, 2003; Kapletia and Probert, 2010; Matthyssens and Vandenbempt, 2010). I adapt the structure from Oliva and Kallenberg (2003) and use a continuum (Penttinen and Palmer, 2007) from transaction-based *services* to relationship-based *service* (e.g., Oliva and Kallenberg, 2003; Kapletia and Probert, 2010) as the horizontal axis. Accordingly, as a vertical axis, I use a continuum from product-oriented *services* to process-oriented *service*. I acknowledge the notions that the transition process is not a linear one (Johnstone et al., 2008), that the change is gradual (Salonen, 2011), and that it can be described as agile incrementalism (Kowalkowski et al., 2012). This is depicted with the twisting arrow in the framework. I also note the continuum in offering (Penttinen and Palmer, 2007) when analyzing the empirical evidence on solution offering. The depicted framework leads to presenting the research design.

3 RESEARCH DESIGN

The overall research design of this study is described in this chapter. Many of us researchers are more focused on what to study than how, when and where (Easton, 1995). Hence, the purpose of this chapter is to introduce and justify the research design employed in the thesis. The chapter begins with describing briefly the ontological and epistemological basis and the research approach of the study. Then, the case study method and the case selection used in the study are introduced. The chapter ends with a description of data collection and finally with tools for analyzing the quality of the thesis.

3.1 Research approach

The reader has to know the values and beliefs of the researcher in order to judge whether or not the chosen methodology is suitable for a particular research problem (Easton, 1995). Easton (ibid.) likes to sensitize the current researcher by addressing a variety of issues the methodological choices arouse, as research itself has both philosophical and practical concerns. He presents a simple hierarchical research choice framework addressing the decisions that are required in order to carry out a research project, see Figure 6. As Kavanagh (1994, p. 36) states, “philosophical debate is noted for its wanton use of cabbalistic terminology”, the research approach of this study is described below as briefly and clearly as possible.

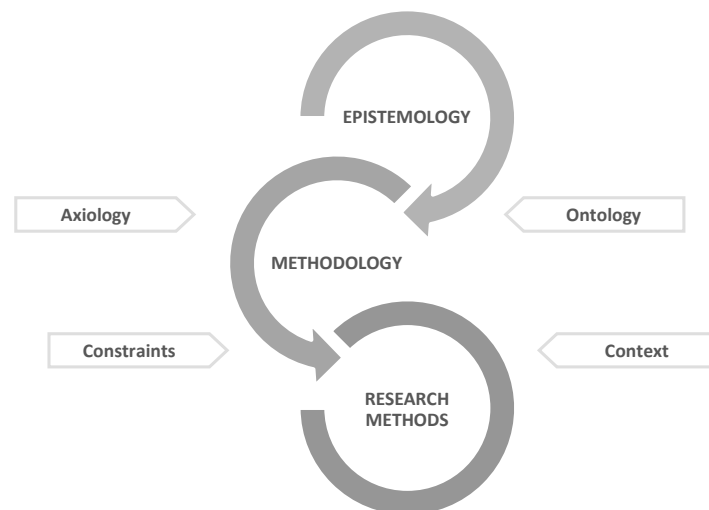


Figure 6. A simple research process framework (Easton, 1995)

Easton's (1995) framework includes *epistemology*, *methodology* and *research methods* as the three hierarchical phases in research. There are also four basic influence factor present, comprising *axiology*, *ontology*, *context*, and *constraints*. These factors restrict and shape but not determine the choices in the research process. These four and their relations in this study are briefly explained first.

Axiology deals with the kind of values and goals the researcher has on a particular piece of research. Here, the goal of this study is to understand a real-life phenomenon and generate information about the phenomenon at a more general level. *Ontology* refers to the researcher's understanding of reality, the assumptions he/she makes. Kavanagh (1994, p. 38) gives the following definition for ontology: "the part of metaphysics which treats of the nature and essence of things. In the social sciences its use is generally limited to the nature and essence of the social world and man's existence." In this study, reality is understood to be socially constructed with no existence of a particular "real world" (Muncy and Fisk, 1987). This can be translated here to mean that there are no correct transition processes or industrial solution offerings but they are determined and formulated uniquely by individuals acting in business relationships. The *context* and content of a study matter heavily in the methodological choices (Easton, 1995). Here the content is the transition process of industrial suppliers. As there is no one and only transition process or industrial solution offering, I have had to take samples of such companies and study their transition processes and offerings in closer detail. The last of the four influence factors, *constraints*, can include time, resources, knowledge, creativity, and skills (Easton, 1995). In this study, the lack of resources may be a slight restriction, especially in the case selection, as it was possible to study only a limited number of cases.

Of the three hierarchical research phases, the first one is *epistemology*, to which Kavanagh (1994, p. 37) gives the following definition: "the branch of philosophy which deals with the origin, nature and limits of human knowledge." Researchers in marketing have been debating on the appropriate tradition for a long time, a fight depicted well by Kavanagh's (1994) topic for his study: "Hunt versus Anderson: Round 16" (see also Anderson, 1983; Hunt, 1990). There are several epistemological traditions to choose from, and often the choice is made between the two heavily contrasting extremes of objectivist (quantitative) and subjectivist (qualitative) paradigms (Burrell and Morgan, 1979). Furthermore, the different traditions are somewhat multi-faceted, as there are different branches in each tradition. Given the research topic, I see that quantitative methods would not be able to help in achieving the desired outcomes. Instead, I see the qualitative, subjectivist, approach as a more appropriate research strategy to allow a deep understanding of the complex

social phenomenon and thus give more insightful results. Easton's (1995) categorization of research orientations provides more options; positivism, conventionalism, realism, and constructivism. I do not believe that there is a single "truth". However, rather than the truth being relative, as with relativism, I think that the reality is constructed (Easton, 1995). I am interested in how the reality is constructed by the participants in the social phenomenon of the study. Hence, I consider constructivism as my epistemological ground.

The second phase in Easton's (1995) framework, *methodology*, includes a set of methodological choices to achieve the research objectives. The choices made in this study are presented in Figure 7. This methodological path includes my selections on the research approach, methodological reasoning, research strategy, research purpose, sample selection, data collection, and data analysis. Next, the path is explained in detail.

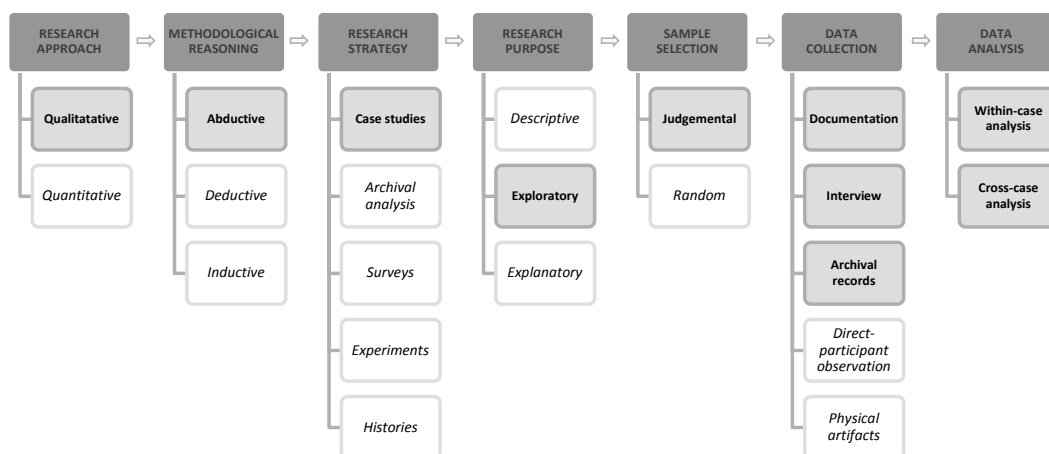


Figure 7. A summary of the methodological path taken in this study (adapted from Ruokonen, 2008)

The third phase in Easton's (1995) framework, *research methods*, is somewhat intertwined with the methodological choices. Next, I explain the methodological path and research methods selected to answer the research problem. There are three approaches for methodological reasoning; deductive, inductive, and abductive. Deductive approaches develop propositions from the current theory and test them in the real world, whereas inductive approaches rely on "grounded theory" (e.g., Glaser and Strauss, 1967), meaning that the results and theory arise from the data, only with no preselected theory background. I have approached the research problem by adopting the third option, abductive

reasoning. Abductive reasoning involves systematic combining of both theoretical and empirical aspects to gain a holistic understanding of the focal phenomenon (Dubois and Gadde, 2002; Kovács and Spens, 2005).

3.2 Case study method

Yin (2009) lists three conditions for selecting the *research strategy*, comprising the type of research questions, the extent of control the researcher has over the actual events, and the focus of the research on either contemporary or historical events. Within case studies, the research questions typically presented are *how* and *why*. Yin (ibid.) sees that the case study fits well especially with a research problem that begins with *how*, but also *what* when used in an explorative study. Regarding control, I was not able to control the actual events but only interview the individuals involved in the events, i.e., acting in industrial supplier companies. This also supports the selection of case study as the research strategy (Yin, 2009). Furthermore, the focus of this study is on a complex contemporary phenomenon, which is best studied in its real-life context by using case study (Eisenhardt, 1989; Yin, 2009).

Within business-to-business and industrial marketing research, case study research is the prevalent research strategy (Easton, 2010). Easton (ibid., p. 119) defines case study as “a research method that involves investigating one or a small number of social entities or situations about which data are collected using multiple sources of data and developing a holistic description through an iterative research process.” Wiersema (2013) notes that, unlike consumer marketing, the business-to-business field suffers from a limited cache of relevant case studies, which might echo the diversity of unique business conditions in business-to-business and thus the need for more situation-specific approaches. This notion supports the selection of case study as the research strategy in this study, as solution business is unique by nature.

Case studies can be used for three kinds of *research purposes*, either descriptive (e.g., giving well-structured descriptions to real-life cases), exploratory (e.g., giving hypotheses or propositions about a relatively new phenomenon), or explanatory (e.g., explaining causal links). The exploratory case study strategy provides a tool to gain fresh insights into the relatively unexplored and complex phenomenon of industrial solution business. I have adopted the exploratory case study approach (Dyer Jr. and Wilkins, 1991; Yin, 2009) as the research strategy by focusing in-depth on four case companies. Case study also provides the opportunity to move between data and theory to gain novel insights into the problem (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). Dubois and Araujo

(2007) argue that the case study method fits well with theory development, providing strong exemplars as well as testing theories from other disciplines, especially in the purchasing and supply management literature. By pointing out a gap in theory, cases can help sharpen existing theory by beginning to fill the gaps (Siggelkow, 2007). My aim is to explore and develop further the theory of the transition process and offering in the context of solution business. I am not looking for providing statistically generalizable results. Thus, the selection of case study as the research strategy is sound and in line with the research objectives.

3.3 Case company selection

Dubois and Araujo (2007) claim that the case selection is the most important methodological decision. Yin (2009) conforms its criticality, but states also that the selection of the unit of analysis is important. In this study the unit of analysis is a company. Yin (ibid.) notes that in single-case studies, the cases are selected because they are unusually revelatory, extreme exemplars, or opportunities for unusual research access. In multiple-case studies, the cases should either support each other or give contrasting results (Yin, 2009). Here, I have employed “theoretical sampling” (Eisenhardt and Graebner, 2007, p. 27), as also called “purposive sampling” (Patton, 2002, p. 2), to select the case companies carefully. As the focal phenomenon in this study is the transition process and offering in industrial solution business, it was important to find four case companies which are actually adopting or have adopted a solution provider strategy recently.

I have revised the criteria employed by Kindström and Kowalkowski (2009) and chosen three principles for the selection of the case companies: 1) the company needs to have substantial manufacturing and solution business capabilities; 2) the company needs to have recently invested in its service development; 3) aiming at customer solutions has been a strategic-level decision. Based on these criteria, I selected four case companies which operate in different contexts. The chosen organizations have important similarities (complex, multi-site, global, engineering), but come from four dissimilar contexts: construction, metal, chemical, and environmental. This diversity on company-specific characteristics provides rich data. The characteristics of the case companies are described in Table 7. For reasons of confidentiality the companies are referred to with letters. This also gives greater freedom in discussing the results and findings.

Company A (studied in Publications 1 and 2) supplies metal-based components, systems, and integrated systems to the construction and engineering industries. Its offering includes a range of metal products and services from bulk products to solutions for a wide range of customers. The

primary customers of the company are heavy machine building companies, various steel construction companies, power plants, and road and railway constructing companies. It has employees in 26 countries across Europe, and while its main market area is Europe, the long-term growth is focused on Eastern Europe. The company has made a clear strategic decision to transform from a bulk product supplier to solution provider and has high growth targets for service.

Table 7. Case company characteristics

	Company A	Company B	Company C	Company D
Business	Supplier of metal-based components, systems and integrated systems	Supplier of environmental and industrial measurement products and services	Project business company	Equipment manufacturer, service provider
Industry	Construction and engineering	Environmental and industrial measurement	Process technology	Filtration equipment
Sales (2009, €M)	2,000	230	880	150
Employees (2009)	12,700	1,400	2,600	600
Primary customers	Construction and engineering industries	Meteorology, airports, roads, defense, and energy industries	Mining & metal industry	Chemical and mining & metal industries
Examined in publications	1 & 2	2	3	3 & 4
Special characteristics	<ul style="list-style-type: none"> Well-informed change process from a bulk material provider to solution business 	<ul style="list-style-type: none"> Among the first high-technology companies in Finland Market leader Difficulties in the transition towards solution business 	<ul style="list-style-type: none"> Newly listed as an independent company History from a large metal company Engineering office background 	<ul style="list-style-type: none"> Bought the current main business from outside Small company with high growth target Market leader Two totally different customer industries

Company B (studied in Publication 2) supplies environmental and industrial measurement products and services to customers in meteorology, airports, roads, defense, energy, and various other industries. The company has long traditions of being a leader in high technology instruments and has now employees in 12 countries, with net sales of around 210 million euros. The company's transition started in early 2003, but it has suffered setbacks and even temporarily halted the

transition. Thus the challenges of the change process are clearly present. In addition, we were able to have broad access to the separate functions in the organization, which supported its selection as a case company.

Company C (studied in Publication 3) is a mining technology company which delivers process technologies worldwide. The company's roots go back to the 1910s. It offers technologies that address the whole chain of processing ores into pure metals. The company is divided into three divisions, each of which concentrates on a particular part of the process chain. Its annual service business growth rate, 75 per cent, is due to the minor role that service has historically played in the company, and its top-level efforts to substantially develop service and solution business. The company's sales vary from mere technology packages and equipment deliveries to large turnkey deliveries.

Company D (studied in Publications 3 and 4) is a filtration solution provider which operates in global mining and chemical markets. With its roots in the 1960s, the company is a world leader in its niche business area. It has recently adopted a solution provider strategy, and significantly increased the role of service elements in its business model. Solution offering is an essential part of the company's core activities. It has actively developed its offering to being a full service solution provider in every phase of its customers' business cycles.

3.4 Methods of data collection and analysis

This dissertation project started around the same time as our two-year academic research project focusing on developing reference-driven business concepts in process technology companies. From the four case companies used in the study, two (companies C and D) were participants in that academic project. This gave us a relatively good access to these two companies, which may otherwise be a problem (Gummesson, 1991). The academic project also provided a solid preconception of the two case companies, as well as to real-life practicing management of process technology industry (cf. Gephart, 2004), which helped us researchers to understand the business environment in such a context.

The primary method for gathering the empirical data was open-ended interviews (Silverman, 2006). This allowed us to interact with the interviewees and grasp interesting topics ad hoc in closer detail, while following the interview frames decided beforehand (for the interview frames, see Appendices 1–3). Also, we acknowledged that each of the interviewees had special knowledge on certain aspects of the interview frames and thus we were able to adjust time usage effectively. To select

appropriate interviewees (Halinen and Törnroos, 2005), we used the snowballing technique (Biernacki and Waldorf, 1981). This “snowball sampling” increases the efficiency, identification, and inclusion of hidden populations by having the already interviewed persons of the target company to recruit other appropriate members (Erickson, 1979; Biernacki and Waldorf, 1981). A negative concern of snowballing is that it lacks validity in representation for the same reason, the sample will be independent from the researcher’s idea. However, we decided to use the method and also acknowledged that the quality of the data is more important than the quantity (Ronkainen, Pehkonen, Lindblom-Ylänne, and Paavilainen, 2011). Hence, we asked to name candidates with extensive experience on the service and business development interface within the company. All the interviewees are listed in Appendix 4, while Table 8 summarizes the data and analysis method in each of the publications.

Table 8. Summary of the data

Publication	Objective	Data	Company	Method
1	To increase understanding on the challenges traditional capital good suppliers face when transforming their business towards solutions.	Empirical, 4 semi-structured interviews in one case company, secondary data.	A	Single case study, content analysis
2	To outline the transition process and its management, and increase understanding on the faced challenges.	Empirical, 12 semi-structured interviews in two case companies, secondary data.	A and B	Multiple case study, content analysis
3	To formulate an industrial solution offering framework and understand its management issues.	Empirical, 10 semi-structured interviews in two case companies, secondary data.	C and D	Multiple case study, content analysis
4	To gain better understanding of fitting a type of Public-Private Partnership BOOT model to an industrial context as a form of solution business.	Empirical, 7 semi-structured interviews in one case company, secondary data.	D	Single case study, content analysis

To benefit from data triangulation in case studies (Yin, 2009), it is recommended to combine interview data with other sources. While the empirical insights were mainly derived from the interviews, the secondary data enabled us to fill the blank areas and understand the business environment better. We used personal notes written by the academic project researchers during two focus group interviews, two company-specific workshops, and two seminars, as well as archive material and company documents (e.g., newsletters, market research reports, annual reports, CEO presentations, a company history book, circulars, brochures, web pages, and trade media articles).

Also, during the research process, we used our research project access to companies to throw ideas at the managers and gain their valuable feedback on the study topics. As such, we were able to employ multiple sources of data, which are typical for the case study approach (Eisenhardt, 1989). Before the interviews, we read company brochures and annual reports to become familiar with the case companies. Also the workshops organized during the academic research project provided highly valuable background information on the companies. In the primary data collection phase, altogether 29 interviews were conducted.

Publication 1 is a single case study as well as a pilot study for the topic of transition process. A single case can be a powerful example of a phenomenon (Siggelkow, 2007), and on this occasion the single case was used to obtain preunderstanding (Gummesson, 1991) of the challenges within the transition process from a product supplier to a solution provider. The interview frame was formulated on the basis of existing literature on strategic change and product-to-solutions transition. Appendix 1 contains the interview frame used in the interviews for publications 1 and 2. Although we interviewed only four persons in Company A, the interviewees were all highly ranked within the organization, including a Chief strategy officer, and were able to give us detailed insights into the transition process itself, as well as the challenges faced during the process.

Publication 2 is a multiple case study with two case companies (1 & 2). Here, the interview data from Company 1 was supplemented with eight interviews in Company 2, using the same interview frame, as the pilot case gave us no reason to change it. The data was first analyzed separately within-case, and then a cross-case analysis was made.

Publication 3 is also a multiple case study with two case companies (3 & 4). In this publication, we were able to utilize the benefits provided by our academic research project fully, as both companies participated in the project as well. Here, the interview frame was formulated on the basis of existing literature on solution business and market offerings. The final frame is presented in Appendix 2. With this publication, we made small changes to the formulation of the questions but maintained the main guidelines and topics of the questions; 1) the case company's role as a solution provider; 2) the development and creation of the case company's offering over time; 3) the role of services in offering creation; and 4) cooperation with customers in the offering creation phase. Appendix 2 contains both versions. The modification was done to help the interviewees orient themselves as they received the frames in advance (this applied to every case company). As with publication 2, the data was first analyzed separately within-case, and then a cross-case analysis was made.

Publication 4 is a single case study and an in-depth analysis of a specific form of solution business offering and its suitability in the industrial context. Company 4 is an extreme example (Yin, 2009) of such a business model. The interviews were conducted separately from publication 3, and the interview frame is presented in Appendix 3. The interview frame was formulated on the basis of existing literature on public-private partnership models as well as solution business. Two of the interviews were conducted by a telephone, as those two interviewees were stationed in Australia and South-Africa.

Each interview, altogether nearly 33 hours, was tape-recorded and transcribed very carefully. Also field notes were written during the interviews to protect against possible equipment failure but also to be able to address the arisen key points again with other interviewees. All the publications contain excerpts from the interviews to demonstrate the reasoning through which the findings were derived. The data were analyzed in all publication by employing qualitative content analysis (Silverman, 2006). The first ideas based on the data were formulated during and briefly after the interviews based on the discussion and field notes. After this, the transcribed interviews were carefully read with all interesting sections marked by hand. These sections were then combined together and written as raw data to the article drafts. The final results were then developed with further analysis between the theory and available data.

3.5 Quality of research

Assuring the quality and trustworthiness of research is perhaps the biggest challenge qualitative researchers face. To give the reader tools for analyzing the quality of the research, the value of qualitative research needs to be argued for and justified against established criteria. Here, the concept of trustworthiness by Lincoln and Guba (1985) is used to evaluate the quality of the research. Trustworthiness is a sound concept when evaluating the goodness of research particularly in constructivist research (Eriksson and Kovalainen, 2008), and it comprises four criteria: credibility, transferability, dependability, and confirmability (Lincoln and Guba, 1985). Of these criteria, transferability is contingent on credibility, which in turn is contingent on dependability and confirmability (Erlandson, Harris, Skipper, and Allen, 1993), see Figure 8. These criteria are explained briefly below.

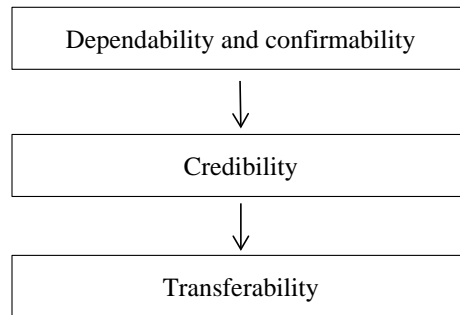


Figure 8. Hierarchy of criteria for a naturalistic study (Erlandson et al., 1993)

Dependability refers to the extent to which there is consistency of explanations or stability of findings. A qualitative study accepts variations (Petty, Thomson, and Stew, 2012). These variations can originate from the researchers, passage of time, and the dynamic and creative nature of the research process when insights are developed. Thus, researchers are encouraged to provide the documentation of data, methods and decisions about the research (an audit trail). This audit trail enables a judgment to be made by others.

Confirmability refers to the extent to which interpretations are the result of the participants and the phenomenon as opposed to researcher bias. Besides proving dependability, an audit trail also confirms the confirmability of the research by explicitly presenting the process of how interpretations, implications and conclusions have been made. The researcher bias can also be reduced by collecting a variety of data, i.e. through data triangulation (Guba, 1981)

Credibility refers to the degree to which the results appear to be acceptable representation of the data. The aim of a qualitative study is to explore a phenomenon in all its complexity, not to control the multitude of factors involved in it (Petty et al., 2012). There are multiple strategies available to facilitate the process (Guba, 1981): prolonged engagement, persistent observation, peer debriefing, triangulation, referential adequacy materials, member checking, and negative cases. Of these, member checking is critical in establishing credibility, noting whether the findings are sound for the actual company representatives (Petty et al., 2012).

Transferability refers to the extent to which the findings can be applied to other contexts. However, a qualitative study format assumes at least some extent of context-specific findings and thus does not aim at generalizing the findings (Petty et al., 2012). The methods for ensuring the transferability of research include using purposive sampling and collecting thick descriptive data. The researcher

cannot guarantee transferability to all contexts. Hence, the responsibility whether or not the findings are sound with other contexts is with those who apply the findings to their own setting (Lincoln and Guba, 1985).

Table 9. Trustworthiness of the research process

Criteria	Method of addressing
Dependability (reliability, auditability) <i>Extent to which there is consistency of explanations or stability of findings.</i>	<ul style="list-style-type: none"> The research process was described as transparently as possible. Case company interviewees reflected on their current and previous experiences as individuals and as representatives of their firms. Written feedback was collected during the workshops. <p>Result: openness of the research process and consistency across the participants' narratives and feedback</p>
Confirmability (objectivity) <i>Extent to which interpretations are the result of the participants and the phenomenon as opposed to researcher bias.</i>	<ul style="list-style-type: none"> Making visible the chain of evidence by describing the companies and the cases used in the articles well, as well as including quotations from the interviews. Receiving case company feedback on the emergent results during project workshops. Some of the findings were presented to the participating companies and found useful. <p>Result: interpretations were altered, expanded and refined</p>
Credibility (internal validity, authenticity) <i>The degree to which the results appear to be acceptable representation of the data.</i>	<ul style="list-style-type: none"> Prolonged engagement: Eight years of research around the topic of service business infusion to capital goods industry. Persistent observation: Two-year research project with a close relationship and several meetings with the four project companies (two of which are case companies in the present study). Peer debriefing: utilization of multiple researchers with feedback on the analysis made, and all the publications were presented in scientific arenas to receive comments from the scientific community. Triangulation: continuous, iterative process to combine literature findings with interview findings and inputs from referential adequacy materials. Member checking: receiving case company feedback on the emergent results during project workshops. <p>Result: the study framework was altered on the basis of the comments from companies as well as other researchers during the research process.</p>
Transferability (external validity, fittingness) <i>Extent to which the findings can be applied to other contexts.</i>	<ul style="list-style-type: none"> Describing the companies and the cases used in the articles well, as well as including quotations from the interviews. Four globally operating companies representing more than ten different industries, and three different European nationalities were interviewed and participated in the workshops. Use of purposeful sampling. <p>Result: the findings can be transferred to some extent across several industries related to industrial solution business.</p>

4 SUMMARY OF THE PUBLICATIONS AND REVIEW OF THE RESULTS

Here, the objectives, main findings, and contributions of each research publication are reviewed. The first publication aims at increasing understanding of the challenges traditional industrial suppliers face when transforming their business towards solutions. The second publication focuses on outlining the transition process and its management, and on increasing understanding of the faced challenges. The third publication formulates an industrial solution offering framework and aims at understanding its management issues. The fourth and final publication focuses on gaining better understanding of fitting a type of Public-Private Partnership BOOT model to an industrial context as a form of solution business. In Figure 9, each publication is positioned to show its role in the conceptual framework of this study.

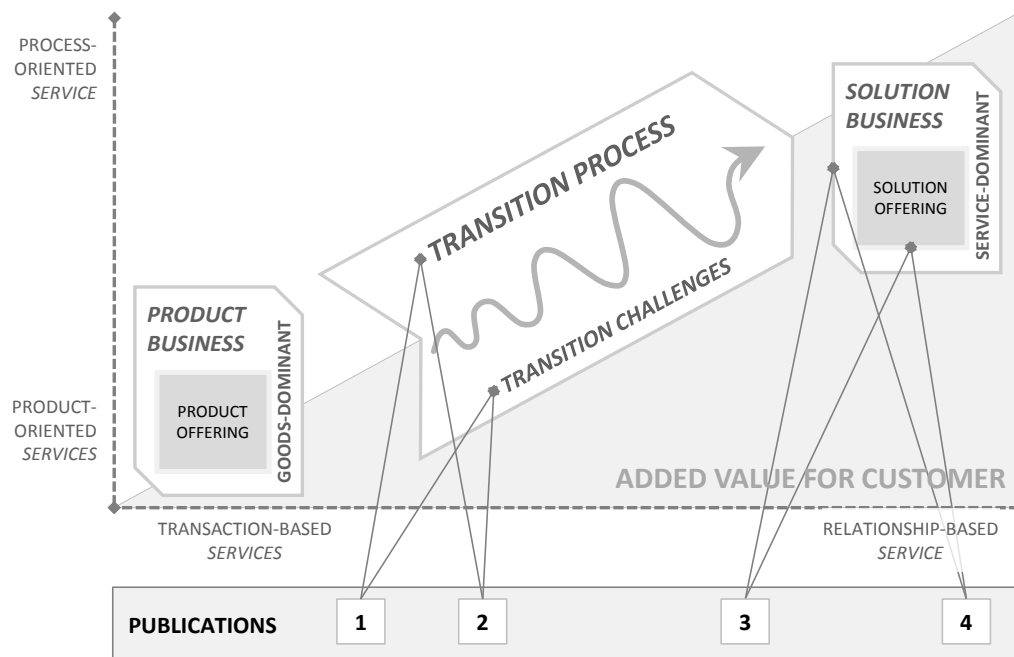


Figure 9. Positioning the publications in the conceptual framework

4.1 Publication 1 – Service-related challenges of becoming a solution provider – a case study

Objective

The main objective of the study was to focus on the challenges a traditional industrial supplier faces on its path towards providing solutions. The study was a pilot study on a single case company. The results were drawn from qualitative interview data. There are few studies on the challenges during the development towards solution business, creating a need for further research (Matthyssens and Vandenbempt, 2008).

Findings

The transition process was divided into three phases: drafting a new strategy, changing organizationally, and managing the solution business. Each of the phases was discussed on strategic, tactical, and operational levels. The pilot study gave support to preliminary understanding on the transition process. Furthermore, the challenges and characteristics found by Brax (2005), Cova and Salle (2007) and Gebauer, Fleisch and Friedli (2005) were supported by the study. However, here the development was studied more longitudinally. This sequential-approach provided an opportunity to study how the challenges change during the transition process. The found challenges were related to the lack of knowledge, expertise and resources, but also to the organizational reconstruction and operational differences. Furthermore, when operating globally, cultural differences have to be acknowledged. The key issue aroused in the interviews was the mindset of a solution provider – the customer-oriented way of operating is a major business model change to a traditional material supplier organization. It has to be communicated internally clearly enough.

Contribution and role in the thesis

The study contributes to the developing solution marketing research stream. Based on the findings, change requires massive organizational reconstruction in a multi-cultural environment. This causes multiple challenges within the organization, most of them relating to the lack of customer-orientation.

4.2 Publication 2 – Scrutinizing challenges during the transition process towards industrial solution business

Objective

The main objective of the study was to focus on the transition process and also to complete the challenges a traditional industrial supplier faces on its path towards providing solutions found in Publication 1. The study was a case study with two case companies. The results were drawn from qualitative interview data.

Findings

Regarding the challenges, the second study supported the findings of Publication 1, and the transition process was divided into the following three phases: drafting a new strategy, changing organizationally, and managing the solution business. Each of the phases was discussed on strategic, tactical, and operational levels. The found challenges were related to lack of knowledge, expertise and resources, but also to organizational reconstruction and operational differences. Furthermore, when operating globally, cultural differences have to be acknowledged.

For managing the transition, four key issues were found. First, the mindset of the solution provider's whole organization must be customer-oriented. This is the major business model change to a traditional material supplier organization. Second, it seems to be essential to acquire firsthand knowledge on the customers' business and earning logics. This can be done by recruiting suitable personnel, at first on the top management level. Third, the transition process cannot be outlined with a linear model. Instead, the process is very complex and extensively fragile to any out-of-line deviation. However, it should be noted that these deviations may open up possibilities that are worth exploring. Fourth, the emphasis moves from the strategic level to a more operational level as the change advances.

Contribution and role in the thesis

The study contributes to the developing solution marketing research stream. Based on the findings, change is not linear and requires massive organizational reconstruction in a multi-cultural environment, especially at the mindset level. This causes multiple challenges within the organization, most of them relating to the lack of customer-orientation.

4.3 Publication 3 – Developing industrial solution offerings: a framework and management guidelines

Objective

The shift in industrial suppliers' business logic from marketing products to marketing solutions sets challenges in creating effective solution offerings. The purpose of the study was to formulate an industrial solution offering framework and to understand its management issues.

Findings

The study proposes a dynamic industrial solution offering (DISO) with two special characteristics that need to be assimilated by the supplier: dynamism and completeness. Dynamism is based on the notion that industrial solution providers must have the ability to seek and grasp new business opportunities provided by their customers' businesses, causing often dynamic changes in the offering. The results also suggest the existence of a continuum from less to more complete solutions, depending on the customer's need and will. The proposed DISO framework contains three elements: relational, financial, and performance (i.e., products and services). Regarding the performance elements, the study presents evidence for a new service category within industrial solution business: services supporting mutual action.

Finally, three main managerial issues to help build a solution mindset were identified; collaboration with customers, organization-wide customer orientation, and effective service-driven organization.

Contribution and role in the thesis

The results of the study contribute to the solution offering literature by formulating an industrial solution offering and developing its management in an industrial capital goods business.

4.4 Publication 4 – BOOT business model in industrial solution business

Objective

The aim of the study was to gain better understanding of fitting a type of Public-Private Partnership, Build-Own-Operate-Transfer (BOOT) model, to an industrial context as a form of solution business. BOOT is a business model where a company is given the responsibility to design, finance, build, own, operate and maintain an entity, such as an industrial process. BOOT arrangements are usually made for a specific time period of up to 30 years and between public and private actors. Hence, the purpose of the study was to provide knowledge on utilizing the BOOT business model in an industrial context.

Findings

The paper introduces an industrial BOOT business model and determines the advantages, disadvantages and risks of an industrial BOOT solution. Furthermore, the paper proposes a description of the BOOT consortium. Based on the results, it is suggested that the BOOT business model can be adapted for an industrial context. Furthermore, the BOOT business model is proposed as an extensive and complete example of an industrial solution.

Contribution and role in the thesis

The study contributes to the growing solution business literature stream by introducing an industrial BOOT business model as an extensive and complete example of an industrial solution.

4.5 Summary of publications 1–4

The four publications have their own role in the thesis as introduced above. Table 10 summarizes the publications by introducing the titles, objectives, research questions, methods, data, findings, and contribution of the individual publications. This overview provides a basis for the conclusions drawn in the following chapter.

Table 10. Overview of the publications and their findings

	Publication 1	Publication 2	Publication 3	Publication 4
Title	Service-related challenges of becoming a solution provider – a case study	Scrutinizing challenges during the transition process towards industrial solution business	Developing industrial solution offerings: a framework and management guidelines	BOOT business model in industrial solution business
Objectives	To increase understanding on the challenges traditional industrial suppliers face when transforming their business towards solutions.	To outline the transition process and its management, and increase understanding on the faced challenges.	To formulate an industrial solution offering framework and understand its management issues	To gain better understanding of fitting a type of Public-Private Partnership BOOT model to an industrial context as a form of solution business
Research questions	What challenges does a manufacturer face when moving towards solution business?	1) What challenges does a company face when moving towards solution business? 2) How is the transition process to solution business seen by industrial suppliers?	1) What are the special characteristics of an industrial solution offering? 2) What types of element should be included in an industrial solution offering? 3) How should an industrial solution offering be managed?	1) What is the role and significance of the BOOT business model in the industrial context? 2) What are the advantages, disadvantages and risks related to industrial BOOT? 3) How can the BOOT business model be implemented and orchestrated within the industrial context?
Method	Single case study	Multiple case study	Multiple case study	Single case study
Data	Empirical, 4 semi-structured interviews in one case company.	Empirical, 12 semi-structured interviews in two case companies.	Empirical, 10 semi-structured interviews in two case companies.	Empirical, 7 semi-structured interviews in one case company.

	Publication 1	Publication 2	Publication 3	Publication 4
Findings	<p>The found challenges are related to the lack of knowledge, expertise and resources, but also to the organizational reconstruction and operational differences. Furthermore, when operating globally, cultural differences have to be acknowledged.</p>	<p>The findings support the findings of Publication 1. For managing the transition, four key issues were found; 1) customer-oriented mindset; 2) firsthand knowledge on the customers' business and earning logics; 3) transition process is not linear; and 4) emphasis moves from strategic to operational level as the change advances.</p>	<p>The study proposes a dynamic industrial solution offering (DISO) with two special characteristics; dynamism and completeness. The DISO framework contains three components: relational, financial, and performance. The study presents evidence for a new service category within industrial solution business; services supporting mutual action. Also three main managerial issues to help build solution mindset were identified; collaboration with customers, organization-wide customer orientation, and effective service-driven organization.</p>	<p>The paper introduces an industrial BOOT business model and determines the advantages, disadvantages and risks of an industrial BOOT solution. Furthermore, the paper proposes a description of the BOOT consortium. Based on the results, it is suggested that the BOOT business model can be adapted for an industrial context. Furthermore, the BOOT business model is proposed as an extensive and complete type of solution.</p>
Contribution	<p>The study contributes to the transition process literature and practice by identifying a variety of challenges a company faces when in the process of change to solution business.</p>	<p>The study contributes to the transition process literature. Based on the findings, change is not linear and demands a massive organizational reconstruction in a multi-cultural environment, especially at the mindset level. This causes multiple challenges within the organization, most of them relating to the lack of customer-orientation.</p>	<p>The results of the study contribute to solution-offering literature by formulating an industrial solution offering and developing its management in an industrial capital goods business.</p>	<p>The study contributes to the growing solution business literature stream by introducing an industrial BOOT business model as an extensive and complete type of solution.</p>

5 CONCLUSIONS

On the basis of the existing literature on solution business, two aspects need to be addressed more thoroughly; the transition process from product to solution business, including the management of solution business, and definition of the offering in the industrial solutions context. First, the transition process from product to solution business has received decent attention from academics lately but the results are somewhat conflicting. Although studies show evidence on a certain path model (e.g., Oliva and Kallenberg, 2003; Davies et al., 2006), there are other studies noting that the process is not as linear as the current literature implies (Johnstone et al., 2008), the change is gradual (Salonen, 2011), or the change follows agile incrementalism lacking clear directions (Kowalkowski et al., 2012). Second, solution providers are struggling to find a balance between unique value propositions to changing customer needs (e.g. Prahalad and Ramaswamy, 2004) and more standardized service operations. Manufacturers need to learn how to combine various elements into routines and methods of operation in the form of solution offerings (Davies et al., 2007). However, Ulaga and Reinartz (2011) acknowledge a need for better categorization of services from the business perspective. Although some conceptualizations for solution offerings exist (Wikner and Andersson, 2004; Brax and Jonsson, 2009; Nordin and Kowalkowski, 2010), there is a gap for comprehensive conceptualization of a solution offering, especially in the context of capital goods industries. Furthermore, the industrial marketing discipline has quite low relevance and influence within the academic discussion on business models (Coombes and Nicholson, 2013), which can be seen as a gap also in solution business research.

For the reasons presented above, the purpose of the study was *to explore the transition process of an industrial company from product to solution business and, as an aid to managing solution business, to explicate the structure and management of an industrial solution offering*. The following research questions were addressed:

1. How can a industrial supplier transform its operations towards industrial solution business?
 - 1.1. How is the transition process to solution business seen by industrial suppliers?
 - 1.2. What challenges does an industrial supplier face when moving towards solution business?
2. What is an offering in industrial solution business?
 - 2.1. What types of elements should be included in an industrial solution offering?
 - 2.2. What are the special characteristics of an industrial solution offering?
 - 2.3. How should an industrial solution offering be managed?
 - 2.4. How can a BOOT business model be adapted to the industrial solutions context?

The research questions were answered through qualitative methods in four separate publications. These publications formed the empirical part of the thesis and were summarized in brief in Table 10. The study began with Chapter one presenting the background, research gap, purpose of the study, and main theoretical background. The theoretical framework was discussed in detail with literature on S-D logic, solution business, transition process and solution offering in Chapter two. The background assumptions, methodological choices and empirical data were presented in Chapter three. The study continued with presenting an overview of the separate publications in Chapter four and finally concluded with the findings in Chapter five.

Based on the results I tentatively suggest that in industrial solution business:

1. The transition from product to solution business is not a linear project but an *evolving process* that varies according to customer needs, which suggests that companies need to possess an ability to develop new business models for different customer needs.
2. The industrial solution offering is *dynamic* as it evolves in collaboration according to the prevailing and latent customer needs, which suggests restructuring of the organization from product-centric to customer-centric.

Furthermore, based on the findings, I define the concept of industrial solutions as follows:

An industrial solution is an ongoing relational process to satisfy a customer's particular business or operational requirements,

and the concept of an industrial solution offering as follows:

An industrial solution offering is an entity comprising customized products, services, collaboration, and finance needed to fulfill the industrial solution.

Next, the theoretical and managerial implications of the study are discussed in detail. Finally, the first part of the study ends with proposing avenues for further research.

5.1 Theoretical implications

The conceptual ground of the study was mainly built on the premises of the service-dominant logic, project and solution business, market offering and business transition literature. Therefore, these frontiers of literature are addressed by discussing the implications in the following sub-sections.

5.1.1 Contributions to the literature of service-dominant logic

Windahl and Lakemond (2010) present solution-logic as a third logic of exchange, besides goods-dominant and service-dominant ones (Vargo and Lusch, 2004), mainly due to the role of products as the main value source in industrial solutions. However, products are well accepted as resources by the service-dominant logic and based on this thesis, separation between solution- and service-logic is not justified. The results of the study show that the industrial solution business can be viewed through the lenses of the evolving service-dominant logic (Vargo and Lusch, 2008a). In their updated foundational premises, Vargo and Lusch (ibid., p. 7) argue that “service is the fundamental basis of exchange”, “goods are a distribution mechanism for service provision”, “operant resources are the fundamental source of competitive advantage”, and “customer is always a co-creator of value”. Although products are highly important in the capital goods industry, the results of this thesis show that the role of the overall service and thus the operant resources attached to the solution is growing, and while the products will distribute the service provision, competitive advantage can be derived from the overall service. An industrial solution is an overall service for the customer, as it solves a customer’s problem. Furthermore, the results of this thesis strengthen the idea of customer as a co-creator in industrial solution business, and thus confirm the premise of customer being always a co-creator of value. This study also provided an example of industrial solution offering, the BOOT business model, that can be understood as a type of operationalization of S-D logic, which Ng et al. (2012) called for.

5.1.2 Contributions to the literature of projects and solutions

The results of the study contribute to the projects and solutions literature (Sawhney, 2006; Cova and Salle, 2007; Tuli et al., 2007; Helander and Möller, 2008; Ulaga and Reinartz, 2011; Paiola et al., 2013) by formulating an industrial solution offering and developing its management in an industrial solution business. First, I propose that the three key issues in solution business are *collaboration*, *customer-centricity*, and a *service-driven organization*. Close communication and mutual trust with a customer are necessary when aiming to benefit from sharing agreements. Moreover, a solution provider should understand its customer’s business, as well as its customer’s customers’ value. That is the only way to be able to develop additional value for the customer’s existing value creation processes. Finally, as services constitute an increasing proportion of turnover, profitable global management of operant resources, mainly the personnel, requires significant effort. However, in line with Turunen and Toivonen (2011) I cannot suggest a single best way to organize operant

resources. It seems that both centralized and decentralized service organizations can prosper and that company size differences affect the efficiency of different organizational formats.

Second, I propose that the nature of an industrial solution business offering is largely dynamic and agile. Solution providers must have the ability to seek and grasp new business opportunities provided by their customers' businesses. For this reason, the framework presented in this study has been named "*dynamic industrial solution offering*". While the core idea in solution business is to offer specific customized solutions, the supplier must be able to adapt to an ever-growing mass of different customer needs. For this reason, the offering itself should have a basic set of building blocks that can be employed to create a customized solution for a variety of customer needs. These building blocks are described in closer detail below.

Third, the findings suggest that size may matter when analyzing capital good suppliers' ability to focus on the capital-intensive industrial solution business. The main factor here seems to be three-fold. The monetary value of solutions, such as outsourcing a part of a process, requires financial resources unreachable to relatively small companies. At least a financial partner is needed when the monetary value of the solution tops the capabilities of the supplier. On the other hand, the service-based nature of these industrial solutions means manpower; and in global business, a global reach in terms of agreed services elements, such as 24-hour emergency maintenance. Again, this issue can be solved with an extensive network of service partners, but then the quality of service will become a topical issue.

Fourth, the scale and type of the offering of suppliers may restrict their ability to enter the solution markets. If a industrial supplier's key products are for a customer's auxiliary manufacturing process, the customer might not focus their purchasing efforts to these smaller actors in the markets, but will let a third party engineering office to handle the acquisition (usually by tendering). To succeed in the solution business, however, the connection must be definitely between the supplier and the end customer.

5.1.3 Contributions to the literature of market offering

The study contributes to the literature of market offering (e.g., Grönroos, 1987; Normann and Ramírez, 1993; Brax and Jonsson, 2009; Nordin and Kowalkowski, 2010) by formulating an offering framework in the context of industrial solution business. First, the study suggests two special characteristics for the offering in the context of industrial solution business; *dynamism* and *completeness*. Solution providers must have the ability to seek and grasp new business opportunities

provided by their customers' businesses *dynamically*. While the core idea in solution business is to offer specific customized solutions, the supplier must be able to adapt to an ever growing mass of different customer needs, by adding the needed new elements to the offering ad hoc. Furthermore, the offering needs to be adaptive regarding to how complete it is for each customer. Our exploratory results, as well as the existing literature (Penttinen and Palmer, 2007), support the existence of a continuum from less to more complete solutions, depending on the customer's need and will. The more a supplier takes control and responsibility over a customer's process, the more complete and complex the offering. As such, it is important that the solution supplier is able to serve both ends of the continuum, again depending on the customer's characteristics. As the nature of an industrial solution business is largely dynamic and agile, the offering framework is named as "*dynamic industrial solution offering*" (DISO). The framework is depicted in Figure 10.

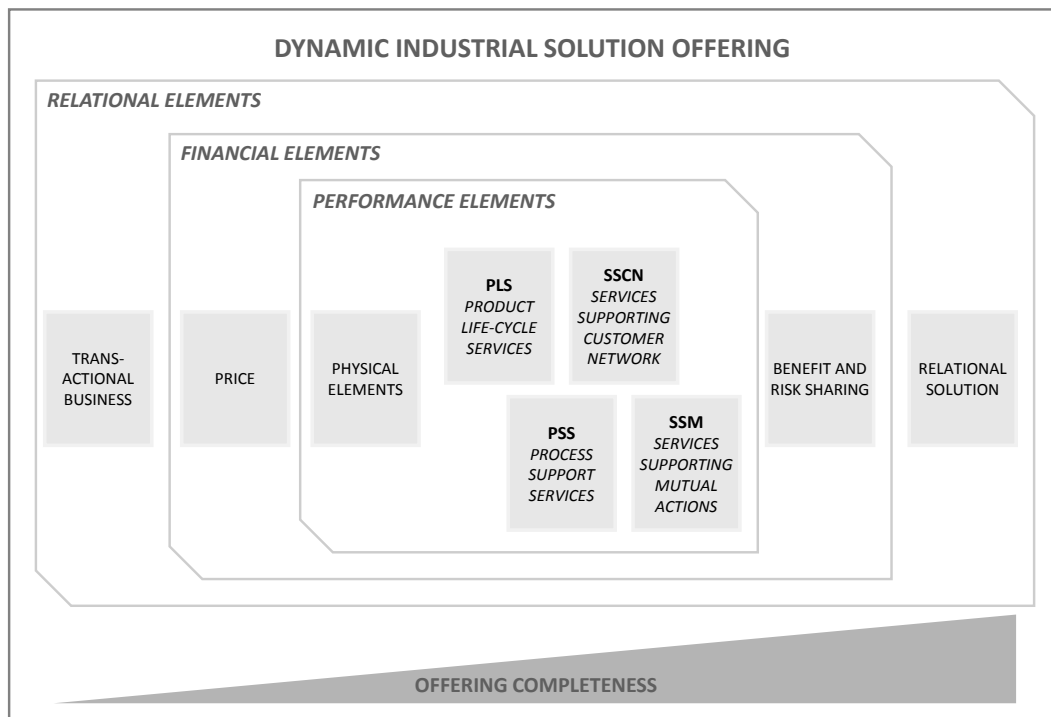


Figure 10. Framework for a dynamic industrial solution offering (DISO) based on case evidence and modified elements from existing literature (see Publication 3)

Second, as industrial solution suppliers must be adaptive to different customer needs, their offering should have a basic set of building blocks that can be employed to create a customized solution for a variety of customer needs. The *dynamic industrial solution offering* comprises three elements: *relational, financial, and performance (i.e., products and services)*. The main contribution here is in performance elements, where a new service category has been recognized. I propose that the services supporting mutual action (SSM) include supplier actions that will benefit both the supplier and its customer in a long-term relationship. SSMs are a result of co-creating the offering, as they deliver additional value to both parties in the long run. Examples of these include service depot agreements and industry-wide conferences. When addressing a more transactional offer, regarding the *financial elements*, only the price element is most likely to be employed. If the offer is more complete, more advanced financial elements can be employed. However, the empirical evidence shows that sharing the benefits needs to overcome several obstacles, such as appropriate measurement and trust issues. Regarding the relational elements, an industrial solution provider can adopt either a transactional role (i.e., usually product-based, low offering completeness) or a collaborative role (i.e., controlling customers' processes, high offering completeness) in the creation of a solution. The relational element dictates that an industrial solution provider needs to be organized so that it can serve both a transactional-type customers as well as partnership-type customers.

5.1.4 Contributions to the literature of the transition process

The study contributes to the literature of the transition process to industrial solution business (e.g., Oliva and Kallenberg, 2003; Davies et al., 2006) by proposing two main contributions, the management issues of the transition process and the challenges faced during the process. Firstly, four key management issues were found. First, the mindset of the solution provider's whole organization must be customer-oriented. This is the major business model change to a traditional material supplier organization. Second, it seems to be essential to acquire firsthand knowledge on the customer's business and earning logics. This can be done by recruiting suitable personnel, at first on the top management level, or acquiring purposeful customer companies. Third, the industrial solution business transition process cannot be outlined with a linear model. Instead, the process is very complex and extensively fragile to any out-of-line deviation. In line with Burnes (1996), I argue that there is no best case scenario available, but the transition has to be planned individually. However, it should be noted that these deviations may open up possibilities that are worth exploring. Fourth, the emphasis moves from the strategic level to a more operational level as the change advances.

Secondly, the companies entering an industrial solution business transition process will face a variety of challenges. The transition process can be loosely divided into three phases: drafting a new strategy, changing organizationally, and managing the solution business. Each of the three phases was discussed at strategic, tactical, and operational levels. The emphasis of challenges moves from the strategic level to a more operational level as the change advances. The found challenges were related to lack of knowledge, expertise and resources, but also to organizational reconstruction and operational differences. Furthermore, when operating globally, the cultural differences have to be acknowledged. The found challenges in the transition process provide insights on what kind of capabilities an industrial solution provider should have. To conclude, the transition from product to solution business is not a linear project but an evolving process that varies based on customer needs, which suggests that companies need to possess an ability to develop new business models for different customer needs. This supports the idea of multiple existing business models within a single company (Benson-Rea, Brodie, and Sima, 2013)

5.2 Managerial implications

The study has explored the transition process from product to solution business as well as proposed a framework for dynamic industrial solution offering. Here, managerial implications related to the findings on both the above topics are discussed.

First, the transition should not be regarded as a project having an end; it is a constantly evolving process that develops in collaboration with the markets, i.e. customers and network partners. Understanding the customer's customer is a key to finding new market possibilities. Business models are often unique and even customer-specific, for example the BOOT model discussed in Publication 4, emphasizing the importance of creativity and out-of-the-box thinking in creating business models and new types of solution offerings. Kjellberg et al. (2012) call for new thinking on what are the markets. This creativity provides managers with practices with which they can shape the market in ways that create competitive advantage. Furthermore, recruiting new personnel from the customer industries could provide a needed boost in advocating the solution type of business thinking – solving customers' problems in a unique way. These recruitments should take place in every organizational level. Top-level directors could provide a more strategic view of different possibilities, while the lower management and line worker levels would have more tactical and operational benefits by strengthening the organization's beliefs on solution business. Also, with constantly developing information technologies, the possibilities of using IT generates new

possibilities, which may even diminish the importance of presence, for example by monitoring and maintaining the installed equipment remotely.

Second, three issues to help manage industrial solution offerings were identified. *Firstly*, solution providers need to *collaborate* with their customers. Close communication and mutual trust with a customer is necessary when aiming at benefiting from sharing agreements. This cannot be achieved without extensive collaboration on and co-creation of the solution. However, there seems to be a demand for various levels of completeness in an industrial solution offering, which industrial providers need to understand. While collaboration is often required, there is no point in allocating resources to it if collaboration is not appreciated by the customer. It is essential to analyze the customer base for different needs and allocate resources emphasizing the more interested and solution-minded customers instead of ‘price buyers’. *Secondly*, there was evidence that understanding the customer and its process is vital for the delivery of profitable solutions. In other words, solution providers need to adopt organization-wide *customer-oriented mindset*. Furthermore, understanding the process is not always sufficient – a solution provider should understand its customer’s business as well as what its customer’s customers’ value. The logic of solution business differs greatly from the traditional industrial supplier’s product business. By enabling different ideas and embedding a new service-based mindset, solution providers can succeed in finding new markets and competitive advantage within them. Providing solutions requires out-of-the-box thinking to develop new methods of creating value for customers while maintaining viable business logic. For example, case company D has actively developed its offering to a service orientation and has relied on customer-orientation for decades; but it seems, however, that the development of its industrial solution offering should be co-created even more extensively with customers, which seems to echo their product-centric starting point. *Thirdly*, solution suppliers need to have a *service-driven organization*. Services constitute an increasing proportion of turnover, and despite of new technologies providing new ways to distribute products globally, e.g., 3D printing (Berman, 2012), profitable management of intangible services globally requires significant effort. In this, there are many risks to be addressed, such as how to resource human-based service operations, how to tackle global distances while promising acceptable response times, and how to manage incentives. Case company D has organized its service function as a separate service business unit. Case company C has divided its service functions across three separate divisions, and thus benefits from closer internal relationships between equipment sales and service. However, it seems that case company D’s organization has progressed further with regard to its solution mindset. Clearly, company size differences affect the efficiency of different organizational formats.

5.3 Suggestions for further research

Focusing intensively to the research questions often creates several others. Here, some insights are shed to these questions that have not been answered within the scope of this thesis. First, organization development literature (e.g., Porras and Silvers, 1991; Weick and Quinn, 1999; Burke, 2010) could be used to study further the industrial solution business transition process. Through organization theories, the aims, incentives and change management issues within the transition process could be understood more in-depth. Also, when focusing more thoroughly to the mindset issues within suppliers' personnel, organization theories could provide another viewpoint.

Second, the actual value co-creation processes would benefit from further studies. There is some work done (e.g., Prior, forthcoming; Korkman, 2006; Jaakkola and Hakanen, 2013), but in line with Aarikka-Stenroos and Jaakkola (2012), there is a need for studies elaborating the joint activities constituting value co-creation. For example, overall management of co-creation activities, different roles in co-creation, financial aspects, and trust issues between companies could offer further avenues for research. Regarding the financial aspects in wider perspective, there are several interesting venues for future work within the context of industrial solution business. Outsourced processes and pay-by-output type of offerings often require that the supplier owns the production facilities. Due to the fact that capital equipment tend to cost a lot, at least the smaller suppliers are in trouble when financing their customer's investments and taking it to their own balance sheets. Here, a third financing party would be required, and this forms an interesting research topic. Furthermore, the pricing of solutions is still a vastly understudied topic. Even common sense directs the mind to focusing on value-based pricing (Roine, Sainio, and Saarenketo, 2012) instead of cost-plus pricing strategies. Moreover, Grönroos and Helle (2010, 2012) propose interesting ideas on mutual gains from relational business engagements, with regard to the issue of benefit sharing.

Third, an interesting avenue would be to analyze how company size is related to the success of a solution business. For example, are smaller, perhaps more agile, companies better suited to this resource-intensive industrial solution business than bigger players? Furthermore, as industrial solutions are often extensive in scale, there are usually many organizations involved in the process. While this study has focused on one industrial company to take charge of the whole solution, also networked solutions (e.g., Palo and Tähtinen, forthcoming) could be interesting area of focus. For example, future research should address a question on how a networked offering, where several companies offer a part of the whole, could be formulated.

Finally, a methodological remark is the lack of quantitative studies on solution business. As an emerging stream of literature, the explorative nature of solution studies guides authors towards more interpretive qualitative research methods and strategies. However, for the aims of a generalizable theory, survey-based quantitative findings would benefit theory development. Although some studies exist (e.g., Homburg, Fassnacht, and Guenther, 2003), the need for quantitative studies is growing as there are now a multitude of proposed constructions and models to test. Research topics could, for example, include testing the relevance of the different industrial solution offering elements proposed in this study. To conclude, for an industrial supplier facing ruthless global competition, the management of constantly evolving solution business seems to be a harsh but rewarding approach to securing profitable sales instead of dumping prices.

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APPENDIX 1: INTERVIEW FRAME 1 (PUBLICATIONS 1 AND 2)

Background information (5 min)

Describe the concept of solution (10 min)

Draw a sketch depicting the network during a typical solution case, which in your opinion describes the network setting in solution business best (15 min)

Describe the change process from equipment to solution provider in your company (20 min)

Describe the challenges in each development step in closer detail (20 min)

How are the challenges changing in the future? (10 min)

Is there anything else you would like to add? (10 min)

APPENDIX 2: INTERVIEW FRAME 2 (PUBLICATION 3)

First interview round (company B)

Background information – Name, position, work history

The company

- What is the company's solution
- What is a solution provider
- What is the company's business logic

Brief overlook and cornerstones in the development of the company's offering

- How the offering has developed
- Why the offering has developed – drivers for the development
- Role of customer's actions
- Financial and risk aspects

The company's offering

- Components
- Modularity
- Customization

Role of services

- Types of services
- Future visions

"The company's way of operating"

- Centralizing project business orders on the parent company
- Customer orientation
- Acquisitions

Cooperation – partnering with customers

- Customer types and differences
- Integration – technical or business process
- Cooperation process
- What is shared
- Roles and motivations
- Organizational buying behavior
- Future goals

Challenges in solution business

- Offering-related
- Cooperation-related

Second interview round (company B)

Background information – Name, position, work history

Concept of solution

- How would you describe solutions and solution providers?
- How would you define the company's business logic in your own terms?

Cornerstones in the company offering development

- How has the offering developed?
- What are the main drivers for the offering development?
- What is the role of customers in the development?

The company's current offering and the role of services

- What are the components and their role in the offering?
- What is the modularity and customization of the offering like?
- What is the role and importance of different service elements?
- How would you describe the role of service in the next five-year period?
- How could the service elements accelerate growth with the existing customers?

Offering creation in cooperation with customers

- Partnering with customers – what does it mean in service-intensive business?
- How much could be co-created in a solution offering?
- Do the customer's competencies affect the creation of the offering?
- Do customers differ in terms of expectations and involvement?
- Is there a common cooperation process and if not, how do these processes differ?
- What are the roles and motivations between the company and customers during offering creation?
- What proactive actions could be utilized in the sales process?
- How could the cooperation be more efficient?
- What could be the future goals?
- What will the customer expect from the supplier in the future?

Challenges in solution business - What challenges are there in solution business, for example with...?

- Offerings
- Cooperation
- Financial and risk aspects

APPENDIX 3: INTERVIEW FRAME 3 (PUBLICATION 4)

Background information – Date, interviewee's name, gender, nationality, geographic location, function at the company, working years at the company

Development of the offering in the company

- How has the offering developed?
- What have been the drivers?
- How do you see the future development of the offering?
 - What is the company mindset like?
 - How would it be possible to ensure smooth transformation towards future offering?
 - Have there been any challenges so far in developing the company's offering?

How would the BOOT business model fit the offering of the company?

- Is the BOOT business model familiar to the interviewee?
 - Has he/she been working with the topic?
 - Clarification of BOOT and related aspects if no common view found.
- What would be the advantages?
- What would be the disadvantages?
- What kind of opportunities do you see?
- What kind of threats do you see?
- Differences between regions?
- Differences between business units/areas?
- Competition aspect regarding the BOOT business model, what do competitors offer?
- Challenges in the company organization structure considering BOOT implementation?
- Boundaries between equipment sales / service?
- Other things which need to be considered?

What kind of BOOT network would be optimal for the company?

- Construction?
- Shareholders?
- Operation?
- Maintenance?
- Suppliers?
- Financing?

APPENDIX 4: INTERVIEW DATA (PUBLICATIONS 1–4)

Nr	Company	Publication	Interviewee	Date	Duration
1	A	1,2	Chief Strategy Officer	20.5.2009	59 min
2	A	1,2	Senior Vice President	24.6.2009	68 min
3	A	1,2	Vice President	24.6.2009	60 min
4	A	1,2	Chief Technology Officer	25.6.2009	110 min
5	B	2	Director	26.3.2010	62 min
6	B	2	Senior Vice President	26.3.2010	50 min
7	B	2	Director, Channel Partnerships and Development	26.3.2010	80 min
8	B	2	Head of Customer Commitment	26.3.2010	79 min
9	B	2	Executive Vice President	29.3.2010	80 min
10	B	2	Head of R&D, Project Office	29.3.2010	58 min
11	B	2	Executive Vice President	29.3.2010	65 min
12	B	2	Head of Project Management Office	29.3.2010	50 min
13	C	3	Manager, Technology Sales	24.3.2009	83 min
14	C	3	Director, Services & After Sales	24.3.2009	72 min
15	C	3	Vice President, Business Unit	24.3.2009	80 min
16	C	3	Vice President, Business Development	24.3.2009	77 min
17	C	3	Director, Services & After Sales	30.3.2009	60 min
18	C	3	Vice President, Engineering, Projects and Services & After Sales	27.3.2009	58 min
19	D	3	Area Manager, Sales	13.3.2008	47 min
20	D	3	Director, Sales	19.3.2008	50 min
21	D	3	Chief Communications Officer	14.3.2008	54 min
22	D	3	Director, Global Customer Support, Service	25.3.2008	83 min
23	D	4	Group Treasurer	25.6.2008	64 min
24	D	4	Senior Manager, Deliveries & Controlling	26.6.2008	62 min
25	D	4	Director, Global Customer Support, Service	7.8.2008	86 min
26	D	4	Managing Director (*)	8.8.2008	64 min
27	D	4	Manager, Service (*)	11.8.2008	59 min
28	D	4	Business Line Director	18.8.2008	65 min
29	D	4	Business Development Director, Service	20.8.2008	76 min
				<i>Sum:</i>	<i>1.961 min</i>
				<i>Average:</i>	<i>68 min</i>

*) on telephone, all others face-to-face

PART II: PUBLICATIONS

PUBLICATION 1

Pekkarinen, Olli, Ryyänen, Harri and Salminen, Risto T. (2009)

Service-related Challenges of Becoming a Solution Provider – A Case Study

Proceedings of the ANZMAC conference, Melbourne 30.11.–2.12.2009

Service-related Challenges of Becoming a Solution Provider – A Case Study

Olli Pekkarinen, Lappeenranta University of Technology, olli.pekkarinen@lut.fi*

Harri Ryyänen, Lappeenranta University of Technology, harri.ryynanen@lut.fi

Risto T. Salminen, Lappeenranta University of Technology, risto.salminen@lut.fi

Abstract

Providing solutions is popular in the current business-to-business market. Responding to the customer demand and enabling longer customer relationships are examples of reasons why traditional manufacturers are nowadays interested in solutions. The change towards solution business is not simply a choice of a new strategy for these companies – the companies face various challenges on their path to solution business. Focusing on a single case company, this study names these challenges during three phases of the change process: *drafting* a new strategy, *changing* organizationally, and *managing* the solution business. Based on the findings, the change demands a massive organizational reconstruction in a multi-cultural environment. This causes multiple challenges within the organization, the most relating to the lack of customer-orientation.

Keywords: Solution marketing, strategic change, organizational development, service-dominant logic, B2B Marketing

Service-related Challenges of Becoming a Solution Provider – A Case Study

Introduction

The solution business has received more and more attention lately emphasizing the importance of developing new insights to solution literature. This paper concentrates on the challenges that traditional industrial manufacturers face on their path to successful solution business. These companies tend to possess strong experience on product business, but are now struggling to update their offerings towards service-based solutions. There are many reasons for the recent development. Solutions are of interest to B2B manufacturers because they help for example in securing sales, enabling longer customer relationships, setting growth opportunities, fulfilling the gaps between purchases, managing through economical cycles, and responding to customer demand. In addition, global markets with new Third World suppliers present new kinds of threats against traditional manufacturers. The change towards solution provider is not only a simple choice of strategy for these manufacturers. Solution business constructs on relational processes (Tuli, Kohli and Bharadwaj, 2007). Furthermore, extensive collaboration with the customers is one of the main antecedents of solution business (Sawhney, 2006). The further a supplier takes control over a customer's business by offering solutions, the more and deeper collaboration is needed. Although going downstream closer to the customer proves to hold profit potential (Wise and Baumgartner, 1999), the role of customer collaboration is many times underestimated among the traditional manufacturing companies.

Collaboration with customers, or the lack of it, is not the only challenge a company faces on its path to solution business. The aim of this pilot study is to offer insights into these challenges, especially in the context of traditional manufacturer transforming to solution providers. There are quite few studies on the challenges during the development towards solution business, creating a need for further research (Matthyssens & Vandenbempt, 2008). The study contributes to the developing solution marketing research stream by answering the following research problem: What challenges a manufacturer faces when moving towards solution business?

Solution business literature

Solution type of business has existed for decades (Davies, Brady and Hobday, 2007). In the academic literature, however, combining products with different services has been debated as the emergence of solution business only recently. There are many intertwined concepts relating to the solution business. According to Stremersch, Wuyts and Frambach (2001), a solution combines numerous elements uniquely to create value for the customer. Solutions are defined as offers, where the scope, scale, and the degree of integration between the elements are at a high level (Cova and Salle 2007). Also the concepts of integrated solutions (Brady, Davies and Gann, 2005; Windahl and Lakemond, 2006) and customer solutions (Cornet et al., 2000; Tuli, Kohli and Bharadwaj, 2007) have been used to describe the same kind of business. Furthermore, project marketing has many similarities with the marketing of solutions. Project-related services (Skaates and Cova, 2004), for example, could be understood as solution elements. In line with the similarities, Cova and Salle (2007) have proposed that there are synergies between the marketing of projects and solutions. In this paper, we have utilized all these concepts and literature streams in order to discuss the subject thoroughly.

In the context of traditional manufacturer companies, solutions are usually based on some sort of physical element, for example, a paper machine. In addition, there are numerous types of service elements implemented in various phases of the solution life cycle (Artto et al., 2007; Pekkarinen, Salminen and Jalkala, 2008). These elements are becoming more and more important (Davies, Brady and Hobday, 2007). Adding more service increases the complexity of an offer. This sets challenges for a manufacturer, who have relied on its technological competence and somewhat neglected the role of service. Besides the offering complexity challenge, solution offering involves collaboration and relational processes (Tuli, Kohli and Bharadwaj, 2007). Solution business has service-dominant (S-D) logic (Vargo and Lusch 2004) characteristics, as solutions are often co-created to match a customer's problem (Cornet et al. 2000, p.2; Sawhney 2006). Traditional manufacturers have used to market their products *to* customers. According to the S-D logic, the marketing in solution business should be performed *with* the customer highlighting the close cooperation (Lusch and Vargo 2006). In the present study, a solution provider is understood as a supplier of complex offerings, delivering value for the customer in close cooperation with the customer.

Challenges related to solution business

The leap from manufacturing towards service-based solution is challenging and gaining profit through complex solutions has shown to be quite a challenge (Tuli, Kohli and Bharadwaj, 2007). Gebauer, Fleisch and Friedli (2005) list three prerequisites for a successful manufacturer service strategy; comprehensive market understanding, comprehensive participation throughout the organization and transparency on the systematic strategy change. On the other hand, Cova and Salle (2007) found four major challenges in solution business; change in the orientation, need for new capabilities and skills, transformation of the structure and processes within the organization, and implementation of the transformation process within the organization. In service-provider solutions, Brax (2005) classified supplier challenges under the following somewhat interrelated categories: marketing, production, delivery, product-design, communication, and relationship. All of these challenges and prerequisites stress the importance of co-production as well as deep organizational development.

When implementing a service-oriented business model, the main challenge seems to be in the organizational change domain (Oliva and Kallenberg, 2003). Furthermore, a gap in the analytic thinking between the headquarters and the operational managers is seen to be an internal barrier when moving towards solution business (Matthyssens and Vandenbempt, 2008). This reflects the importance of internal communication during such transformation. There are a few studies that have described the change process through the offering development viewpoint (Matthyssens and Vandenbempt, 2008; Oliva and Kallenberg, 2003; Vandermerwe and Rada, 1988). However, the organizational reconstruction has not been discussed thoroughly. Thus, we approach the change process from an organizational development viewpoint. Before the interviews, we formulated a four-part development phase model: strategic preparation, decision making, first delivery, and finally management of solution business. These phases were selected to cover the change process from a single idea level to a successful management of solution business.

Research setting

The nature of this study is explorative. In order to gain a deeper understanding of the relatively unexplored change process from a traditional manufacturer to a solution provider, we have adopted a classic case study approach by focusing in-depth on a single case company (Dyer and Wilkins, 1991; Yin 2003). The use of a single case as an empirical data supports the idea of explorative research problem in a complex phenomenon studied in its real-life context (Yin, 2003). Case study offers also a possibility to move between data and theory to gain novel insights into the problem (Eisenhardt, 1989; Eisenhardt and Graebner 2007). The case selection is the most important methodological decision (Dubois and Araujo, 2007). It should be selected because of it is unusually revealing or an extreme example, or based on the opportunities for unusual research access (Yin, 2003). Also, the selection of appropriate informants is important (Halinen and Törnroos, 2005). The research problem directed the search of the case company towards a solution provider that has recently gone through a transformation for a traditional manufacturer to a solution provider. As this is a pilot study, it was decided to choose a limited number of top-level managers in order to explore the topic at a strategy-level. Finally, three corporate-level directors (Chief Strategy Officer, Senior Vice President, Marketing, and Chief Technology Officer) as well as one division-level director (Vice President, Marketing) were interviewed using a thematic interview structure.

While the primary method for gathering the empirical data was thematic interviews, the data collection was carried out with multiple sources of data. This is typical with case studies (Eisenhardt, 1989; Yin 2003). The personal interviews covered issues such as the interviewee's perception of the solution business, the case company's milestones in the development path to become a solution provider, the challenges the company has faced on its path, and how these challenges have been managed. All the interviews were tape recorded and transcribed and field notes were made during the interviews. The transcriptions were then analyzed by using a content analysis, which helped to reduce and classify the information (Patton, 2002). Secondary data included company documents, such as annual reports, CEO presentations and brochures, as well as company web pages.

Case analysis

The case company supplies metal-based components, systems and integrated systems to construction and the engineering industry. The company has a wide range of metal products and services. The net sales in 2008 were almost 4,000 million EUR with an operating profit of nearly 15 per cent. Around 15,000 employees worked within the company in 26 countries across Europe. Its main market area is Europe, while the long-term growth is focused on Eastern Europe. During the last five years, the case company has transformed from a traditional industrial material supplier into a customer-oriented solution provider. Based on our empirical findings, we needed to modify our conceptual change process phase model. Instead of the above described four phases, the process can be outlined with the following three phases; Drafting, Changing, and Managing. This change process is depicted in Figure 1. The boundaries between each phase are described above the timeline. The drafting phase started with an idea of a strategy change. Then, the decision of going towards solution business launched the changing phase. Finally, the company moved to the managing phase as it started to build its first solution according to new business model. Next, the found challenges within each phase are discussed. As the challenges occur in rather different organizational levels, each phase is discussed through *strategic*, *tactical*, and *operational* levels.

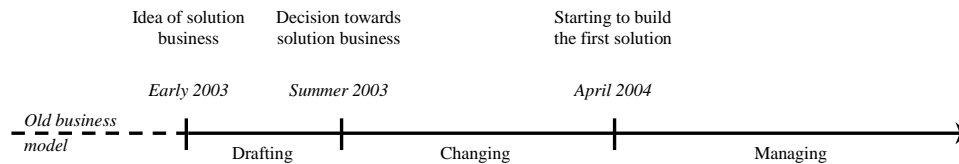


Figure 1. Timeline for the strategy change in the case company

Drafting-phase

The need for a change in the company strategy arose from the industry, which had witnessed plenty of mergers and acquisitions in the beginning of 2000's. Being a relatively small actor, the case company had to find its niche market or else it would have most likely become a victim of the ongoing consolidations. In early 2003, the company started to search new direction and an idea of going downstream towards the customer in the value chain was discussed. The time between the idea of solution business as a strategy and the final board decision to focus on solutions is here called a strategy *drafting* phase. In the beginning of the transformation, the main focus was on strategy development. The main challenge at first was solution definition – what is a solution and what it is not. In the case company, the start was handled by a small group of interest employees: *“There were only five of us at the beginning... it took us half a year to decide where to go... and what options to take”*. While the case company changed its business model rather drastically; it became clear that it would need fresh customer-oriented ideas from the customer industries. Thus, the planning of recruitments and acquisitions were started. Acquiring new experience was a challenge, mainly because the new strategy was not crystal clear and there were some misjudgments made. Furthermore, the experienced managers were at first skeptical about the new planned direction.

Changing-phase

After the strategy drafting, the company moved on to actually changing its organization towards a solution provider. This organizational *changing* phase lasted about a year until the development of a first solution was started. On a strategic level, strategy redefining, acquisition, and recruitments continued to set challenges. Now, the tactical level received the most attention – how to carry out the new strategy within a substantially reborn organization. One of the key issues was to think marketing differently, in a more customer-oriented way. According a director: *“it is not enough to understand the customer, we really need to understand the customer's customers, and even the end-users”*. This sets multiple challenges, as the sales skills have to be renewed: *“Solution selling requires consultative selling skills, it is different, and it takes a lot of practicing and training”*. A major barrier in this process is cultural-related, as a director puts it: *“in Eastern Europe, there are numerous issues in training, but we need to start with English language”*. On an operational level, project management and planning must be re-configured. Also, the new strategy has to be communicated throughout the organization.

Managing-phase

The final phase, titled as *managing*, includes developing, selling and delivering solutions. The management of solution business is the focal task. Strategically, the challenge is to listen to

the markets for possible strategy re-orientation needs. Tactical challenges remain quite the same, with emphasis on customer relationship related tasks and flexibility of (networked) resources. The focus moves now more on the operational level, as the new strategy have to be implemented efficiently. One of the sales-related challenges is to find the right channel to market the solution to a customer organization, as an interviewee said: *“our understanding is that the first contact should be CEO or someone who really understands the added value and does not think only the price”*. Overall, it can be noted that there are numerous challenges when moving towards solution business in the case company. These are listed in Figure 2.

Drafting	Changing	Managing
<i>strategic</i> <ul style="list-style-type: none"> ▪ Defining new strategic directions ▪ Planning acquisitions ▪ Recruiting managers to follow through the change 	<i>strategic</i> <ul style="list-style-type: none"> ▪ Planning acquisitions ▪ Redefining organizational structures ▪ Specifying strategy in more detail 	<i>strategic</i> <ul style="list-style-type: none"> ▪ Keeping track for possible strategy changes
	<i>tactical</i> <ul style="list-style-type: none"> ▪ Carrying out acquisitions ▪ Forming the core offering ▪ Renewing sales processes towards customer-orientation ▪ Dealing with internal change resistance ▪ Recruiting customer-oriented employees ▪ Integrating the new organization, culture and language differences ▪ Implementing new strategy 	<i>tactical</i> <ul style="list-style-type: none"> ▪ Carrying out acquisitions ▪ Enabling scaling of network resources ▪ Planning value-based pricing models
	<i>operational</i> <ul style="list-style-type: none"> ▪ Reshaping project planning and management skills ▪ Communicating the change internally 	<i>operational</i> <ul style="list-style-type: none"> ▪ Implementing new strategy ▪ Acknowledging different customer needs ▪ Finding the right sales channels within customer organizations ▪ Recruiting customer-oriented employees ▪ Managing sales force ▪ Co-creating the offering with customers ▪ Maintaining customer information effectively

Figure 2. Challenges in the case company during the transformation towards solution business

Discussion

The pilot study strengthens the previous research results. The challenges and characteristics found by Brax (2005), Cova and Salle (2007) and Gebauer, Fleisch and Friedli (2005) are supported by our results. However, here the development is studied more longitudinally. This sequential-approach provides an opportunity to study how the challenges changes during the transformation process. The emphasis slides from a more strategic decision type of tasks to more operational level issues as the change advances.

The found challenges relate to the lack of knowledge, expertise and resources, but also to the organizational reconstruction and operational differences. Furthermore, when operating globally, the cultural differences have to be acknowledged. The key issue aroused in the interviews was the mindset of a solution provider – customer-oriented way of operating is a major business model change to a traditional material supplier organization. It has to be communicated internally clear enough.

Next, we will verify the results by using a revised interview framework in two-to-three solution provider companies. Furthermore, as our aim is to model the change process from a traditional industrial supplier to a solution provider, a quantitative approach is not excluded in the future. Quantitative analysis would allow us to study the importance of different factors more systematically.

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PUBLICATION 2

Pekkarinen, Olli and Ryyänänen, Harri (2011)

Scrutinizing the challenges during the transition process towards industrial solution business

Earlier version presented at the BMM 2011, International Conference on Business Market Management, 18–20 May 2011, Tampere.

A revised version of the paper, attached to the present thesis, is currently at the 1st review round in the review process of the International Journal of Services and Operations Management.

SCRUTINIZING CHALLENGES DURING THE TRANSITION PROCESS TOWARDS INDUSTRIAL SOLUTION BUSINESS

Olli Pekkarinen¹ & Harri Ryyänen²

*¹School of Industrial Engineering and Management,
Lappeenranta University of Technology, Finland*

*²Business School, Joensuu Campus
University of Eastern Finland*

email: olli.pekkarinen@lut.fi

Keywords: *Solution business, industrial solution, change process, organizational development, B2B marketing, empirical research, case study*

Abstract

Traditional capital goods suppliers are continuously seeking new business opportunities to grow their revenues and share in the increasingly competitive global marketplace in a time where outstanding product quality is not the only decisive factor anymore. Responding to the customer demand and enabling longer customer relationships are examples of reasons why traditional manufacturers have interested now in solutions. The change towards solution business is not simply a choice of a new strategy for these companies – the companies face various challenges on their path to solution business. Focusing on a two case companies, this qualitative study names these challenges during three phases of the change process: drafting a new strategy, changing organizationally, and managing the solution business. Based on the findings, the major issue in the described transition is the organization-wide change of mindset. Starting from top management, the change has to be well-organized and uniformly expressed.

Introduction

There are three key drivers why manufacturers are growing interest on service-based offerings comprising outsourcing trends (Agndal, Axelsson, Lindberg, and Nordin, 2007), saturation of the installed base (Brax and Jonsson, 2009), and commoditization in product markets (Matthyssens and Vandenbempt, 2008). The development of combining products with different services has been debated as the emergence of solution business, where the scope, scale, and the degree of integration between the elements in an offer are at high level (Cova and Salle, 2007). Thus, manufacturers are focusing their efforts on providing solutions (Sawhney, 2006), which are delivered through relational processes with customers (Tuli, Kohli, and Bharadwaj, 2007), by using solution-driven business models (Storbacka, 2011). In the management of marketing activities, this can be regarded as closer customer relationships (Penttinen and Palmer, 2007), service-dominant business logic (Vargo and Lusch, 2008), and collaboration in solving customers' problems (Cova and Salle, 2008).

The solution business literature stream has received more and more attention lately, which emphasizes the importance of solution research. In the context of traditional manufacturer companies, solutions are usually based on some sort of physical element, for example, a paper machine. In addition, there are numerous types of service elements implemented in various phases of the solution life cycle (Artto, Wikström, Hellström, and Kujala, 2008). While various service elements are becoming more and more important (Davies, Brady, and Hobday, 2007), accompanying more service increases the complexity of an offer. This sets challenges for a manufacturer, who have relied on its technological competence and somewhat neglected the role of service. Furthermore, traditional manufacturers have used to market their products to customers, thus many of them do not have extensive collaboration with their customers. According to the service-dominant (S-D) logic (Vargo and Lusch, 2004), the "marketing" in solution business should be performed with the customer, emphasizing "market with" instead of "market to". This highlights the role of close cooperation relationship between the supplier and the customer, which is the essence of solution business (Tuli et al., 2007). S-D logic is relevant in the solution business as collaboration is typical in solution marketing and solutions are often co-created to match a customer's problem (Sawhney, 2006). The further a supplier takes control over its customer's business, the deeper collaboration is needed in the relationship.

The solution concept has a variety of somewhat differing descriptions (Nordin and Kowalkowski, 2010). Following the definition by Stremersch, Wuyts and Frambach (2001),

here a solution is understood as a “unique combination of numerous elements which will contribute to producing value for the customer” whereas the solution provider is “a supplier of complex offerings, delivering value for the customer in close cooperation with the customer”. Gaining profit through delivering complex solutions has shown to be quite a challenge (Tuli et al., 2007). The change is a major leap in many ways. During their transition towards successful solution business, companies face multiple challenges (Davies, Brady, and Hobday, 2006; Cova and Salle, 2007; Jacob and Ulaga, 2008; Matthyssens, Vandenbempt, and Weyns, 2009; Martinez, Bastl, Kingston, and Evans, 2010; Ryyänen, Pekkarinen, and Salminen, 2012).

The extant literature on solution business is quite young and still emerging as the topic is a dynamic, constantly changing business arena. Regarding the transition from products to solutions, studies show evidence on a certain path model (e.g., Oliva and Kallenberg, 2003; Davies et al., 2006). However, others note that the process is not as linear as the current literature implies (Johnstone, Dainty, and Wilkinson, 2008), change is gradual (Salonen, 2011), or it is described as agile incrementalism lacking clear directions (Kowalkowski, Kindström, Alejandro, Brege, and Biggemann, 2012). Matthyssens and Vandenbempt (2010) claim for studies on the effects of the transition towards services for companies business models as well as managerial guidance on dealing the stress. Current research has somewhat treated solution suppliers homogenous whereas in practice solution providers have a variety of different business strategies to choose from (Helander and Möller, 2007). Alajoutsijärvi, Mainela, Salminen, et al. (2012) synthesize four empirically grounded configurations of organizing logics in project business delivering solutions, based on how unique the projects are and how the work within supplier companies is coordinated. Furthermore, Kapletia and Probert (2010) argue for more narrow studies on business solution strategies and solution provider capabilities. This reflects the importance of context when studying project / solution business. Thus, we see that the transition process from product to solution business including management of solution business need to be addressed more thoroughly.

The study contributes on the developing solution transition research stream by answering the following questions: *1) what challenges a company faces when moving towards solution business?* and *2) how the transition process to solution business is seen by industrial suppliers?* The transition towards solution business is a complex phenomenon. Hence, we use a qualitative case study strategy (Dyer Jr. and Wilkins, 1991; Yin, 2009) with two case companies that have recently reoriented their businesses towards solutions.

Solution business as a business model

The literature on solution is multidisciplinary with multiple terms and definitions from different authors, see Table 1. The different definitions are context-dependent and vary depending on the scope of the offering, the type of elements integrated, or type of industries studied (Lay, Schroeter, and Biege, 2009). Furthermore, project business holds significant similarities with solutions (Skaates and Tikkanen, 2003; Cova and Salle, 2007; Jalkala, Cova, Salle, and Salminen, 2010; Alajoutsijärvi et al., 2012).

Table 1. New business concepts relating to solution type of business

Concept	Definition	Citation
Project marketing	“A complex transaction covering a package of products, services and work, specifically designed to create capital assets that produce benefits for a buyer over an extended period of time” (project)	Cova et al. (2002, p. 3)
Customer solutions	A set of “relational processes comprising customer requirements definition, customization and integration of goods and/or services and their deployment, and postdeployment customer support” to address customers’ business needs	Tuli et al.(2007, p. 5)
Full service contracts	“...comprehensive bundles of products and/or services, that fully satisfy the needs and wants of a customer related to a specific event or problem.”	Stremersch et al. (2001, p. 1)
Integrated solutions	“A third effective business model is to combine products and services into a seamless offering that addresses a pressing customer need.”	Wise and Baumgartner (1999, p. 138)
Product-service systems	“a marketable set of products and services capable of jointly fulfilling a user’s need.”	Goedkoop et al. (1999, p. 18)
Servitization	A trend to offer “... fuller market packages or “bundles” of customer-focused combinations of goods, services, support, self-service, and knowledge.”	Vandermerwe and Rada (1988, p. 314)
Service infusion	“...empirical phenomenon, whose common denominator is the increased importance of service in the offering and organization of manufacturing firms”	Kowalkowski et al. (2013, p. 18)
Performance based contracting	“Performance-based contracting is reshaping service support supply chains in capital-intensive industries ... [and] aims to replace traditionally used fixed-price and cost-plus contracts to improve product availability and reduce the cost of ownership by tying a supplier’s compensation to the output value of the product generated by the customer”	Kim et al. (2007, p. 1843)
Hybrid offerings	“Hybrid offerings in business markets ... combine industrial goods and services”	Ulaga and Reinartz (2011, p. 5)

Kapletia and Probert (2010) argue that the extant literature on solutions have been separated into two, although considerable overlapping, bodies of literature; “migration from products to solutions” and “management of solutions”. They include service dominated logic (Vargo and Lusch, 2004), servitization (Vandermerwe and Rada, 1988), strategy and transformation (Bennett, Sharma, and Tipping, 2001), and downstream value migration (Wise and Baumgartner, 1999) to the former and modularizing and repeating solutions (Foote, Galbraith, Hope, and Miller, 2001), company capabilities for solutions provision (Davies and Brady,

2000), and solutions provision and network relationships (Windahl and Lakemond, 2006) to the latter body of literature. On the other hand, Pawar et al. (2009) identify three streams of literature to organize the field of solution research, comprising 1) “product service systems” literature with environmental sustainability as an objective (reduce environmental impact); 2) “integrated solutions” literature with financial focusing as an objective (long-term customer value and profit); and 3) “experiential services” literature with co-creating value as an objective (memorable experience). We acknowledge the same ideological separation of Kapletia and Probert (2010), and consider our study to contribute to both categories. Regarding the Pawar et al. (2009), our study builds on the second and third perspective, as the long-term customer relationships and co-creation of solutions are the focal issues, although the use of experiential services does not sound familiar in our context.

It can therefore be seen that strong relationships and cooperation have high relevance in solution business. Also, the essence of solution business is that there are a multitude of different customer problems that suppliers need to be able to address. Hence, suppliers are forced to develop their business model more flexible than when providing merely products. It has been argued, that there can be multiple business models within a single company (Chesbrough and Rosenbloom, 2002; Kujala, Artto, Aaltonen, and Turkulainen, 2010; Benson-Rea, Brodie, and Sima, 2013). Therefore, a solution business model should include several sub-models to cope with changing customer needs. To conclude, the diversity of possible customer problems sets major challenges to manufacturers that are in transition to industrial solution business. Next, we explore the transition process literature.

Transition process

The transition process from product to solution business has received a decent attention from academics lately, as we found nine articles studying the transition process, see Table 2. In many cases, the steps of the transition are categorized on a 2 X 2 matrix, usually giving two optional development paths (vertical or horizontal first change, with the goal being in the opposite corner). For the decisive and descriptive axes within their solution model matrixes, authors have chosen the nature of buyer-seller relationship (transactional-relational) (e.g., Oliva and Kallenberg, 2003; Kapletia and Probert, 2010), the product vs. service/process orientation (e.g., Oliva and Kallenberg, 2003; Kapletia and Probert, 2010; Matthyssens and Vandenbempt, 2010), the degree of completeness of an offering (Penttinen and Palmer, 2007), or the degree of customization (Matthyssens and Vandenbempt, 2010). However, other studies note that the process is not as linear as the current literature implies (Johnstone et al., 2008),

change is gradual (Salonen, 2011), or it is described as agile incrementalism lacking clear directions (Kowalkowski et al., 2012).

Table 2. Findings on transition from the extant literature

Focus	Used concept	Findings	Industry and methodology	Author(s)
Transition from product manufacturer into service provider	Solution provider mentioned	Transition occurs in the following phases; 1. Consolidating product-related services (existing service offering under a single organizational unit), 2. Entering the installed base service market, 3 expanding to either relationship-based or process-based services, and 4. Taking over the end-user's operation.	Capital equipment (machine) manufacturers. Qualitative multiple case study	Oliva and Kallenberg (2003)
Charting a path toward integrated solutions	Integrated solutions	A three-phase capability model for building repeatable solutions: growing the front end, building the back end, and refocusing. Addresses the challenges companies might face.	International companies based in manufacturing and services. Qualitative multiple case study	Davies, Brady, and Hobday (2006)
Moving from commoditized basic offerings to value-added solutions.	Value-added solutions	Proposes alternative step-by-step strategies for making the transition to service-based solutions, and offers alignment suggestions for overcoming identified barriers. No single best way, two factors to model the change pathway: technical application integration and business process integration.	Electro-technical. Longitudinal qualitative multiple case study	Matthyssens and Vandenbempt (2008)
Organization delivering PSS, product-service organization (PSO)	Product-service systems	There are (from an operations point of view) three phases in designing solutions: defining value, designing value and delivering value.	Large companies, complex PSS providers. Road-mapping, literature review, case study	Pawar, Beltagui, and Riedel (2009)
Service development process	Industrial service offering	A four-phase service offering development framework; 1) market sensing, 2) development, 3) sales, and 4) delivery. Critical aspects of NSD in a manufacturing context are highlighted.	Manufacturers. Qualitative multiple case study	Kindström and Kowalkowski (2009)
Transition process, identification of different service addition paths	Integrated solutions	Four strategy types; 1) after sales service (standardized, mainly products), 2) service partner (standardized, mainly services), 3) solution partner (customized, mainly products), 4) value partner (customized, mainly services).	Machine building and mechatronics. Qualitative multiple case study	Matthyssens and Vandenbempt (2010)
Strategy-Structure Configurations in Manufacturing Companies	Integrated solutions	Views the transition as steps towards service orientation, which can be translated into different situation-specific service strategies: aftersales service provider, customer support service provider, outsourcing partner, or development partner.	European manufacturing companies. Quantitative survey	Gebauer, Edvardsson, Gustafsson, and Witell (2010)
Service transition strategies	Solutions	Industrial manufacturers are not abandoning product manufacturing operations, but engage in a range of product related services, while adopting a solution orientation to create a gradual change in the organizational mindset, capabilities, and processes.	Metal engineering. Qualitative multiple case study	Salonen (2011)
Service infusion process	Service infusion	Service infusion takes place in small steps without clearly directed efforts. Introduces the concept of agile incrementalism.	Materials handling. Qualitative single case study	Kowalkowski, Kindström, Alejandro, Brege, and Biggemann (2012)

Challenges during the transition process

There are studies concerning the challenges in the transition process (e.g., Davies et al., 2006; Cova and Salle, 2007; Jacob and Ulaga, 2008; Matthyssens and Vandenbempt, 2008; Ryynänen et al., 2012). The development and management of solution offerings creates challenges for traditional capital goods suppliers for three main reasons. *First*, suppliers are accustomed to tendering for customers' contracts within strict specifications. Frequently, this only leads to price competition between capable suppliers without determining the most valuable approach to satisfying a customer's need. *Secondly*, suppliers are not accustomed to adapting their offerings to create new solutions for customers. A supplier organization often has strictly defined internal roles, and collaboration between departments is not necessarily at a level capable of providing customized solutions (Ryynänen et al., 2012). *Thirdly*, suppliers are not accustomed to collaborating with their customers at the level required to co-create something totally unique – an industrial solution (e.g. Tuli et al., 2007). Penttinen and Palmer (2007) suggest that, as companies are moving from basic offerings to more complex solutions, the form of buyer-seller interaction also changes from transactional to a relational relationship.

Oliva and Kallenberg (2003) see the most challenges relate in organizational change domain, including e.g., goals, incentives, and change management. They pinpoint three topics that challenge the transition comprising not believing in the economic potential of the service component; deciding that providing services is beyond the scope of their competencies; and failing the deployment of a successful service strategy. Matthyssens and Vandenbempt (2008) found that a gap in analytical thinking between management and operational to hinder the transition, as would the customer's willingness to share vital information. Cova and Salle (2007) argue that a company must manage four challenges comprising 1) a change in the orientation of the company, 2) a need for new capabilities and skills, 3) a transformation of the structure and processes within the organization, and 4) the implementation of the transformation process within the organization. Based on a single interview with a manager, Jacob and Ulaga (2008) noted that understanding and implementing service as a business logic constitutes the major management challenge. Furthermore, Davies, Brady and Hobday (2006) argue that the employees' traditional mindset around products and services is the highest hurdle to overcome.

Modeling the change

There are various theories on how a company can change its strategy, but although several existing studies (see Table 2), Velamuri et al. (2011) argues for more research on how companies can effectively reconfigure their businesses towards providing solutions. Despite

the critique on the linear transition models (Johnstone et al., 2008), a sequential starting point gives us a practical tool for the empirical data collection. However, we acknowledge the gradualness (Salonen, 2011) and incrementalism (Kowalkowski et al., 2012) notions as we analyze our data.

Companies change their strategies continuously. Pawar et al. (2009) identify three phases in the process in the development of organizing product service systems. Their framework comprises defining value; designing value; and delivering value. This framework gives a tool to manage the solution business. However, for the more profound change of the whole organizational direction from product-oriented organization to solution-driven organization we need a somewhat different framework. Hence, we chose the model by Lewin (1947), which involves three phases for the organizational change in general. In Lewin's model, the change process is divided into unfreezing, moving, and refreezing phases. Although Lewin's model has received rather much critic (e.g., Dent and Goldberg, 1999), it can be considered as relevant to the modern world (Burnes, 2004).

The first phase of Lewin's model, unfreezing, is about destabilizing the quasi-stationary equilibrium where the company is acting. Schein (1996) continues Lewin's work by identifying three phases needed in unfreezing comprising disconfirmation of the validity of the status quo, the induction of guilt or survival anxiety, and creating psychological safety. Schein (1996) continues that unless a certain level of psychological safety is created, the first two aspects fail as well. In the moving phase, organization should identify and evaluate all the available options as a learning process (Lewin, 1947). Finally, in the refreezing phase the most important thing is to have a common understanding on the new situation. To success, refreezing often requires changes to organizational culture, norms, policies and practices (Cummings and Huse, 1989). Next, we present our research setting and a modification to this model in the end of the following chapter.

Research setting

The nature of this study is explorative. In order to gain a deeper understanding of the relatively unexplored change process from a traditional manufacturer to a solution provider, we have adopted a classic case study strategy by focusing in-depth on two case companies (Dyer Jr. and Wilkins, 1991; Yin, 2009). The use of cases as our empirical data to explore the complex phenomenon in its real-life context supports the idea of explorative research problem (Yin, 2009). Case study offers also a possibility to move between data and theory to gain novel insights into the problem (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). The case

selection is the most important methodological decision (Dubois and Araujo, 2007) and cases should be selected because of they are unusually revealing or an extreme examples, or based on the opportunities for unusual research access (Yin, 2009). Besides the case companies, the selection of appropriate informants is also important (Halinen and Törnroos, 2005).

The research problem directed the search of the case companies towards industrial companies that have recently gone through a transformation from a traditional manufacturer to a solution provider. We selected two business-to-business companies (case Alpha and case Beta) providing capital goods which have recently put substantially effort on developing their organization and offering towards solution type of business. Thus, the companies fit ideally to our research aims. There are, however, differences between the selected cases. While case Alpha has succeeded quite well in their transformation process, company Beta has faced various obstacles on their journey. This makes the comparison of these two cases intriguing.

Table 3. Interview description

Company and interviewee's title	Interview length (minutes)
Alpha, Chief Strategy Officer	59 min
Alpha, Senior Vice President	68 min
Alpha, Vice President	60 min
Alpha, Chief Technology Officer	110 min
Beta, Director	62 min
Beta, Senior Vice President	50 min
Beta, Director, Channel Partnerships and Development	80 min
Beta, Head of Customer Commitment	79 min
Beta, Executive Vice President	80 min
Beta, Head of R&D, Project Office	58 min
Beta, Executive Vice President	65 min
Beta, Head of Project Management Office	50 min
<i>Sum</i>	821 min
<i>Average</i>	68 min

As this is an explorative study, it was decided to choose a limited number of top-level managers in order to explore the topic at a strategy-level. Finally, together twelve in-depth interviews (see Table 3) were made using a thematic interview structure to guide the data collection. The personal interviews covered issues such as the interviewee's perception of the solution business, the case company's milestones in the development path to become a solution provider, the challenges the company has faced on its path, and how these challenges have been managed. All the interviews were tape recorded and transcribed and field notes were made during the interviews. The transcriptions were then analyzed by using content analysis, which helped to reduce and classify the information (Patton, 2002). While the primary method for gathering the empirical data was the thematic interviews, the data collection was supplement by using multiple data sources, which is typical with case studies (Eisenhardt,

1989; Yin, 2009). In our study, secondary data included company documents, such as annual reports, CEO presentations and brochures, as well as company web pages.

In order to aid interviewees to recollect the activities in correct order, i.e. obtain more longitudinal view on the change process, we sketched a conceptual change process phase model before the data collection. The conceptual model (see Figure 1), comprise the three phases by Lewin (1947) adapted in our research setting. We define the phases as follows. In the unfreezing phase, the company drafts its strategy, and defines the outlines for the solution business strategy and transition. The moving phase starts after the decision to change towards the new strategy is taken and comprises changes in e.g., organization, personnel, and business networks. The refreezing phase can be considered to start when the first solution is provided according to new business model, and it comprises managing issues, e.g., operational and tactical decisions, knowledge management and controlling networks. However, refreezing has a certain echo of a solid status. We consider solution business as evolving state of organization, and decided to rename the three phases. Hence, we call the process phases *drafting*, *changing*, and *managing*.



Figure 1. Conceptual timeline for the strategy change, presented to the interviewees

Case analysis

In this chapter, we review the empirical case material that addresses the transformation process of the two case companies, Alpha and Beta. Finally, we propose an outline for the transition process. We begin by describing the case companies' businesses. The main features of both case companies are shown in Table 4.

Case company Alpha supplies metal-based components, systems and integrated systems to the construction and engineering industries. During 2003–2008, Alpha has transformed from a traditional industrial material supplier into a customer-oriented solution provider. It has recently adopted a solution provider strategy, and significantly increased the role of service elements in its business model. Solution offering is an essential part of the company's core

activities. It has actively developed its offering to being a full service solution provider in every phase of its customers' business cycles.

Table 4. Case company description

Feature	Alpha	Beta
Business	Supplier of metal-based components, systems and integrated systems	Supplier of environmental and industrial measurement products and services
Markets	Global, mainly Europe	Global, mainly N&S America
Customers	Construction and engineering industries	E.g., meteorology, airports, roads, defense, energy industries
Employees (2009)	12,700	1,400
Net sales (2009, €M)	2,000	230

Case company Beta supplies environmental and industrial measurement products and services to customers in meteorology, airports, roads, defense, energy, and various other industries. Beta has 1,400 employees in 12 countries, with net sales of around 210 million euros. Beta's transition started in early 2003, but it has suffered setbacks and even temporarily halted the transition. Thus the challenges of the change process are clearly present. In addition, we were able to have a broad access to the separate functions in the organization supports its selection as a case company.

Both companies face a situation where they needed to change their then business models as their industries were undergoing a fundamental change (e.g., consolidations). This change processes are depicted in Figure 2. The year marks between each phase are described above the timeline. The drafting phase started with an idea of a strategy change. Then, the decision of going towards solution business launched the changing phase. Finally, the companies moved to the managing phase as they started to build its first solution according to new business model. As it can be seen from the Figure 2, the processes differ somewhat between the companies. In Alpha, the change was more straightforward whereas Beta faced more turbulence during their change. Next, we discuss the found challenges within each phase in more detail. As the challenges occur in rather different organizational levels, we discuss each phase through *strategic*, *tactical*, and *operational* levels.

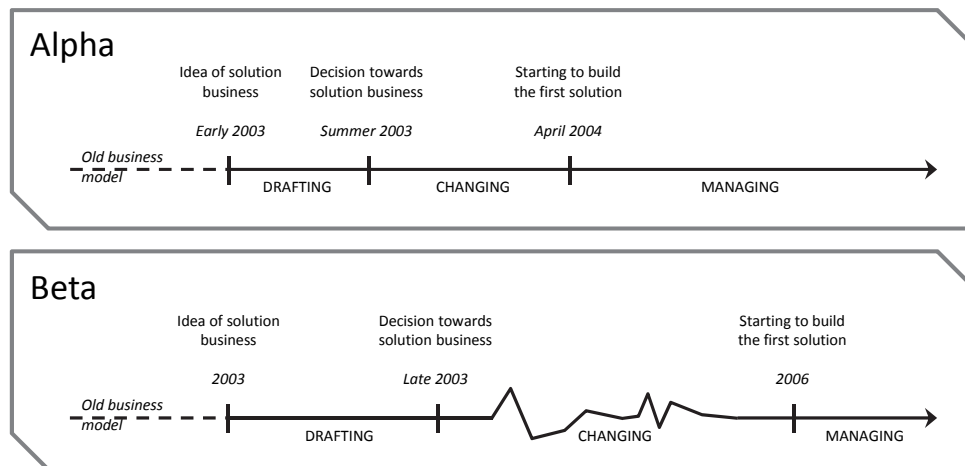


Figure 2. Timeline for the strategy change in the case companies

Drafting-phase

The need for a change in Alpha company strategy arose from the industry, which had witnessed plenty of mergers and acquisitions in the beginning of 2000's. Being a relatively small actor, the case company had to find its niche market or else it would have most likely become a victim of the ongoing consolidations. In early 2003, the company started to search new direction and an idea of going downstream towards the customer in the value chain was discussed. The time between the idea of solution business as a strategy and the final board decision to focus on solutions is here called a strategy *drafting* phase. In the beginning of the transformation, the main focus was on strategy development. The main challenge at first was solution definition – what is a solution and what it is not. In the case company, the start was handled by a small group of interest employees: *“There were only five of us at the beginning... it took us half a year to decide where to go... and what options to take”*. While the case company changed its business model rather drastically; it became clear that it would need fresh customer-oriented ideas from the customer industries. Thus, the planning of recruitments and acquisitions were started. Acquiring new experience was a challenge, mainly because the new strategy was not crystal clear and there were some misjudgments made. Furthermore, the experienced managers were at first skeptical about the new planned direction.

Also the business environment where Beta operates was changing rapidly in the early 2000's resulting in diminishing profit figures for Beta. At first, Beta was organized under three different business units comprising components, systems, and solutions units. However, the company decided to ask for outside advice and received two alternative strategy directions

from a business consultant. Beta was given two options; either to focus strictly to providing components or to proceed with an organizational change to providing solutions. They chose to follow the latter one. In the beginning, the top management was very anxious in developing its operations towards solutions. However, it was not communicated clearly enough and parts of Beta still does not employ the solution mindset. Furthermore, as an interviewee state *“I don’t think that solution business is a reasonable way to operate for all of our business units”*, the pure solution business model might not be suitable for all the business units. Hence, the drafting phase was left a bit undone in the case company Beta with the largest concern relating to what and how the solution provider way of operation is executed.

Changing-phase

After the strategy drafting, the company moved on to actually changing its organization towards a solution provider. This organizational *changing* phase lasted about a year until the development of a first solution was started. On a strategic level, strategy redefining, acquisition, and recruitments continued to set challenges. Now, the tactical level received the most attention – how to carry out the new strategy within a substantially reborn organization. One of the key issues was to think marketing differently, in a more customer-oriented way. According to a director: *“it is not enough to understand the customer, we really need to understand the customer’s customers, and even the end-users”*. This sets multiple challenges, as the sales skills have to be renewed: *“Solution selling requires consultative selling skills, it is different, and it takes a lot of practicing and training”*. A major barrier in this process is cultural-related, as a director puts it: *“in Eastern Europe, there are numerous issues in training, but we need to start with English language”*. On an operational level, project management and planning must be re-configured. Also, the new strategy has to be communicated throughout the organization.

Following the unclear drafting phase, Beta decided to not to recruit employees or make acquisitions but used the existing organization. Furthermore, well-defined guidance on how the transition would be carried out was missing. The overall mindset within the company was still largely focused on product business with relatively standard components. One of the major changes was the selling phase. According to a director, *“We have to try to sell more than a customer asks from us, because the problem is that the customer does not know what we can do more. We have to be active and understand the whole... more than the customer does.”* This also reflects that in solution business, suppliers need to understand their customer businesses and needs, even those that are not proposed or realized by the customer. While a typical question from customers have been *“what business are you in?”*, one director has developed an

apt response: *“what business do you want me to be in?”* However, creating unique solutions was a challenge because the overall product-related mindset of the organization was hindering the fresh insight on how to solve a certain customer problem. Also, the internal communication between different departments, essential in creating bundled solutions, was only developing.

Also, the marketing focus and material had to be changed from product flyers to more describing success stories. A director describes the change: *“we know product marketing but we struggle with solution marketing... I think it is all about refocusing our brand image and in it we have failed.”* Instead of pure product characteristics, the overall brand of a solution provider is emphasized. Another issue with Beta was the emerging need of new partners. For example, if there is a certain response time promise in a distant location, a partner company has to be negotiated to handle the sudden customer needs or emergencies. On some occasions, the customer has already teamed up with a third partner and Beta has to work with that partner if they like to participate. This has created a challenge in managing the partnerships, since the ideal case is that there is only one actor, preferable company Beta, that owns the customer's lifecycle process in question. Overall, the changing phase within Beta was not a straight-forward process, which is emphasized with a tortuous path in Figure 2.

Managing-phase

The final phase, titled as *managing*, includes developing, selling and delivering solutions. The management of solution business is the focal task. Strategically, the challenge is to listen to the markets for possible strategy re-orientation needs. Tactical challenges remain quite the same, with emphasis on customer relationship related tasks and flexibility of (networked) resources. The focus moves now more on the operational level, as the new strategy have to be implemented efficiently. One of the sales-related challenges is to find the right channel to market the solution to a customer organization, as an interviewee said: *“our understanding is that the first contact should be CEO or someone who really understands the added value and does not think only the price”*.

In Beta, it has become evident that solution type of offerings is not suitable for every customer. They have struggled in convincing their solution offerings to all types of customers and realized only after that there are certain customer types that should not be approached with solution-type of approach. A director said *“if we try to sell a solution to a ‘price-buyer’, it just will not work”*, meaning that also the customer should have a certain mindset when purchasing solutions. Regarding the sales process in general, they have used success stories as an internal tool for giving new business insights to employees: *“The only language that is understood*

internally is examples. We are afraid to sell something we do not know exists”. Overall, it can be noted that there are numerous challenges when moving towards solution business in the case companies. These are listed in Figure 3.

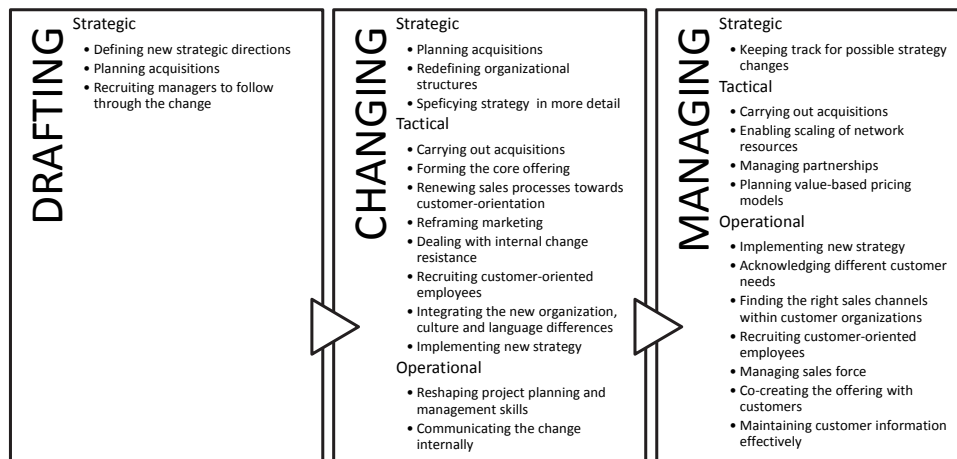


Figure 3. Challenges in the case company during the transformation towards solution business

Conclusions

We contribute to the literature on transition process (e.g., Oliva and Kallenberg, 2003; Davies et al., 2006) by proposing two main contributions; the *management issues of the transition process* and the *challenges faced during the process*. To start with, we found four key *management issues*. First, the mindset of a solution provider whole organization must be customer-oriented. That is the major business model change to a traditional material supplier organization. Second, it seems to be essential to acquire firsthand knowledge on the customers’ business and earning logics. This can be done by recruiting suitable personnel, at first in the top management level, or acquiring purposeful customer companies. Third, the transition process cannot be outlined with a linear model. Instead, the process is very complex and extensively fragile to any out-of-line deviation. In line with Burnes (1996) we argue that there is no best case scenario available, but the transition has to be planned individually. However, it should be noted that these deviations might open up possibilities that are worth exploring. Fourth, the emphasis moves from strategic level to more operational level as the change advances.

Second, the companies entering a transition process will face a variety of *challenges*. The transition process can be loosely divided into the following three phases: drafting a new strategy, changing organizationally, and managing the solution business. Each of the three phases was discussed through strategic, tactical, and operational levels. The emphasis of challenges moves from strategic level to more operational level as the change advances. The found challenges relate to the lack of knowledge, expertise and resources, but also to the organizational reconstruction and operational differences. Furthermore, when operating globally, the cultural differences have to be acknowledged. The challenges and characteristics found by Brax (2005), Cova and Salle (2007) and Gebauer, Fleisch and Friedli (2005) are supported by our empirical results. In our research, however, the development is studied longitudinally. The used sequential-approach provided an opportunity to study how the challenges changes during the transformation process.

To conclude, the transition from product to solution business is not a linear project but an evolving process that varies based on customer needs, which suggest that companies need to possess an ability to develop new business models for different customer needs. Regarding further studies, quantitative analysis would allow us to study the importance of different factors more systematically. For example, which are the most pressing challenges in each transition phase could provide new insights to transition literature as well as company managers. Also, using organizational theories (e.g., Burke, 2010) could provide more thorough insights on the organizations' mindsets, how individuals could be guided to think beyond product logic.

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Developing industrial solution offerings: a framework and management guidelines

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Developing industrial solution offerings: a framework and management guidelines

Olli Pekkarinen · Risto T. Salminen

Abstract: An offering describes the elements through which a company can provide value for its customers. In the present study, we focus on an industrial solution provider's offering and its formulation by reviewing the solution business, services marketing, and project business literature, as well as conducting a case study. Based on our results, we propose a dynamic industrial solution offering (DISO) with two special characteristics that comprise dynamism and completeness. Furthermore, we propose a framework for DISO that contains three components that comprise relational, financial, and performance. We also present evidence for a new service category within industrial solution business: services supporting mutual action. An industrial solution business addresses collaboration with customers, and we regard this aspect as an element in the dynamic industrial solution offering. Finally, we found three main managerial issues to help build solution mindset that comprise collaboration with customers, organization-wide customer orientation, and effective service-driven organization.

Keywords: Industrial solution · Offering · Solution business · Manufacturing industry · Case study

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O. Pekkarinen

Lappeenranta University of Technology, LUT School of Industrial Engineering and Management, Finland
e-mail: olli.pekkarinen@lut.fi

R.T. Salminen

Lappeenranta University of Technology, LUT School of Industrial Engineering and Management, Finland
e-mail: risto.salminen@lut.fi

Introduction

Manufacturing industry has changed its business model dramatically in the 21st century. In the current market, manufacturers are driven to provide more comprehensive offerings, meaning the elements through which a company can provide value for its customers, which go beyond the traditional goods with throw in services thinking (Ulaga and Reinartz 2011). In a nutshell, this is often achieved by providing capacity and availability instead of fixed priced machinery. This type of business is often termed the provision of solutions, whereby goods and services are uniquely bundled to address a particular customer need (e.g., Sawhney 2006). We define these business-to-business manufacturers as industrial companies; thus excluding, for example, financial companies.

From incidental merchandise, services have become the core of industrial companies' offerings with long lasting service agreements over the life-cycles of their goods. This change is driven both by the need for providers to grow and gain competitive advantage and by increased customer demand that is caused by customers' sourcing strategies (Agndal et al. 2007), as well as outsourcing trends and core business focuses. The three key drivers for industrial companies' service strategies are outsourcing trends, saturation of the installed base, and commoditization in goods markets (e.g., Reinartz and Ulaga 2008). Thus, industrial companies are focusing their efforts on providing bundled offerings of goods and services, described as different types of solution (e.g., Brady et al. 2005), which are delivered through relational processes with customers (Tuli et al. 2007), by using solution-driven business models (Storbacka 2011). In the management of marketing activities, this can be regarded as closer customer relationships (Penttinen and Palmer 2007), service-dominant logic (Vargo and Lusch 2008), and collaboration in solving customers' problems (Cova and Salle 2008).

Although industrial companies acknowledge the importance of services, they struggle with the management of their solution offerings. Gaining profit by delivering complex solutions has proved to be quite a challenge (Tuli et al. 2007). Thus, re-constructing an offering when adopting a solution provider strategy can be problematic. The mindset of employees might be focused on specifications of their goods and price margins with almost zero customer collaboration in the development of new features (e.g., Cornet et al. 2000). Product managers focus on long maintenance intervals while service managers try to sell regular maintenance, which delivers mixed signals to customers. In addition to the sales personnel, the whole organization needs to understand the new, more service-based, business model and have a common mindset to enable coherent collaboration with customers (Ryyänen et al. 2012). In addition to their mindsets, solution providers are struggling to find a balance between unique offerings to changing customer needs (e.g., Prahalad and Ramaswamy 2004) and more standardized service operations. It seems to be challenging to construct a solution offering in a manner that supports the core business instead of being a burden. Several authors (e.g., Lefaix-Durand and Kozak 2010; Neely 2009) have pointed out the insufficient understanding on customer

perception of value. Hence, customer value components have to be understood (Klanac 2013).

To understand customers' needs and values, solution providers need to engage in close relationships with their customers. Tuli et al. (2007) regard solutions as relational processes between suppliers and customers. The solution-based business model (Storbacka 2011) changes a firm's offering from one based on selling goods with particular specifications to providing solutions that include several service elements which are co-created with customers. Industrial companies need to learn how to combine various elements into routines and methods of operation in the form of solution offerings (Davies et al. 2007). However, despite the growing literature base on business-to-business services and services in the context of solution business, Ulaga and Reinartz (2011) acknowledge a need for better categorization of services from a business perspective. Wikner and Andersson (2004) offer a more traditional conceptualization for a solution offering by including the elements of goods, services, and price versus benefits and sacrifices. Brax and Jonsson (2009) divided the solution offering structure into four components that comprise installed base, solution system platform, information offerings, and service components, which then are adapted and applied in customer specific conditions as a bundle or a customer solution. However, more context specific solution frameworks are called for (e.g., Nordin and Kowalkowski 2010), therefore, we argue that there is a gap for comprehensive conceptualization of a solution offering that includes different elements beyond traditional goods/services, especially in the context of industrial companies.

We focus on an examination of the development and role of various elements in an industrial solution provider's offering, henceforth termed *industrial solution offering*, by addressing the following research questions: 1) *What are the special characteristics of an industrial solution offering?*; 2) *What types of element should be included in an industrial solution offering?*; 3) *How should an industrial solution offering be managed?* The results contribute to the solution offering literature (e.g., Brax and Jonsson 2009; Nordin and Kowalkowski 2010) by identifying industrial companies' solution offering elements. By introducing categorized building blocks, our study will also help industrial managers to build value-adding customer-oriented industrial solution offerings. The study begins with an introduction to the relevant literature on the topics of solution business and the concept of offering in Chapters 2 and 3 respectively. Chapter 4 clarifies the research design issues. Our empirical case evidence and derived findings are presented in Chapter 5. Finally, Chapter 6 delivers answers to the research questions, and proposes avenues for future research.

Solution business and industrial companies – industrial solutions

Service-dominant logic (Vargo and Lusch 2004) has challenged traditional goods-dominant logic in the marketing literature with close cooperation relationships between supplier and customer (Lusch and Vargo 2006). This has led manufacturing companies to transform from goods to solution business, which has recently received increasing academic interest (Brax and Jonsson 2009; Davies et al. 2006; Jacob and

Ulaga 2008; Kindström et al. 2012; Salonen 2011). The extant literature contains several overlapping concepts that are employed to describe solution oriented business. These include integrated solutions (Brady et al. 2005), customer solutions (Tuli et al. 2007), value added solutions (Matthyssens and Vandenbempt 2008), servitization of manufacturing (Baines et al. 2009), product-service systems (Meier et al. 2010), performance based contracting (Hypko et al. 2010), and hybrid offerings (Ulaga and Reinartz 2011). The definition of a solution often includes customization and integration of goods and services to address a customer's business needs (e.g., Sawhney 2006).

In solution business, companies should focus on their customers' businesses by identifying their customers' latent needs (Matthing et al. 2004). Customers' sourcing of services has evolved to be more value-focused (Agndal et al. 2007). However, customers tend to have a different perception of value than suppliers (Lefaix-Durand and Kozak 2010). Furthermore, Tuli et al. (2007) acknowledge a disparity between the perceptions of both parties, and suggests that suppliers do not understand to the required degree their customers' business environments. Based on their findings, Tuli et al. (2007) propose a four phase relational solution process model: 1) customer requirements definition; 2) customization and integration of goods and/or services; 3) their deployment; 4) post deployment customer support. The model has been tested (Naudé et al. 2009) with the importance of relational aspects found to be accurate. Payne et al. (2008) define the relational processes as encounters which must aim to help a customer utilize better both its own and its supplier's resources. By understanding the relational nature of solutions, suppliers are able to deliver more effective solutions at profitable prices (Tuli et al. 2007). Through collaboration, a key characteristic in solution business, both supplier and customer co-create the solution and, thus, the customer value. Furthermore, solutions often provide cash flow over a long period of time due to fixed service agreements. In sum, we employ in our study the concept of *industrial solutions* that we define as follows: *An industrial solution is an ongoing relational process to satisfy a customer's particular business or operational requirements.*

The concept of offering in the solution business context

Ulaga and Reinartz (2011) argue that services need to be better categorized from a business perspective. Services are taking the leading role in creating customer perceived value, but there are only a few studies that examine which types of service are included in industrial solutions. There is evidence that services form the most important aspect of solutions as companies outsource production and the largest proportion of in-house activity is shifting towards service components (Davies et al. 2007). With this in mind, our focus is mainly on the service aspects of industrial solutions. In the following, we first draw from several literature streams to map the concept of offering in general, and then identify relevant elements for an industrial solution offering.

Offering concept

An offering comprises the elements through which a company can provide value for its customers. Examination of the various definitions for the concept of offering indicates that most authors agree on the obvious role of goods and services in an offering. However, depending on the context, there are a number of opinions regarding other elements of an offering that authors have suggested, such as technology, information, capabilities, financial elements, quality, benefits and sacrifices, risk sharing, and even brand image, to be included in an offering (see Table 1).

Table 1: Different concepts of an offering gathered from the literature

Offering elements	Context	Authors
Core, facilitating, supporting services surrounded by the service concept, accessibility of the service, interactions, and consumer participations	Service business. Augmented service offering (ASO), the role of technology, service marketing	(Grönroos 1987, 2000)
Goods, services, risk sharing and risk taking, access to or usage of systems or infrastructure, and information	Consumer business. Risk aspects	(Normann and Ramírez 1993)
Technological, legal/financial, and socio-political offering	Project marketing, creative offering with proactive anticipation	(Cova et al. 1994)
Product quality, salesperson, service and price	Partnering	(MacKenzie and Hardy 1996)
Goods, services, programs, or systems	Market offering. To add value or reduce cost	(Anderson and Narus 1999)
Goods/service attributes, relationship, and image	Customer value proposition	(Kaplan and Norton 2000)
Goods/services, information, resources, and capabilities	E-business	(Amit and Zott 2001)
Technical components, service elements, and financial components plus specifications and flexibility	Definition of project offer	(Cova et al. 2002)
Goods, service, price/cost	E-business	(Hedman and Kalling 2002)
Advice, goods, service, logistics, and adaptation	Business-to-business	(Ford et al. 2002)
Goods, services, price vs. benefits and sacrifices	Integrated solutions	(Wikner and Andersson 2004)
Installed base, solution system platform, information offerings, and service components	Integrated solution, manufacturing industry	(Brax and Jonsson 2009)
Industrial goods and services combined into innovative bundles	Hybrid offerings in business markets	(Shankar et al. 2009; Ulaga and Reinartz 2011)
Customization, integration, range, bundle, proactive/reactive, vertical/horizontal, and goods/business/partnership	Characteristics of solutions, the literature review	(Nordin and Kowalkowski 2010)

Offering in industrial solution business

The development and management of industrial solution offerings creates challenges for traditional industrial suppliers for three main reasons. *First*, suppliers are accustomed to tendering for customers' contracts within strict specifications. Frequently, this only leads to price competition between capable suppliers without determining the most valuable approach to satisfying a customer's need. *Second*, suppliers are not accustomed to adapting their offerings to create new solutions for customers. A supplier organization often has strictly defined internal roles, and collaboration between departments is not necessarily at a level capable of providing customized solutions (Ryynänen et al. 2012). *Third*, suppliers are not accustomed to collaborating with their customers at the level required to co-create something totally unique – an industrial solution (e.g., Tuli et al. 2007). Penttinen and Palmer (2007) suggest that, as companies are moving from basic offerings to more complex solutions, the form of buyer-seller interaction also changes from transactional to a relational relationship.

A supplier has to understand various customer value components when improving its offerings (Klanac 2013). Customer value has been categorized as having three value-drivers that comprise product-based, service-based, and relationship-based value (Eggert et al. 2006; Lapierre 2000). Hence, an industrial solution offering should communicate value for the customer through each of these components. Industrial solutions are often based mainly on specific technology/ies and, traditionally, the role of goods has been significant. However, while the goods are often a necessity, they rarely form the key competitive advantage. Ford et al. (2002, p.122) state that goods have no intrinsic value but are only a solution to a problem. It is the variety of services that differentiates business-to-business offerings (e.g., Ford et al. 2002; Stremersch et al. 2001).

Mainly due to their intangible nature, it is difficult to universally classify services. Boyt and Harvey (1997, p.294) noted the existence of many studies that attempt to classify services; however, "classification of industrial services has not received the same level of attention as has the categorization of consumer services." Although this notion is somewhat aged, the situation has remained the same (Ulaga and Reinartz 2011). In project business, there are numerous types of service implemented in various phases of a project life-cycle (Artto et al. 2008) that also apply to solutions. Artto et al. (2008) characterize project business services into before, during, or after delivery, according to the phase in which the service is employed. Van der Valk (2008) identifies four types of service on the basis of how the services are employed by a customer that comprise consumption, instrumental, semi-manufactured, and component services. These classifications are not built on the extensive relationship perspective but on goods-centric logic. However, Boyt and Harvey (1997) classify industrial services in three categories according to the extent of buyer-seller interaction. These categories are elementary service (e.g., telephone service), intermediate service (e.g., repair services), and intricate services (e.g., consulting). Although this classification includes the buyer-seller interaction, the complexity of solution business requires a more extensive relationship perspective.

Uлага and Reinartz (2011) classified industrial services for hybrid offerings by employing two dimensions: service recipient (good or process) and the nature of value proposition (input- or output-based). They recognized four types of service: Product life-cycle services (PLS), Process support services (PSS), Asset efficiency services (AES), and Process delegation services (PDS). PLSs and PSSs are individually performed services while AES and PDS are combinations of different service elements (Uлага and Reinartz 2011). For this reason, we are interested in the PLS and PSS categories. Oriented to the supplier's goods, PLS refers to services that help a customer to operate and maintain the supplier's machinery. Conversely, PSS orients to the customer's process by helping customers improve their business processes. Again, being relatively close to solution marketing, we reviewed also project marketing literature. Mathieu (2001) introduced two service categories within project business: service supporting the supplier's product (SSP) and service supporting the client's action in relation to the supplier's product (SSC). All of these categories concern the supplier and customer. However, complex industrial solution business involves often a network of actors. For this reason, Cova and Salle (2008) introduced an offering element termed services supporting the customer network action (SSCN). This category is less coherent and often polymorphous in nature. However, in networked offerings the supplier might need to provide services to third parties which justify the existence of SSCN.

The elements of goods- and service-based customer value have been discussed above. We also touched upon the third value-driver category: relationship-based value. When marketing full-service offerings, the two most important attributes for the buyer are total costs and performance (Stremersch et al. 2001). Customers are interested in, for example, how productive the solution is going to be – in process industries, customers usually demand a set of different test periods before the actual guarantee period commences. Although the solution might well surpass the customer's expectations, there is always a risk that something does not go as planned. Normann and Ramirez (1993) have included risk sharing and risk taking as a part of their offering concept. In complex environments such as project or solution business, risks are "inherent to any offering" (Normann 2001). While the management of risks is essential in project business, it also needs to be involved in an industrial solution offering.

Finally, the extent of a solution business offering is found to vary depending on the customer (e.g., Penttinen and Palmer 2007). This can be described as the continuum of completeness of an offering (Penttinen and Palmer 2007), whereby completeness is a concept to describe the extent to which a customer's problems/process are solved/controlled by the solution provider. Penttinen and Palmer (2007) also noted a continuum in the supplier-customer interactions from transactional to relational. In addition, it is worth mentioning that the needs of customers often evolve over time (see e.g., Burns et al. 2010)

Although solution business is described as a process (Tuli et al. 2007), we argue that an industrial solution offering still contains the elements needed to provide the customer the desired outcome. Based on our review of various offering concepts found in the extant literature, we propose that an industrial solution offering *is an entity comprising customized goods, services, collaboration, and finance needed to fulfill the industrial solution*. Next, we use our empirical evidence from two industrial companies that provide process technologies to complete our framework. We argue that by presenting a set of building blocks based on the extant literature and our empirical findings, and arguing their relevance in the solution business field, we can propose a comprehensive perspective on an industrial solution offering.

Research design

To gain an understanding on the relatively unexplored concept of an industrial solution offering, we adopted a classic case study approach (Dyer Jr. and Wilkins 1991; Yin 2009) by focusing in-depth on two case companies. The research problem, the formulation of an industrial solution offering, is a complex contemporary phenomenon that is best studied in its real-life context by the case study method (Yin 2009). Case study also provides the opportunity to move between data and theory to gain novel insights on the problem (Eisenhardt and Graebner 2007; Eisenhardt 1989).

According to Yin (2009), the selection of cases is critical in case study research, and the cases are selected because they are unusually revelatory, extreme exemplars, or opportunities for unusual research access. Dubois and Araujo (2007) claim that case selection is the most important methodological decision. We employed theoretical sampling (Eisenhardt and Graebner 2007) to carefully select the case companies. As the focal phenomenon in our research is the formulation and management of an industrial solution offering, it was important to find two case companies which are actually adopting a solution provider strategy. We employed literal replication, whereby cases are selected so that they predict similar results (Yin 2009). We revised the criteria employed by Kindström and Kowalkowski (2009) and selected three criteria for the selection of our case companies: 1) the company needed to have substantial manufacturing and solution business capabilities; 2) the company needed to have recently invested in its service development; 3) that aiming at customer solutions has been a strategic-level decision. Based on these criteria, we selected two case companies which operate in the same kind of business setting but differ to a large extent in size. The primary method for gathering the empirical data was open-ended interviews (Silverman 2006). To select appropriate interviewees (Halinen and Törnroos 2005), we used the snowballing technique (Biernacki and Waldorf 1981) by focusing on candidates with extensive experience on the service interface within the company.

We had a preconception on our case companies based on their participation in our then academic research project. However, this project provided us with exceptional access to real-life practicing management (cf. Gephart 2004). We began the present study with a review of the literature on offerings. When a preliminary understanding

had been obtained, we formulated a research interview framework that addressed the following issues: 1) the case company's role as a solution provider; 2) the development and creation of the case company's offering over time; 3) the role of services in an offering creation; 4) cooperation with customers in the offering creation phase. We used this interview framework with four interviewees from the first case company (spring 2008). We then analyzed the four interviews and decided to enhance our review of the literature according to our new empirical insights on the topic. After this, we continued to the second case company and conducted six interviews with more precise questions regarding cooperation with customers (spring 2009).

The interviewees from both companies had extensive work experience in their companies, and dealt with customers and company development on a daily basis (see Table 2). Many of the interviewees have also switched positions within their company and thus acquired experience and different perspectives on the organization. This was more pronounced at case company Clatec, where, for example, the chief communications officer has been in charge of many different sales areas and where, as the area manager, also held positions within production. This ensured that the interviewees had a comprehensive perspective on their business. Finally, having conducted ten interviews and gathered extensive secondary data, we were able to begin analyzing our data as a whole. Each interview was tape recorded and transcribed very carefully and field notes were written during the interviews.

Table 2: Interview description

Company and interviewee's title	Experience at the case company (years)	Interview length (minutes – pages)
Clatec, Area Manager, Sales	25	47 – 12
Clatec, Director, Sales	15	50 – 12
Clatec, Chief Communications Officer	27	54 – 12
Clatec, Director, Global Customer Support, Service	25	83 – 16
Metfi, Manager, Technology Sales	34	83 – 13
Metfi, Director, Services & After Sales	20	72 – 11
Metfi, Vice President, Business Unit	40	80 – 15
Metfi, Vice President, Business Development	34	77 – 15
Metfi, Vice President, Engineering, Projects and Services & After Sales	13	58 – 11
Metfi, Director, Services & After Sales	18	60 – 13
Sum	251	664 – 130
Average	25.1	66.4 – 13

The data were analyzed by employing qualitative content analysis (Silverman 2006), first by focusing on single companies to understand their offering development and then with a cross-case analysis to create the industrial solution offering

framework. While the main empirical insights were derived from the interviews, secondary data enabled us to fill the blank areas and better understand the business environment. We used personal notes written by the project researchers during two focus group interviews, two company specific workshops, and two seminars, as well as archive material and company documents (e.g., newsletters, market research reports, annual reports, CEO presentations, a company history book, circulars, brochures, web pages, and trade media articles). Also, during the research process, we used our research project access to companies to throw ideas at managers and gain their valuable feedback on the study topics. As such, we were able to employ multiple sources of data, which are typical of a case study approach (Eisenhardt 1989; Yin 2009).

Industrial solution offering

In this chapter, we review the empirical case material that addresses the development and current state of the case companies' offerings. Finally, we propose a framework for an industrial solution offering. We begin by describing the case companies' businesses. The main features of both case companies are shown in Table 3.

Table 3: Case company description

Feature	Clatec	Metfi
Business	Classification solution provider	Mining technology company
Employees	560	2,500
Net sales (2008, €M)	200	1,200
Growth rate (2003–2008)	Approx. 30%	Approx. 25%, service business 75%
Market position	Market leader in specific industry segments.	Market leader or niche player depending on the technology.
Competition	Few globally operating competitors and many smaller local or regional ones.	Highly competitive environment in which competition is consolidating. No direct competitors, but various competitors on different technologies.

Clatec is a classification solution provider which operates in global mining and chemical markets. With its roots in the 1960s, Clatec is a world leader in its niche business area. The company fulfills our criteria for case selection. It has recently adopted a solution provider strategy, and significantly increased the role of service elements in its business model. Solution offering is an essential part of the company's core activities. It has actively developed its offering to being a full service solution provider in every phase of its customers' business cycles.

Metfi is a mining technology company which delivers process technologies worldwide. The company's roots are established in the 1910s. Metfi offers technologies that address the whole chain of processing ores into pure metals. The company is divided into three divisions, each of which concentrates on a particular part of the process chain. Metfi's annual service business growth rate, 75 per cent, is due to the minor role that service has historically played in the company, and its top-level efforts to substantially develop service business. Metfi's sales vary from mere technology packages and equipment deliveries to large turnkey deliveries. Thus, Metfi also satisfies our case criteria.

Offering history and development in Clatec

Clatec's technology, especially in more complex applications, is top class and included basic after sales services as part of its offering from the outset. Soon the company added the planning of auxiliary equipment (e.g., pumps) to its offering, although not all of its deliveries include these auxiliaries. With spare parts and know-how, the company has been able to participate in its customers' processes after completion of machine delivery projects. The need for this after sales service, which has helped maintain customer relationships and collaboration, came from both the case company and its customers.

In the two industries in which Clatec operates, each customer's process materials are unique. Hence, Clatec's most important service has been the ability to test its equipment with its customer's actual process material. In the process technology industry, customers are highly concerned with the results and reliability of their processes. Tests enable Clatec to fine-tune the process machine, and also its customer's realization of what to expect from the machine after installation.

Clatec advocates lifetime value through long customer relationships in the form of service contracts. The typical life-cycle of Clatec's solutions is from 15 to 25 years, and the manufactured goods are only a small portion of the lifetime costs of the investment. Clatec's first operation contract began in a newly industrialized country. The customer corporation has nine sites, five of which are now operated by Clatec. Despite its customer's, especially site-level managers', doubts, Clatec managed to negotiate a pilot operation contract with corporate-level supply chain management. After seeing the results, the customer is now considering outsourcing more of its sites to Clatec. A large factor in this success has been mutual agreement and will. The case began with complete refurbishment of the application machinery utilizing original equipment manufacturer (OEM) spare parts. The operating staff was replaced, and the new personnel trained to meet the higher standards. One of the managers said:

"We fully upgraded the operating staff, which meant new local employees; nobody from the original operators was hired. The new employees were then fully trained and they receive partial bonuses based on the actual operating costs and reliability."

Also, the machines were updated with optimized operating parameters and regular maintenance. The regular cleaning and inspection of the machines improved the

process results. The most notable change is among the operating staff. As the service manager enthusiastically said:

“The change in labor force has led to the fact that in case of a breakdown in the process, instead of doing nothing like the old operators the new operating staff now runs to fix the problem ... Whenever we visit the site, the new operators have always kept the machinery in excellent condition by painting and cleaning it regularly. You even can read from their eyes how proud they are of the installation.”

In its progression to a solution based company, the next step from operating and maintenance service is to the so-called build-own-operate-transfer (BOOT, see Pekkarinen et al. 2012) contract, whereby the supplier plans, finances, builds, owns, operates, and, after a specified period, transfers the system to the funding entity. Various BOOT options have been planned by Clatec. However, the magnitude of the financial aspects and risks that relate to this type of business remain challenging for a relatively small supplier.

Although Clatec has always included basic service elements in its offering, the main emphasis has long been on its advanced technologies and goods. Partly due to separated sales and service functions, a part of the sales force still struggles to communicate effectively the service-based offering. Through acquisitions, in-house research and development, and organic growth, Clatec is now focused on becoming a solution provider. While the company retains many characteristics of a traditional equipment manufacturer, it aims increasingly to transform itself into a solution provider. Clatec's technological knowledge provides it with a unique position to understand its customers' classification processes. The company has also been developing various service offerings for quite some time. In a recent sales case, Clatec offered to establish a service agency near to the prospect customer if the deal was accepted. Top management has focused the company's strategic priority on more demanding customer solutions.

Clatec's current offering

Currently, Clatec has divided its services (see Table 4) into four dimensions that comprise spare parts, technical, modernization, and refurbishment services (labeled by Clatec). Based on our analysis of the data, we can draw two notions from Clatec's solution offering. *First*, although its technical service includes operation and maintenance service contracts, which can be considered complex services, the simplest mode of service comprising the delivery of spare parts is most profitable for the case company. *Second*, it seems that Clatec wants to emphasize process support services (PSS), as the majority of the services listed in Table 4 relate to the customer's process in general.

Table 4: Clatec's current service portfolio

Spare parts service	Technical service	Modernization service	Refurbishment service
Spare parts recommendations	Inspection services	Continuous goods improvement	Refurbishment of old machines for new applications
Spare parts deliveries	Maintenance services	Earlier classifier generation upgrades	
Warehouse planning support services	Repair services	Capacity expansions	
Cloth and component selections support	Annual overhaul services	Equipment relocation service	
	Remote support services	Documentation service	
	Training services		
	Consultation services		
	Operation services		

With regard to the extent of deliveries, as a minimum, Clatec only delivers standard main process machinery. At the other end of its offering continuum is a full service BOOT contract, which is constructed in close cooperation with the customer. Usually the deliveries fall somewhere between the extremes, which comprise the main classification machinery and added service elements, such as a maintenance contract. Thus, the offering must also be adaptive. As one interviewee stated:

“The business has to be adjusted according the customer needs. Certain customers buy standard goods without any consultative selling process ... In more advanced machinery solutions, the consultative selling process and collaboration is heavily present.”

Clatec also has services that support the customer network action (SSCN). In some customer cases, Clatec enters into a dialogue with environmental legislation authorities to gain a better position in the tendering phase or to make the investment possible at all. Clatec serves its customers by delivering evidence which proves that its solutions can outperform the regulations in terms of, for example, energy saving and the handling of hazardous materials. In future, Clatec expects that tightening environmental legislation will increase the demand for such services. Furthermore, Clatec delivers services that benefit both itself and the customer in a long-term relationship. The Clatec case provides evidence of this type of service:

“We added to our offering that if the deal is closed, we will establish a service depot near by the customer site with local trained staff to maintain the installation ... This would not have been added if the deal was small and, furthermore, if the deal breaks we will not establish the depot in that location ... This will help the customer to perform better with shorter maintenance breaks ... For us, this helps in closing the deal, but also in organizing the services needed and perhaps in opening up new markets.”

Currently, Clatec is involved in a couple of operation contracts, whereby the company is responsible for a classification plant. In many cases, the operating

agreements have led to improved performance and reliability, with lowered operating costs. These operation agreements also exclude (usually local) third party maintenance companies. Clatec would like to increase the number of operation agreements; however, currently there are shortages in the available local workforce.

Offering history and development in Metfi

Metfi has been a traditional technology supplier with strong technological capabilities for decades. At the same time, Metfi has somewhat neglected its service business potential. Its strong market position and technology leadership are based partly on several company acquisitions. Aided by its own research facilities, Metfi has extensively developed its technologies since the 1930s. This has secured its competitive advantage in technological skills. Metfi's various acquisitions have also provided support for the development of its offering.

Metfi has put effort into developing technologies instead of manufacturing its own equipment, and began selling technology licenses to other mining companies in the 1950s. At that time, the offering included licenses and also some types of basic engineering and design schemes. These basic licensing contracts no longer exist. Later, Metfi developed its own proprietary equipment and offered technology transfers in addition to simply supplying equipment. Usually the technology transfer package contains know-how in the form of the license, basic design schemes, proprietary equipment, supervision, and startup support. The offerings are normally modular in nature; the key point being that the concept design comes from Metfi. Depending on the division and technology, there might be various equipment alternatives from which to choose.

The customer's role in the offering development is not distinct. Every interviewee raised the importance of knowing the customer process and listening to the customer, but omitted to explain the customer's role. Nonetheless, solving the problems and challenges faced by customers with the help of Metfi's own research will gradually develop Metfi's offering. Another issue is that usually the raw materials for which the equipment must be tailored differ from customer to customer. This dissimilarity forces Metfi to offer customized solutions according to each customer's characteristics. It also means that customers contact Metfi at quite an early stage in their investment projects, which provides time for co-creation of the offerings. A comment by an interviewee describes differences in customer needs:

"The problems occur in customer's process and then it is our duty to find the solution and do it so that it can be copied through several customers using the same process equipment."

Currently, the most central parts of Metfi's services business comprise shutdown maintenance services, plant and equipment maintenance, and component services. However, in specific parts of the organization, service contracts are perceived as a secondary source of revenue, and often the price only covers the costs. Offering spare

and wear part packages within the project contract for one product line has come closest to the provision of service contracts. As stated by an interviewee:

“When I joined the team in 2006, we made a list of all spare and wear parts we could think of, and the customer bought it, the whole list, when he bought the solution ... We know, that whenever a customer buys some equipment, he always has five to ten per cent budget for spares. But if you do not sell the whole package at once, the money will be gone in a year or two.”

In addition to the customer's opinion and raw material characteristics, the customer's own know-how also influences its behavior and needs. Customers with multiple sites and long experience are keen to acquire only the minimum delivery from Metfi. At the other extreme, newcomers such as junior companies are keen to obtain different types of supervision and maintenance services. There are profitable ongoing service contracts, which can vary from two or three years in length to continuous deals. Usually, these include predefined visits to the site and basic maintenance. Alongside the closer customer relationship, a major benefit is that Metfi can anticipate its customer's needs and offer, for example, modernization services. However, a conservative opinion in some customer industries has been against entering into service contracts. As an interviewee stated:

“Traditionally the industry has been conservative and the customers have not seen the benefits from outsourced service ... Previously when Metfi's parent company had their own production facilities, the customers contacted these units directly and that was considered (good will) service ... Currently, we have a few customer support contracts, which run on their own in terms of profit, but can open up new technology deals if a customer need is noticed.”

Similar to Clatec, Metfi also has always possessed service elements in its offering, namely design services, while the main emphasis has long been on its advanced technologies. The development path seems to follow that of Clatec in some key aspects such as acquisitions, in-house research, and organic growth. Metfi has long perceived its goods as solutions; however, in comparison to the solution business concept, the focus seems to have been on closing single deals instead of focusing on relationships. Recently, the company has set ambitious growth targets for service, which forms a clear need to develop its solution offering. Currently, while delivery sizes have grown, the direction is more to product life-cycle models, including service contracts. Optimization services and environmental updates are the top priority among Metfi's customers, while outsourcing of maintenance also has become more common.

Metfi's current offering composition

Metfi's three divisions focus on different customer industries. In general, the first division concentrates on equipment sales, the second specializes in technology transfer, and the third has extensive know-how in lump sum turnkey projects. Metfi has categorized its service portfolio under the following four labels (see Table 5): component services, expert services, equipment and plant upgrade services, and operation and maintenance. From these, spare parts and modernizations are the most important sources of revenue. Similar to the Clatec case, the majority of the listed services can be described as process support services (PSS) that relate to the

customer's process in general; however, there are some differences. According to the interviewees, the utilization of this service portfolio depends heavily on the division, and thus, the markets. For example, a recent acquisition of a maintenance-specialized service company has strengthened the potential for offering maintenance contracts to one division's customers. In another division, seven service structures have been developed.

There are also services recognizable in the Metfi case that support customer network action (SSCN). Junior customer companies with no notable business history can utilize Metfi's reputation as a well-known supplier when they need to convince financiers of their project's viability. Thus, Metfi indirectly influences its customer's network by agreeing to participate in a particular *"letter of understanding"* document. Furthermore, every three years, Metfi holds specially organized conferences for its customers, at which they can share information with Metfi regarding their business challenges. These conferences provide Metfi with accurate insights on possible development needs faced by its customers in everyday operations. In addition to the development needs, Metfi can also identify rumors concerning new actors and projects in the industry during informal conversations. The forum also helps to sell new technology to existing customers because of other customers' self-presented success stories, thereby offering information on technological possibilities for customers, and benefiting both Metfi and its customers. The importance of these conferences was emphasized by an interviewee:

"The conferences are a good forum; our customers meet each other and chat about their problems, and this is sometimes a good thing because once a customer realizes he is having a problem, we can offer him a solution."

Table 5: Metfi's current service portfolio

Component services	Expert services	Equipment and plant upgrade services	Operation and maintenance
Spare and wear parts	Plant audits	Process and equipment optimization	Preventive maintenance
Component repair services	Plant and equipment inspections	Plant modernization	Operational maintenance
Stock management	Operation consultation Startup support Training Research and analysis services	Installation and startup services	Operation and maintenance training

A topical issue in Metfi's agenda was the commercialization of service concepts to enhance and widen its offering. Taking account of Metfi's customer industries, a solution cannot be predefined and structured from goods designed at its headquarters.

However, there must be particular, readily specified but flexible service structures. The final offer, or solution, is then co-created with a customer on the basis of these structures to match specific customer needs. An interviewee provided an apt metaphor:

"It is like when you are coaching children in sport, everyone is unique and you have to address your directions accordingly. The same goes for organizations and geographical areas."

One of the main factors that slows down the development of services might be the mindsets of Metfi's employees. The service organization is divided into the three divisions, which have some communication differences. For example, the idea of product life-cycle management has been understood rather differently:

"It is hard to understand or concretize what the product life-cycle means ... I once asked my colleagues what is the life-cycle in our business. The answers related merely to the delivery and startup phases of the project ... No one thought of the possibilities of long-term contracts."

This reflects the old manner of regarding technology as the focal offering element. Similar to its customers, some of Metfi's own personnel also think that technology is their key competitive advantage, and that services are not worth developing:

"Why do we need it (service business) now, we have not needed it before?"

Nowadays, lump sum turnkey projects also form part of Metfi's offering. These are heavily networked projects, in which Metfi takes the lead and supplies core equipment. The size of the average deal has grown significantly, which can be attributed to the numerous consolidations being experienced by its customers. As with Clatec, there have been some enquiries concerning even more comprehensive solutions with a heavy financial focus; for example, full service BOOT projects. However, instead of developing BOOT projects, Metfi perceives growth opportunities especially by developing comprehensive service agreements, improving production efficiency and spare parts deliveries, modernizing work, training, and researching and testing services together with their customers. However, a challenge remains for Metfi as the majority of its customers are not accustomed to purchasing service contracts. Next, we proceed to draw the case evidence together and propose an industrial solution offering framework for solution providers.

Case synthesis

Our synthesis of the offering analysis on both case companies is presented in Table 6. It can be seen that, while the case companies differ from each other, and quite substantially in terms of size, the cases demonstrate many similarities. However, it seems that the smaller and more agile Clatec has had more short term success in becoming a solution provider. Clatec also has a more extensive background concerning service elements, and thus its employees have a particular service mindset that is partly lacking from the personnel at Metfi.

Table 6: A comparison between the case companies' development from goods-driven to solution business

Feature	CLATEC	METFI
Company setup	Focus on classification by employing various technics with a separate service organization. Two different customer industries: mining and chemical.	Three different divisions, each with a service function. Customers from mining industry with different positions in the value chain.
Sales process	Up to two years. Consultative approach to find the best solutions for customers. Unified image throughout the company to customers.	Up to three years. Delivers information on new possibilities regarding a customer's processes.
Contract values	€2–3 million each.	€3–300 million each.
Reasons behind solution development	Long service traditions; customer demand for service contracts; company set service growth targets.	Recent huge growth in service; strategic choice by the company, solving customers' problems and challenges.
Customer role in solution development	Usually closely with customers, mainly customer-driven. New types of service developed in collaboration with customers.	Depending heavily on the customer, mainly company-driven. New types of service developed in collaboration with customers.
Solution completeness	Delivers wide range from plain machinery to BOOT solutions.	Fulfills different needs, ranging from solely delivering goods to solutions.
Goods elements	Some alternative technologies, mainly adapting for each customer.	Several alternative technologies from which to choose.
Service elements	Delivers 19 basic service elements (PLS+PSS). Unique testing, whereby the technology is tested with customer's material. Environmental-related services that affect the customer's network (SSCN). Mutual benefits from service depot agreements.	Offers 15 basic service elements (PLS+PSS). Consultancy service, whereby company experts are provided to customers to analyze and develop further their processes. A role as a trusted supplier to influence customer's network (SSCN). Holds conferences at which mutual learning is emphasized.
Financial elements	Normal pricing. Benefit and risk sharing has a minor role, usually emphasizing risk sharing. BOOT model under consideration.	Normal pricing. Benefit and risk sharing has a minor role, difficulties in guiding customers' mind sets towards benefit sharing
Relational elements	Depends on the customer, from transactional to collaborative relationships. Reactive vs. proactive approach depends on the customer.	Depends on the customer, from transactional to collaborative relationships. Moving from reactive to proactive approach.

During our analysis, we were able to recognize two main issues regarding the development of an industrial solution offering. First, the case companies face a relatively heterogenic customer base in respect of their willingness to acquire complete

industrial solutions. Customers have a variety of needs; however, according to our evidence, this is also a customer's mindset issue. While some customers are demanding transactional offerings, others are willing to build a deep relationship and develop the offering together with the supplier. Although demand for fully operated solutions is steadily rising, not all customers are willing to relinquish control of their operations to an industrial solution provider. Thus, there seems to be a demand for various levels of completeness as well as customer/supplier integration in an industrial solution offering. Second, it seems that customers' needs are constantly evolving; therefore, suppliers need to be flexible in their operations, especially with regard to their service elements. An equipment provider can no longer trust somewhat static technological advantages to continually win in the ever-tightening business environment. New methods of operation have to be developed constantly, which means that suppliers must be able to flexibly adjust their offerings. This synthesis leads us to propose a new framework for industrial solution offerings.

Dynamic industrial solution offering framework

Based on our empirical evidence, we propose a framework for a *dynamic industrial solution offering* (DISO) in the context of an industrial solution business, depicted in Fig. 1. We argue that an industrial solution offering has two special characteristics: dynamism and completeness. First, the dynamic nature of the offering is derived from the ability for change within an offering. In industrial solution business, customers' problems are the main driver for the offering development. Our empirical cases have shown that, to provide additional value for the customer, an industrial solution provider needs to adapt to each customer case individually, which means that the offering also needs to be adaptive; that is, dynamic. Second, it is important to include the offering completeness in our framework. Completeness describes the extent to which a customer's problems/process are solved/controlled by the solution provider (Penttinen and Palmer 2007). The less complete (usually transactional) solutions include merely standardized goods and supporting services (PLS, PSS), which require less collaboration between the supplier and its customer. At the other extreme, companies are providing relational solutions to their customers, whereby a supplier takes responsibility of a particular process of its customer and, therefore, the completeness of an offering is at a high level. For example, Clatec plans to provide its customers with full-service BOOT contracts, which can be seen as a complete relational industrial offering. In these contracts, Clatec will take responsibility for planning, financing, building, owning, and operating its customer's classifier plant. Currently, the magnitude of the financial aspects and risks that relate to this type of business remain a challenge for a relatively small supplier. Being a considerably larger company, Metfi might possess adequate resources for BOOT contracts. However, the development of Metfi's whole service ideology is still in too early a phase.

In addition to characteristics of dynamism and completeness, the proposed *dynamic industrial solution offering* framework comprises three elements: relational, financial, and performance (i.e., goods and services). Based on the evidence, we propose relational elements to be part of the offering. By relational elements we mean

supplier/customer collaboration that, in the case companies, differs from pure transactional deals to relational collaborative partnerships. At the other extreme, an industrial solution provider might need the tools to service a customer in a purely transactional way. For example, some customers order products from catalogues with only minimal supplier collaboration. Alternatively, and in accordance with the relational solution perspective, a supplier has to have methods for more collaborative customer interface. Hence, we propose that in a relational solution, both customer and supplier co-create the offering, whereas with some other customers, suppliers deliver transactional business.

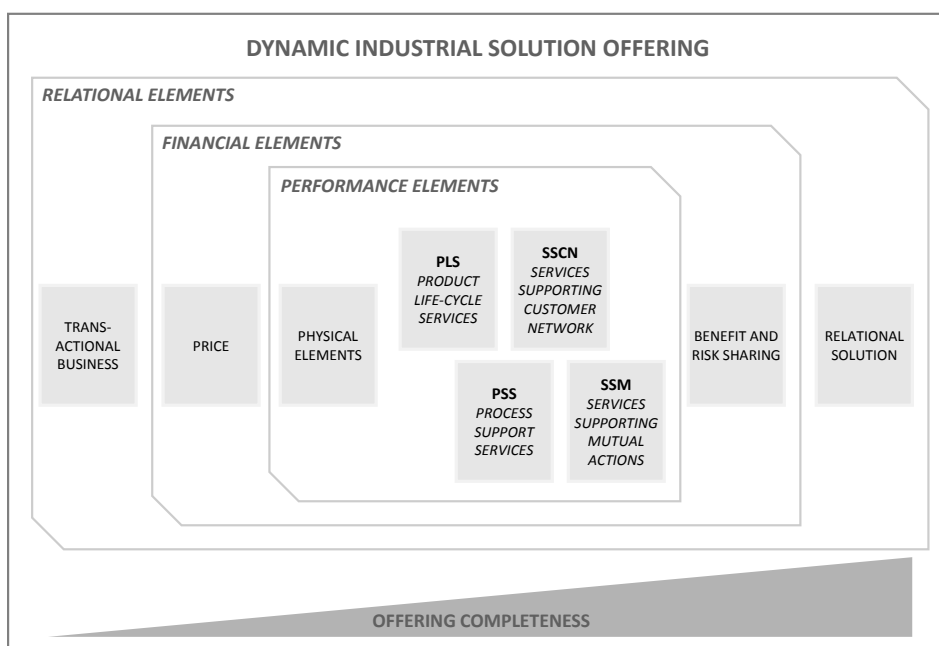


Fig. 1: Framework for a dynamic industrial solution offering (DISO) based on the case evidence and modified elements from the extant literature (Cova and Salle 2008; Normann and Ramírez 1993; Penttinen and Palmer 2007; Ulaga and Reinartz 2011)

With regard to the financial aspects, we argue that financial issues are in the central of industrial solution business. For example, the demand for BOOT business model that Clatec has been developing has derived from smaller customers that possess enough natural resources for mining operations but does not have the needed funding to invest on a large scale factory. In our framework, we included two financial elements. First, every solution has a price. Price is a more decisive factor when the solution concerns simple goods or goods/service combinations. The more a supplier participates in its customer's process, the more complete the offering and the greater the need for alternative financial arrangements. Here, an interesting issue is whether or not to share risks and benefits. When Clatec takes responsibility for the operation of a particular customer's classifier plant, the pricing is usually arranged in

accordance with a dollar per ton principle. Here, the benefit and risk sharing element can be utilized by setting specific targets for process outcomes in conjunction with the customer. Depending on the process outcome, the supplier might receive an agreed share as a bonus or participate in potential realized risks. Our case evidence also supports this element in the Metfi case; however, considering their current offering, the time has not yet arrived for these conversations. The inability to calculate the upper and lower limits, and capacity in manpower, are two critical aspects of such deals. Furthermore, customers have not been ready to adapt to such a different logic of earnings.

Performance elements are those that develop the performance of a solution, comprising both goods and services. Goods are the machinery included in the industrial solution offering, usually proprietary and auxiliary equipment. Services can be divided further into four categories, of which the first three are recognized in the extant literature. The simplest services are product life-cycle services (PLS, see Ulaga and Reinartz 2011), which relate closely to the goods. In the case companies, PLS are, for example, spare parts, maintenance, and installation services. These types of service are standard in nature and are applied very often as a component of deliveries. More sophisticated process support services (PSS, see Ulaga and Reinartz 2011) include, for example, employee training and consultation services, and demand more collaboration during the offering creation and customer relationship. Further examples of PLS and PSS services can be found in Table 4 and Table 5. The services that focus on a customer's network are termed services supporting the customer network action (SSCN, see Cova and Salle 2008). We found evidence of this in both case companies: environmental-related services from Clatec and a type of certificates of trust given by Metfi to junior companies.

As a new service element, we have recognized a fourth service category: services supporting mutual action (SSM). We propose that SSM's include supplier actions that will benefit both supplier and customer in a long-term relationship. Examples of these include service depot agreements (Clatec) and industry wide conferences (Metfi). In the service depot case, the company agreed to establish a service depot near the customer if the customer accepted their offer, which happened. Thus, Clatec gained access to new markets surrounding the newly established service depot, and the customer reduced downtime in cases of sudden breakdown. In the case of Metfi, the organized conferences provide a venue for networking with its customers. The benefits for Metfi are mainly based on knowledge they receive concerning various customer problems and possible future investments, while the customers can learn both from their peers and new technologies presented by Metfi and other customers. We see that the service elements presented in the literature have mainly focused customer benefits but, considering the relational nature of industrial solutions, we put forward the fourth element, SSM, to complement the categorization of different service elements by focusing on mutual benefits to both customer and supplier.

Conclusions

Our study shows that the provision of industrial solutions is not an easy task for industrial companies that have worked for years with a fundamentally different goods-oriented mindset. However, it is evident that the case companies are willing to invest and change their modes of operation to provide industrial solutions. The results of our study contribute to the solution offering literature (e.g., Brax and Jonsson 2009; Nordin and Kowalkowski 2010) by formulating an industrial solution offering and developing its management within industrial companies. In the following, our research questions are revisited. We conclude our study with managerial implications, limitations of the study, and directions for future research.

Our first research question was **“What are the special characteristics of an industrial solution offering?”** Based on our analysis, an industrial solution offering has two special characteristics that need to be assimilated by the supplier: dynamism and completeness. *First*, we learnt that the nature of an industrial solution business offering is largely dynamic and agile. Solution providers must have the ability to seek and grasp new business opportunities provided by their customers' businesses. For this reason, we termed our framework *“dynamic industrial solution offering”*. While the core idea in solution business is to offer specific customized solutions, the supplier must be able to adapt to an ever growing mass of different customer needs, by adding the needed new elements to the offering ad hoc.

Second, the offering needs to be adaptive regarding to how complete it is for each customer. Our exploratory results, as well as the extant literature (Penttinen and Palmer 2007), support the existence of a continuum from less to more complete solutions, depending on the customer's need and will. The more a supplier takes control and responsibility over a customer's process, the more complete the offering. As such, it is important that a solution supplier is able to serve both ends of the continuum, again, depending on its customer's characteristics. For these two reasons, the offering itself should have a basic set of building blocks that can be employed to create a customized solution for a variety of customer needs. Next, we will describe these building blocks in more detail.

The second research question was **“What types of element should be included in an industrial solution offering?”** Based on the literature and insights derived from our case evidence, we propose that our *dynamic industrial solution offering* (DISO) comprises three elements: *relational, financial, and performance (i.e., goods and services)*. *First*, the *relational* element addresses the extent of collaboration with customers. A solution provider can adopt either a transactional role (i.e., usually goods-based, low offering completeness) or a collaborative role (i.e., controlling customers' processes, high offering completeness) in the creation of a solution. The relational element dictates that an industrial solution provider needs to be organized so that it can serve both a transactional-type customers as well as partnership-type customers.

Second, the *financial* elements include price as well as benefit and risk sharing. When addressing a more transactional offer, the price element is most likely to be employed. But if the offer is more complete, more advanced financial elements can be employed, such as benefit and risk sharing (Normann and Ramírez 1993). This reflects novel possibilities in earnings logic for suppliers as they pursue longer lasting customer relationships and steadier cash flows. However, while supported in the solution literature (e.g., Sawhney 2006), our case evidence shows that sharing especially the benefits needs still to overcome several obstacles, such as appropriate measurement of performance levels and overall trust issues within partnerships.

Performance elements are the building blocks of solutions. Performance elements include goods, which are the supplied machinery, as well as different types of services. We recognized the existence of the literature based product life-cycle services (PLS, see Ulaga and Reinartz 2011), process support services (PSS, see Ulaga and Reinartz 2011), and services supporting the customer network action (SSCN, see Cova and Salle 2008). Unseen in the extant literature, we argue that there is also a fourth service category. We propose that services supporting mutual action (SSM) include supplier actions that will benefit both the supplier and its customer in a long-term relationship. SSMs are a result of co-creating the offering, as they deliver additional value to both parties in the long run. Examples of these include service depot agreements (Clatec) and industry wide conferences (Metfi). Together, three elements presented above form our proposed DISO framework (see Fig. 1). However, if not managed properly, these elements are not enough by themselves to create a successful service business.

The last and more managerial research question was “**How should an industrial solution offering be managed?**” We identified four issues to help manage industrial solution offerings. *First*, solution providers need to *collaborate* with their customers. Close communication and mutual trust with a customer is necessary when aiming to benefit sharing agreements. This cannot be achieved without extensive collaboration on and co-creation of the solution. However, there seems to be a demand for various levels of completeness in an industrial solution offering, which industrial providers need to understand. While collaboration is often required, there is no point in allocating resources to it if collaboration is not appreciated by a customer.

Second, we found evidence that understanding the customer and its process is vital for the delivery of profitable solutions. In other words, solution providers need to adopt *customer oriented* mindsets. Furthermore, understanding the process is not always sufficient – a solution provider should understand its customer’s business as well as what its customer’s customers’ value. The logic of solution business differs greatly from traditional industrial companies’ goods-based business. By enabling different ideas and embedding a new service-based mindset, solution providers can succeed in finding new markets and a competitive advantage within them. Providing solutions requires out-of-the-box thinking to develop new methods of creating value for customers while maintaining a viable business model. For example, although case company Clatec has actively developed its offering to a service orientation and has

relied for decades on customer-orientation, it seems that the development of its industrial solution offering should be co-created even more extensively with customers, which seems to echo their goods-centric starting point.

Third, solution suppliers need to have a *service-driven organization*. Services constitute an increasing proportion of turnover, and profitable management of intangible services globally requires significant effort. In this, there are many risks to be addressed, such as how to resource human-based service operations, how to tackle global distances while promising acceptable response times, and how to manage incentives. Clatec organized its service function as a separate service business unit. Metfi divided its service functions across three separate divisions, and thus benefits from closer internal relationships between equipment sales and service. However, it seems that Clatec's organization has progressed further with regard to its solution mindset. Clearly, company size differences affect the efficiency of different organizational formats.

Finally, we present our thoughts on limitations and future research agendas. Our study concentrates on an industrial solution offering in solution business by deriving empirical insights from two case companies. Although case research provides deep access and understanding on the studied phenomenon, it also has shortcomings. The results are entirely based on the case companies, and their suitability within other environments cannot be guaranteed. Furthermore, the case companies represent similar settings; they both operate in the mining industry and both are building their business on their existing base. Thus, the results are heavily context bound. However, when analyzing the empirical data, we have endeavored to deliver fresh insights on the solution business literature by proposing our framework for a dynamic industrial solution offering. We have focused on defining an industrial solution offering, and left the notions concerning profitability and communication to future research agendas. Also, we focus here on theory construction rather than theory testing. This leaves a gap for testing and possibly refining the proposed dynamic industrial solution offering framework with multiple cases or a survey study. Further studies should be conducted to obtain more empirical evidence and support for our framework, especially for the new SSM element. Furthermore, an interesting avenue will be to analyze how company size relates to the success of a solution business. For example, are smaller, perhaps more agile, companies better suited to this resource intensive industrial solution business than bigger players? To conclude, for an industrial solution provider facing ruthless global competition, the management of solution business seems to be a harsh but rewarding approach to securing profitable sales instead of dumping prices.

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BOOT business model in industrial solution business

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BOOT business model in industrial solution business

Olli Pekkarinen*, Markus Piironen and
Risto T. Salminen

Department of Industrial Management,
Lappeenranta University of Technology,
P.O. Box 20,
Lappeenranta 53851, Finland
E-mail: olli.pekkarinen@lut.fi
E-mail: m_piironen@hotmail.com
E-mail: risto.salminen@lut.fi

*Corresponding author

Abstract: Many industrial manufacturers are transforming their business models towards long-term customer solutions. An extensive option to implement solution business is a build-own-operate-transfer (BOOT) business model, where a company is given the responsibility to design, finance, build, own, operate and maintain an entity, such as an industrial process. Usually, the arrangement is made for a specific time period of up to 30 years and between public and private actors. The purpose of the present study is to provide knowledge on utilising the BOOT business model in an industrial context. The methodologies used in the study were a literature review and a single case study. This paper introduces an industrial BOOT business model and determines the advantages, disadvantages and risks of an industrial BOOT solution. Furthermore, this paper proposes a description of the BOOT consortium. Based on the results, we suggest that the BOOT business model can be adapted for an industrial context.

Keywords: customer solutions; solution business; PPPs; public-private partnerships; BOOT; build-own-operate-transfer; business model; business innovation; service business; industrial marketing; industrial service.

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Biographical notes: Olli Pekkarinen is currently working as a Doctoral Student in the Department of Industrial Management at Lappeenranta University of Technology, Finland. His main areas of expertise include industrial marketing, customer cooperation, service-based business models and solution business.

Markus Piironen is currently working as a Sales Manager at a privately owned company. His current tasks include business-to-business sales and key account management. Previously, he worked as a Research Assistant in the Department of Industrial Management at Lappeenranta University of Technology, Finland. His research focuses on industrial service, especially the BOOT business model.

Risto T. Salminen is a Professor of Industrial Marketing in the Department of Industrial Management at Lappeenranta University of Technology, Finland. His main research interests include project and solution business, customer references, industrial business relationships and networks and pedagogy in industrial management. His publications appear in *Industrial Marketing Management*, *Journal of Business-to-Business Marketing*, *Journal of Business and Industrial Marketing*, *Journal of the Academy of Marketing Science*, *European Journal of Engineering Education*, etc.

1 Introduction

The role of service has become a major issue in industrial transactions (Ahonen et al., 2010; Stremersch et al., 2001; Vargo and Lusch, 2004). Companies are utilising more service-oriented business models to overcome discontinuity between projects – one of the traditional project business characteristics represented within the discontinuity-uniqueness-complexity model by Mandják and Veres (1998). Besides reducing fluctuation and unpredictability in customer relationships, service contracts also enable more efficient use of supplier capacity (Ojasalo and Ojasalo, 2008). As a result, more companies are transforming their operations from separate products and services to capacity-based offerings (e.g. Brax and Jonsson, 2009; Cohen et al., 2006). The existing literature offers a wide range of different concepts describing these new kinds of offering, such as product-service systems (Meier et al., 2010), servitisation of manufacturing (Baines et al., 2009) and performance-based contracting (Hypko et al., 2010). However, combining products and services to produce unique value for the customer is widely recognised as solution business (Nordin and Kowalkowski, 2010; Tuli et al., 2007).

Solution business, described as ‘customer’, ‘integrated’, ‘business’ or ‘total’ solutions, has recently attracted increasing interest in academia (e.g. Nordin and Kowalkowski, 2010). Customer solutions are often heavily cocreated (Payne et al., 2008) and linked to the ability to create ‘unique value’ (Davies et al., 2006; Miller et al., 2002). In academia, it is often agreed that customer value means the trade-off between all benefits and costs delivered by an offering throughout its lifetime (e.g. Blocker, 2011). However, in practice, perceptions of value often vary between customers and suppliers (e.g. Corsaro and Snehota, 2010). While understanding customer value is vital to business suppliers (e.g. Ulaga, 2011), the present study concentrates on a particular type of solution offering through its business model and value creation logic.

The present study focuses on describing a solution business model originating from the public–private partnership (PPP) literature (e.g. Cova and Salle, 2011; Grimsey and Lewis, 2002; Hodge et al., 2010). PPP projects have mainly been used to construct and manage public sector infrastructure projects (Jefferies et al., 2002), such as the cross-harbour tunnel in Hong Kong (Tam, 1999) or the Larnaca desalination plant (Bartels et al., 2008). Furthermore, while studies on PPPs have often employed case evidence from developing countries (Ariguzo et al., 2007; Chen and Doloi, 2008; Kumaraswamy and Zhang, 2001; Shrestha, 2011; Yang et al., 2010), PPPs can also be used in developed countries (Papajohn et al., 2011). According to the US General Accounting Office (1999), there are 14 different types of PPP. We focus on a specific type of PPP from the solution supplier perspective in the industrial context: a business model based on build,

own, operate and transfer (BOOT) actions. The main idea behind the BOOT business model is that a group of private actors finance, build, own and operate an installation which can be transferred to the customer after a specified period (Murtoaro, 2006).

Although there are a few studies on PPPs, it seems that the BOOT business model has not been thoroughly discussed within the industrial context. Our study contributes to this research gap by expanding the knowledge on the BOOT business model in the industrial solutions context. The research questions are:

- 1 'What is the role and significance of the BOOT business model in the industrial context?'
- 2 'What are the advantages, disadvantages and risks related to industrial BOOT?'
- 3 'How can the BOOT business model be implemented and orchestrated within the industrial context?'

The first research question is answered via a literature review, while the second and third questions benefit from empirical case evidence. The study begins with an introduction to the relevant literature on the topics of solution business, business models and PPPs. Then the methodological issues of the case study are presented. Next, with the help of the obtained empirical case data, the characteristics of an industrial BOOT model will be explained. Finally, based on the literature review and findings from the case study, a model for an industrial BOOT network is proposed. The results are summarised in Section 6 together with highlights of the key findings.

2 Solutions as business models

First, we start with a brief discussion on solution business, followed by the introduction of relevant business model frameworks. The transformation of supplier offerings from products to solutions has recently attracted increasing academic interest (e.g. Brax and Jonsson, 2009; Nordin and Kowalkowski, 2010; Salonen, 2011). Solution business differs largely from the traditional product led business models and, to deliver unique value for their customers (e.g. Ballantyne et al., 2011), companies are transforming their businesses from meeting customer needs to identify their latent needs or creating their needs. Preliminary research also suggests that the value provided by customer solutions varies depending on contextual conditions (Worm et al., 2009). While companies need to actively develop innovative (e.g. Czuchry et al., 2009) business models to provide new value for their customers (Chesbrough, 2010), a solution business model has only lately interested scholars (e.g. Storbacka, 2011). With an effective business model, solution business can provide a competitive advantage in global markets when competing against price cuts.

Large industrial capital investment projects are usually based on a physical product, e.g. a paper machine. While the required services can be purchased separately (e.g. Ahonen et al., 2010), solution business emerges when numerous service elements are implemented in various phases of the project life cycle (Artto et al., 2007). While these services are the most important constituent of solutions as companies outsource production (Davies et al., 2007), the concept of solution has a variety of definitions (see Nordin and Kowalkowski, 2010). Several overlapping solution-related concepts exist in the literature including customer solutions (e.g. Tuli et al., 2007), value added solutions

(e.g. Matthyssens and Vandenbempt, 2008), full service contracts (Stremersch et al., 2001) and integrated solutions (e.g. Brady et al., 2005). We define the term solution as, according to Stremersch et al. (2001), a 'unique combination of numerous elements which will contribute to producing value for the customer' with the solution provider being 'a supplier of complex offerings, delivering value for the customer in close cooperation with the customer'. Solutions can vary in their completeness. The more complete a solution, the more the supplier controls the customer's business (Penttinen and Palmer, 2007). However, the more complete a solution, the greater the knowledge needed to utilise such a business model (Rhyne, 2009). Hence, solution providers require the ability to acquire new skills and having efficient learning capabilities can enhance the profitability of the company (e.g. Kortelainen et al., 2011).

These conceptualisations emphasise the nature of solution through its different elements. However, according to Tuli et al. (2007), customers tend to view solutions as ongoing relational processes in the buyer–seller relationship. Hence, in addition to the variety of exchanged products and services, providing customer solutions also requires constant interaction and reciprocal adaptation (Tuli et al., 2007; Windahl and Lakemond, 2010). Payne et al. (2008) refer to these relational processes as encounters which must aim to help the customer better to utilise their own and the supplier's resources. Therefore, it can be seen that strong relationships and cooperation have high relevance in solution business.

The business model literature has been booming for less than a decade. As with the solution concept, various definitions for the concept exists (e.g. Hedman and Kalling, 2002). One of the most cited concepts is by Osterwalder et al. (2005), who present nine business model building blocks:

- 1 value proposition
- 2 target customer
- 3 distribution channel
- 4 relationship
- 5 value configuration
- 6 core competency
- 7 partner network
- 8 cost structure
- 9 revenue model.

Palo and Tähtinen (2011) studied networked service business models and argue that the central elements are service and customers. They also emphasise the dynamic nature of the networked business model. Regarding service-based business models, Kindström (2010) elaborated on Chesbrough's (2007) framework and utilises the following elements:

- 1 value proposition
- 2 revenue mechanisms
- 3 value chain

- 4 value network
- 5 competitive strategy
- 6 target market.

On solution-specific business models, Kujala et al. (2010) concentrate on six very similar business model elements. However, compared to the Kindström's (2010) model, they reference supplier's capabilities instead of value chain. Furthermore, Storbacka (2011) identifies the following three central aspects:

- 1 process point of view
- 2 cross-functionality
- 3 solution-specific capabilities.

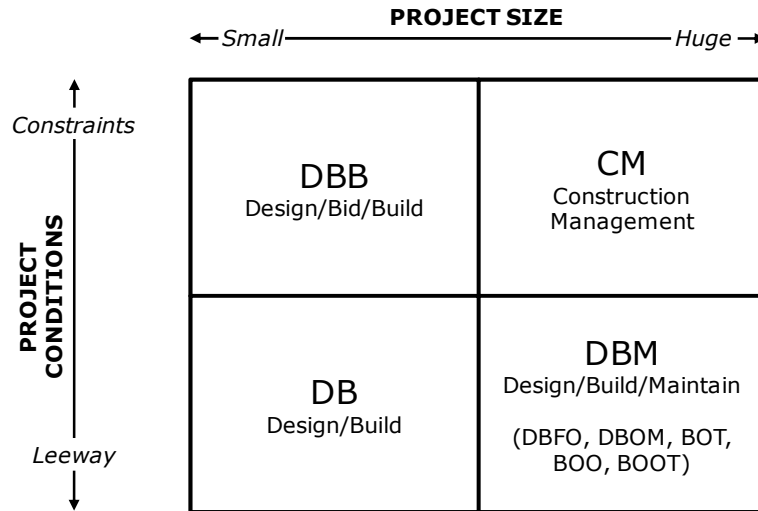
Storbacka (2011) emphasises both commercialisation and industrialisation of solutions as being highly interdependent and interfunctional processes, in which the customer is deeply integrated.

To conclude, extant literature claims that the solution business model is a process that undergoes constant change in which the customer is heavily integrated. Companies are also expected to be able to manage various capability needs and utilise networks during the solution process.

3 BOOT as an industrial solution business model

The section begins with a brief overview of different project delivery methods also known as PPP models, followed by a more detailed description of the BOOT business model which originates from project business. In project business, there are a large number of existing business models from which to choose (e.g. US General Accounting Office, 1999). Koppinen and Lahdenperä (2004) have reviewed four common types of project delivery method in their report on road infrastructure projects. These methods are design-bid-build (DBB), construction management (CM), design-build (DB) and design-build-maintain (DBM). Furthermore, the DBM model includes variants, such as design-build-finance-operate, design-build-operate-maintain, build-operate-transfer (BOT), build-own-operate and, finally, build-own-operate-transfer (BOOT). The characteristics and applicability of different project delivery methods are explained next in brief (see also Figure 1). Overall, it can be stated that adopting a PPP scheme is not easy (Kwak et al., 2009) and needs to be thoroughly analysed before utilising the BOOT business model (Khasnabis et al., 2010).

Depending on the case, different project delivery methods can be used. The traditional method has been the DBB model, where each of the three stages is independent and carried out separately (Friedlander, 1998). DBB is used mainly on smaller projects with fewer opportunities for innovation (Koppinen and Lahdenperä, 2004). CM is a similar business model to DBB as the project tasks are also typically kept separate, however, with a consultant agency or more experienced firm operating in the same field taking over managerial responsibility for the project (Koppinen and Lahdenperä, 2004). Koppinen and Lahdenperä (2004) propose CM for large-scale projects that are strictly bounded by given conditions.

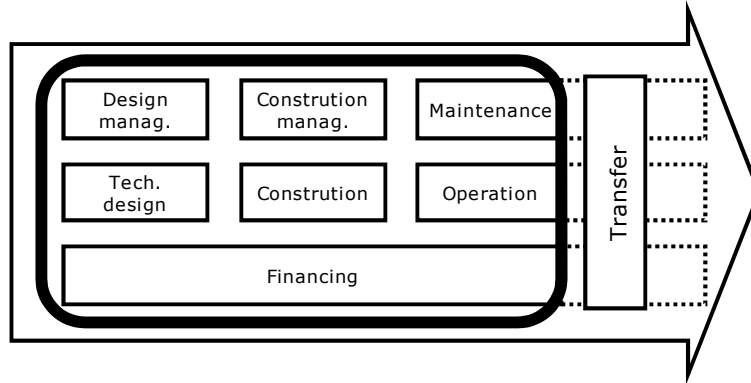
Figure 1 Applicability of the project delivery methods

Source: Adapted from Koppinen and Lahdenperä (2004).

The next step towards a more integrated project delivery package is the DB business model where a single corporation has the responsibility to both design and build the project (Koppinen and Lahdenperä, 2004). DB is usually adopted in innovative projects of small to medium size. The most integrated project delivery business model is the DBM and its variants. Characteristic of DBM models is a complex agreement providing the customer with a complete solution encompassing the whole project life cycle (Koppinen and Lahdenperä, 2004). In DBM variants, the project sizes vary from average to large and the project conditions are flexible (Koppinen and Lahdenperä, 2004). The characteristics of DBM, and especially BOOT, make them highly suitable within the industrial context.

3.1 BOOT business model

The aim of the present study is to focus on clarifying the BOOT business model in an industrial context. The BOOT model, a variant of the DBM family, is one where a supplier with a certain network builds, owns and operates a unique package of goods and services to fulfil a customer's needs (see Figure 2) (Woodward, 1995). The BOOT business model is actually a concession agreement made between a grantor and an operator (Koppinen and Lahdenperä, 2004). The contract includes designing, financing, building, owning and operating a certain part of the grantor's facilities for a specified period of time. After the concession period expires the ownership of the agreed facility is transferred back to the grantor. Thus, BOOT can be considered as a specific type of customer solution, where all of the elements are combined into a solution package clearly defining a single entity responsible for providing the whole solution to a customer.

Figure 2 BOOT business model framework

Source: Adapted from Koppinen and Lahdenperä (2004).

Nielsen (1997) says that the emergence of BOOT type procurement projects has been caused by the privatisation trend, by the ability to secure much needed infrastructure investments, by the new way to finance projects in less wealthy parts of the world and by easier project cost and schedule calculation. Furthermore, project grantors have been keen to shift the risk towards contractors in complex projects. Historically, BOOT schemes were used mostly on public infrastructure projects or other types of PPP between governments and private BOOT consortiums. The first ever project to adopt BOT, a project delivery method closely related to BOOT, was the cross-harbour tunnel in Hong Kong, built in the 1970s (Tam, 1999). The motive for this type of project procurement was the lack of government funding and knowledge. Thereafter, BOOT project procurement has been used, e.g. in publicly owned power, transportation, telecommunications and process industries (Lam, 1999). Although Woodward (1995) already stated in the mid-1990s that “the grantor of the concession does not have to be a government; it could be a private sector organisation, as in the case of an industrial facility operator”, only during the last ten years or so has the potential of BOOT projects been widened from public investments towards industrial investments.

The high-risk transfer towards the contractor and the extensive number of actors needed to handle such a contract is inherent in a BOOT contract as well as, to a certain extent, in other DBM models (Woodward, 1995). A BOOT contract offers a supplier a high possibility of profitability if the complexity and risks can be managed. There is, however, seldom enough capability in a single company to cope with all the components. Hence, among other actors, subcontractors and outside financiers are used. The use of third parties creates the structure of the BOOT consortium, comprising contractors and operators (Woodward, 1995), which is considered to be the single, most important factor of a BOOT project’s success (Jefferies et al., 2002). According to Woodward (1995), there are seven types of actor present in a typical BOOT network: a grantor, an operator, suppliers, investors, lenders, constructors and users. The grantor enters into a concession agreement, together with the BOOT consortium, which defines their mutual responsibilities towards each other. The consortium is responsible for designing, financing, constructing, owning, operating and maintaining the facility during the concession period, normally defined in years and carries the risks related to the project.

The grantor may also have some supporting responsibilities defined in the contract. When the concession agreement expires, the ownership of the facility transfers to the grantor.

With one company rarely willing to perform all tasks, the BOOT consortium divides them according to their capabilities and objectives (Woodward, 1995). For example, some or all of the operation, supply and construction functions could well be outsourced. An offtake contract and a shareholder agreement (Woodward, 1995) might also be included. The offtake contract is made with the grantor who uses the solution to guarantee a certain income level, however modest, from the consortium. Shareholder agreements are made with investors who get their share of the consortium. The investors can include the main consortium actor, who coordinates the project and the grantor of the concession agreement (Tam, 1999). This kind of mutual ownership can actually improve the end result through the mindset created by mutual interest, as seen by Koppinen and Lahdenperä (2004). The lenders in this scenario provide adequate financing for the project throughout its life cycle. Financing BOOT projects has different characteristics to other types of financing, as lenders are rarely provided with securities by the consortium other than the expected cash flows from the project (Woodward, 1995). The consortium will try to make a financial package as attractive to lenders as possible while simultaneously minimising their risks in the event of project failure.

3.2 *Characteristics of a BOOT business model*

Before describing the advantages, disadvantages and risks of a BOOT business model, a brief look at the critical success factors of the model show that many seen in Table 1 attach to the BOOT consortium structure and its qualities. Other major factors are the local surroundings and the environment where the solution is to be organised, the technical progressiveness of the solution provider and management-related issues, such as delays and environmental impacts. Qualifications and experience of key personnel are ranked as the most important factor when selecting participants in PPPs (Zhang, 2005). The critical success factors can be classified into the advantages, disadvantages and risks of a BOOT business model.

The BOOT *advantages* cover multiple issues ranging from the outsourcing trend of customers (Brady et al., 2005) to risk avoidance (Koppinen and Lahdenperä, 2004). Customers might lack various resources, such as knowledge and finance, and are therefore willing to outsource (Brady et al., 2005). Lifetime cost thinking can attract customers from the huge lump sum cost to monthly payments or a similar method (National Audit Office, 2003), and enhances the chance of profitability for the supplier (Cornet et al., 2000) as well as providing steadier and longer customer relationships. There is also a possibility to use off balance sheet finance to diminish the financial risks faced by the supplier (Woodward, 1995). With regard to the supplier, a single point of responsibility gives a contractor the freedom to utilise the most suitable elements for the process (National Audit Office, 2001). Often, BOOT will also provide better maintainability than detached elements (Koppinen and Lahdenperä, 2004).

The *disadvantages*, on the other hand, relate to resource and expertise deficiencies (Koppinen and Lahdenperä, 2004). The tendering process for BOOT models is often time-consuming while the size of BOOT projects sets challenges, especially for smaller or even medium-sized suppliers. Limited experience in risk assessment and pricing are also mentioned as downsides (Koppinen and Lahdenperä, 2004).

Table 1 Critical success factors in BOOT projects

<i>Author</i>	<i>Critical success factors</i>
Dey and Ogunlana (2004)	<ul style="list-style-type: none"> • Consistent demand on the service provided or adequate offtake agreements • Political stability • Promising economy and adequate financial markets
Jefferies et al. (2002)	<ul style="list-style-type: none"> • Well organised and defined consortium structure • Good social relationships and trust in the project consortium
Salzmann and Mohamed (1999) ^a	<ul style="list-style-type: none"> • Project management ability and proven expertise • Having a local partner
Tiong and Alum (1997) ^a	<ul style="list-style-type: none"> • Avoiding delays and cost overruns • A well prepared environmental impact statement
Keong et al. (1997) ^a	<ul style="list-style-type: none"> • Comprehensive feasibility study • Existing infrastructure
Tiong et al. (1992) ^a	<ul style="list-style-type: none"> • Technical innovation • Financial capability and support
Tiong (1990)	<ul style="list-style-type: none"> • Developed legal/fiscal/economic network • Favourable and predictable inflation, exchange and interest rates

^a Cited in Jefferies et al. (2002).

The *risk* level in the BOOT business model is higher than in traditional project business (Woodward, 1995) and the longer time period emphasises the role of risk analysis (Dey and Ogunlana, 2004). Baker (1986, cited in Dey and Ogunlana, 2004) categorises BOOT-related risks as political, constructional, operational, financial and legal. According to Kumaraswamy and Zhang (2001), political risks include a country's internal resistance, labour resistance, nationalisation and its effects on foreign businesses, political influence and an unstable political environment. In the construction phase, any delays might substantially weaken overall profitability (Woodward, 1995). While the BOOT model is in operation, cooperation between the participants should run smoothly (Koppinen and Lahdenperä, 2004). On the financial side, Kumaraswamy and Zhang (2001) raise the following aspects: devaluation risk, exchange rate risk, inconvertibility of local currency, inflation risk and interest risk. Finally, legal risks might include corruption and bribery as well as changing laws and regulations (Kumaraswamy and Zhang, 2001).

In our study, it is claimed that a BOOT business model is an extensive type of solution. We describe the BOOT business model as a complete customer solution. Next, we leverage the previous literature and empirical data to propose an industrial BOOT business model. First, we take a brief look at the methodological choices utilised in our study.

4 Methodology and case selection

The phenomenon studied is that there seems to be a demand for complete solutions which build-up and then take full responsibility for a customer's business over a certain period of time with part exchange financing. A BOOT business model would be a suitable way of providing this kind of solution, but it seems that there are no studies concerning the BOOT business model in an industrial context. To gain a deeper understanding of the phenomenon, and to explore the possibilities for the BOOT business model in an industrial context, we approached the research problem by adopting abductive research logic. Abductive logic involves the systematic combining of both theoretical and empirical aspects to gain a holistic understanding of the focal phenomenon (Dubois and Gadde, 2002; Kovács and Spens, 2005). For the empirical data, we adopted a classic case study approach by focusing in-depth on a single case (Dyer and Wilkins, 1991; Yin, 2003). As the research problem is a complex phenomenon studied in its real-life context, the case study method is appropriate (Yin, 2003). Case study also provides the possibility of moving between data and theory to gain novel insights into the problem (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). Furthermore, it allows researchers to gain a deep understanding of the actors and their interactions, sentiments and behaviour involved in the studied context (Woodside and Wilson, 2003).

To achieve a holistic understanding of the BOOT business model in an industrial context, we searched for an industrial process equipment supplier that operates globally, has extensive service operations and continuously develops its offering in cooperation with its customers, including those from less developed countries. Our case company, Zeta (disguised), fulfils these conditions. Zeta is a process equipment solutions provider, which operates worldwide and has long traditions in industrial services. The case evidence also includes a developing country aspect. The company has a turnover of between 100 and 200 million euros and employs around 400 people. During recent years, Zeta has put more effort into service development to maintain its competitive advantage as a solution supplier. Zeta develops, designs, manufactures and supplies industrial installations and service and is a market leader in certain industry segments. Being an essential part of the company's core business it actively develops its service offering, which makes the company ideal for our research purposes in this context. Characteristics that make the company unique include, among others, its 100% focus on specific process method and its service concept, where aftermarket service plays a major role. Service has its own business unit and the company has actively developed its offering concept from aftermarket towards being a full service solution provider in every phase of its customers' business cycles. The role of service elements in its business model has increased significantly which also makes the company ideal for our research purposes. Thus, the company can be regarded as a revelatory case when examining a solution provider's industrial BOOT business model.

The construct validity (e.g. Ghauri and Gronhaug, 2005) of data gathering was increased by using open-ended interviews (Silverman, 2006); the respondents (see Table 2) could speak freely without overly restrictive questionnaires and the interviewer was able to clarify the questions whenever needed. All the interviews were conducted between June and August 2008, with two being undertaken in a foreign language which may have caused a small language barrier.

Table 2 Interview description

<i>Title of the interviewee</i>	<i>Experience at the case company (years)</i>	<i>Interview length (min)</i>
Group treasurer	2	64
Senior manager – deliveries and controlling	4	62
Director – global customer support, service	25	86
Managing director	5	64
Manager – service	10	59
Business line director	3	65
Business development director – service	1	76

The respondents were selected from different areas of responsibility within the company. To familiarise themselves with the topic and to improve the validity of the data they were given the interview outline in advance. At the end of the interview session, the respondents were asked to comment on the suitability of a BOOT consortium model as described by Woodward (1995). The tape-recorded interviews were transcribed very carefully and then qualitative content analysis (Weber, 1990) was utilised to obtain the following results.

5 Results

Our first research question deals with the BOOT business model and its suitability for industrial markets. For the case company, the customer demand for the BOOT business model is evident. Demand provides business opportunities for suppliers that are capable of managing the various risks related to the extensive BOOT business model. We found three main reasons underlying this demand.

Firstly, the general development in business is moving increasingly towards resource shortage. Some customers, especially in developing countries, are short of resources, including finance and labour, to run all the operations by themselves. With regard to finance, outsourcing to a solution provider can help to move the customer's capital expenditure towards the end of the project cycle, to bring the cost of ownership down and generally remove the fixed assets which place a financial strain on the customer's business. In terms of labour, the lack of skilled personnel is the most central problem. Depending on the country in question, finding and hiring skilled labour is expensive and sometimes even impossible while using non-skilled labour occasionally causes problems. Therefore, a supplier with the ability to manage this challenge receives demand for an industrial BOOT solution. As stated by a respondent during the interviews: "If you can get it under control, it will open up lot of opportunities and you can ask more or less what you like. Price is not going to be the concerning factor".

Secondly, partly as a consequence of the resource shortage, customers are increasingly concentrating on their core businesses. To achieve greater efficiency they want to outsource secondary business functions. The objective of these customers is to increase production and improve the reliability and availability of resources with less money. *Finally*, it has become more common among customers to look for bigger entities providing solutions, described as one-stop-shopping, offering one deal for whole plants

instead of single process machinery. In more advanced solutions, the customer does not pay for the machinery – it pays for the capacity, priced by, e.g. dollars/ton. This is also the principal idea in industrial BOOT solutions.

5.1 *Advantages, disadvantages and risks of BOOT for Zeta*

In the literature review, we found multiple advantages, disadvantages and risks relating to the BOOT business model. Combined with the empirical case evidence, we propose the following categorisation to be used when evaluating these characteristics in industrial BOOT solutions (see Figure 3).

The components are categorised as follows. The subcategories for the *advantages* are

- 1 customer demand
- 2 profitability
- 3 customer relationship
- 4 financing.

Within *disadvantages*, we found two subcategories:

- 1 the need for resources
- 2 the lack of expertise categories.

Finally, *risks* can be divided into five subcategories;

- 1 political
- 2 constructional
- 3 operational
- 4 financial
- 5 legal.

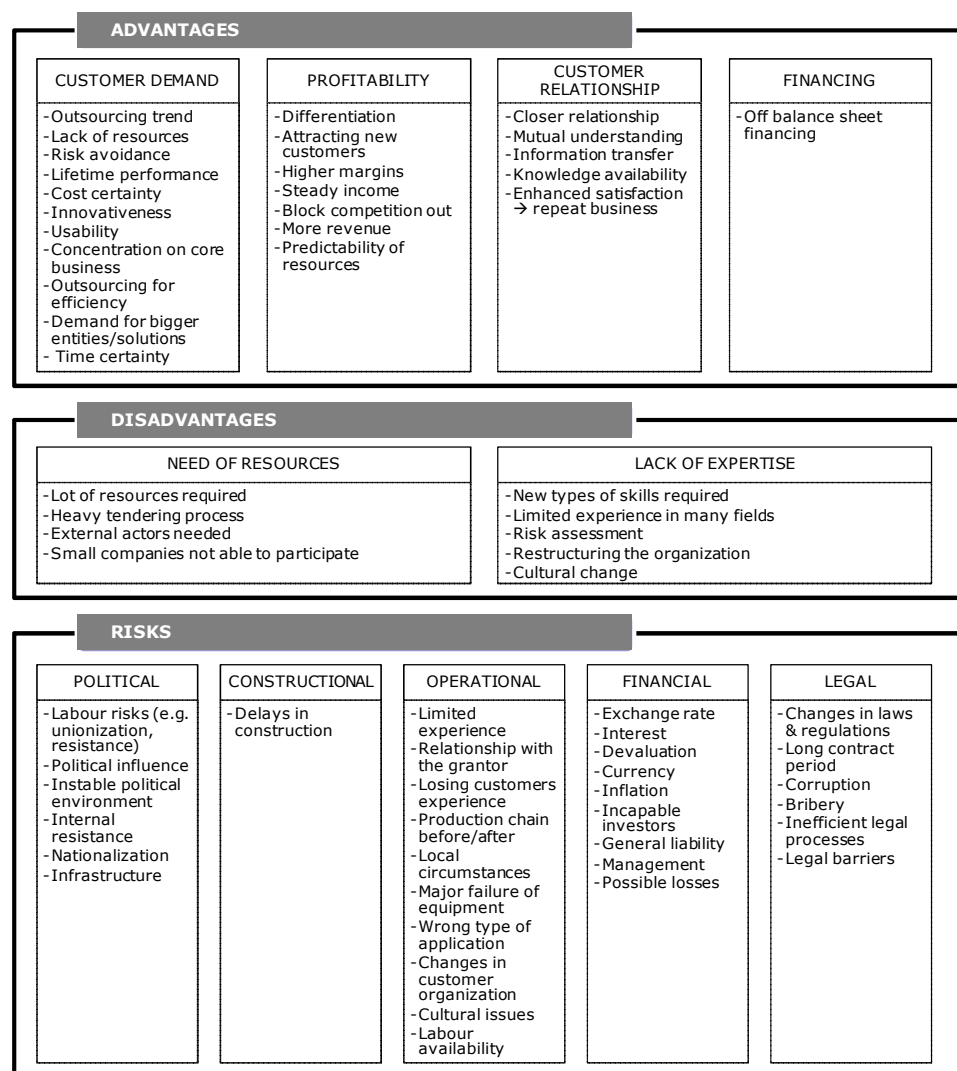
In the following, these are discussed through our research findings to answer the second research question relating to advantages, disadvantages and risks of the BOOT business model.

The disadvantages can be divided between those relating to resources or expertise. It is obvious, based on the research, that a lot of *resources* are needed to run industrial BOOT solutions requiring larger deliveries and therefore more capital, workforce and other types of resource, even during the tendering phase of the deal. This might require scale advantages as small companies cannot acquire the necessary resources. Furthermore, these resources are significantly harder to obtain. There is also a new type of *expertise* needed as, e.g. successfully evaluating the financing options of industrial BOOT solutions demands extensive expertise which many suppliers might lack.

The theoretical risk framework by Baker (1986, cited in Dey and Ogunlana, 2004) had somewhat different weighting within our empirical results. From the five main risk subcategories, *political*, *financial* and *legal risks* were better recognised in the literature, whereas the *constructional* and *operational* risks were more extensively highlighted during the interviews. The *political* risks include aspects that are controlled by the local government, such as too strong unionisation or other types of labour resistance. Also an

unstable environment with political changes, nationalisation in the country and poor local infrastructure forms a risk for suppliers. In the area of *construction*, one major risk was found to be delay in the construction of a BOOT project damaging the profitability of the whole project. Thus, the construction partner has to be selected carefully. There seems to be only limited experience of the BOOT business model in industrial settings and a BOOT agreement adds responsibilities which might not be known by the supplier. The relationships should be strong and trustworthy because, when operating an industrial BOOT solution, where a concession agreement with benefit sharing is in place, the customer's production chain before and after the BOOT plant forms a risk through production failures. There is also a risk of major failure of the supplier's equipment.

Figure 3 The proposed advantages, disadvantages and risks of an industrial BOOT solution



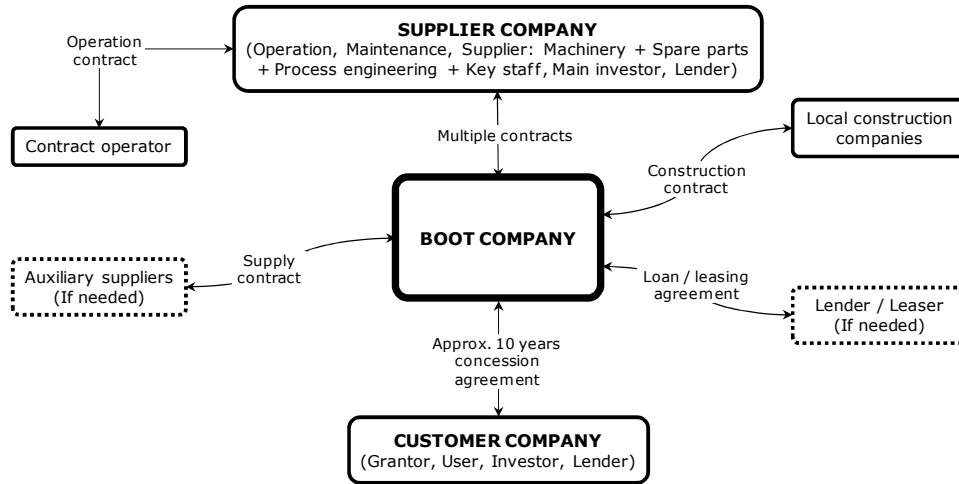
The most obvious risks linked to the *financial* issues concern currencies, devaluation and exchange rate fluctuations. Other uncertainties are inflation and interest rates. Additionally, risks of incapable investors investing in the project, general liability risk, managing the financials and the possibility of realising enormous losses in case of project failure should be considered carefully. Overall, the financial aspects form a major issue as the financial respondent stated: “They’ve picked BOOT because it is something that is widely known and maybe it’s easier to conceptually sell than other project types, but...I just don’t think it suits us particularly well from the financing side”. In the area of *legal* risks, those caused by changes in laws and regulations (e.g. ones regarding construction and industrial safety) plus a long contract period were commonly recognised during the interviews.

5.2 Industrial BOOT solution consortium

Our third research question deals with the implementation of an industrial BOOT solution. Based on the interviews, there is support for the BOOT consortium, also known as the network surrounding the central BOOT company. The consortium (see Figure 4) is responsible for constructing the facilities and, for a period of several years, operating, maintaining and carrying the risk of the project. The need for a separate BOOT company, founded by the supplier and the customer, to run and lead the BOOT project was acknowledged. Because of the long time span of an industrial BOOT solution, reliable and well-known partners are needed for the BOOT company, which will be in charge of managing the solution.

Taking partners is not an end in itself but a factor that should help to run the solution. Hence, not too many partners should be included. The different types of actor are based on the framework of Woodward (1995), whose structure of the BOOT network was seen as a functioning model by the respondents. Generally, it was agreed that the fewer actors in the network, the better the end results. The participants should all be well known and trustworthy. The main contract should be a two-way contract between the customer and the established BOOT company. The customer, who acts as the grantor of the concession agreement, should be evaluated very carefully beforehand to avoid surprises in risk management. The length of concession agreement should be around 10–12 years in the case company, which is highly appropriate for the life cycle of the case company’s products. No further money transfer will occur at the end of the concession as the customer would already have paid for the transfer during the concession agreement period. The payments during the concession agreement could be either tied to production volumes or a fixed sum, or something between these two options.

The operation contract, including maintenance, could be outsourced fully from the BOOT company to Zeta. Part of the operations could be further outsourced with maintenance handled in-house by Zeta. The fewer people on Zeta’s payroll, the more flexible and efficient the operation would be. Zeta would provide at least the main equipment and spare parts. Process engineering, management and other staff could be sourced through the BOOT company. If needed, auxiliary suppliers could be used.

Figure 4 The proposed industrial BOOT solution consortium

The ownership of the BOOT company raised two options: either Zeta could own the daughter company totally or let others in as investors. However, due to risk factors in certain geographical areas, high interest rates might diminish possible profits if external shareholders were involved. On the other hand, the risks would then be shared. In the end, it comes down to Zeta's willingness to offset the risks and share the profits. Finally, different arrangements regarding the financial aspects have a major effect on Zeta's balance sheet. Both Zeta and the customer want the BOOT company off their balance sheets. According to the case evidence, there are two major options for this: leasing or loan agreements. Some of the respondents thought both of these were equally applicable, while some claimed only one or other option would make sense.

6 Conclusions

The main objective of our study was to gain a better understanding on fitting a type of PPP BOOT model to an industrial context. We contribute to the growing solution business literature stream by introducing an industrial BOOT business model. *The first research question* dealt with the role and significance of a BOOT business model in the industrial context. Based on our literature review, there seems to be a lack of relevant studies focusing on the BOOT business model in an industrial setting. Although we found a few studies focusing on public-private interactions, the BOOT model was, if anything, only mentioned in the business-to-business literature. Hence, our study proposes a new kind of business model for industrial solution providers. We propose that the BOOT business model is an extensive and complete type of solution. Furthermore, based on our empirical evidence of a customer with a business setup but lacking the financial ability to make an extensive lump sum investment, there has been demand for the BOOT business model in the industrial context. The high-risk transfer towards the contractor and the extensive number of actors needed to handle such a contract are inherent factors in an industrial BOOT solution.

The second research question scrutinised the advantages, disadvantages and risks related to the BOOT business model. Our study proposes a categorisation of these characteristics (see Figure 3). We identified the characteristics and then made subcategorisations based on the findings. Eventually, we determined four advantages, two disadvantages and five risk segments. The empirical study revealed that although many of the traditionally public–private-based BOOT characteristics (e.g. Koppinen and Lahdenperä, 2004) also apply in the industrial context, there are a few differences. With regard to the *advantages* of BOOT, the outsourcing trend as well as the customer desire for extensive/complete solutions boosts demand for the industrial BOOT business model. Also, the predictability of the income and resource needs increases in the long run if lengthy industrial BOOT solutions are adopted. Furthermore, because of the more professional operation of the installed equipment, customer satisfaction was said to be enhanced. Among the *disadvantages*, the main difference related to the need for cultural change. This was not emphasised during the interviews and might not have an effect in an industrial setting. Lastly, the theoretical *risk* framework by Baker (1986, cited in Dey and Ogunlana, 2004) had a somewhat different weighting within our empirical results. The subcategories of political, financial and legal risks were better recognised in the literature, whereas the constructional and operational risks were more extensively highlighted during the interviews. Operational risks in the industrial BOOT model include aspects of the production chain, local circumstances, major equipment failures and the use of the wrong type of application. Additionally, the literature identified factors which the case company respondents were unable to name: corruption and bribery, inefficient legal processes in the host country and legal barriers preventing smooth business operation. However, although these were not mentioned during the interviews, it would be a mistake not to consider them as threats for a successful industrial BOOT solution.

The final research question dealt with the implementation of an industrial BOOT business model. The empirical evidence demonstrated that the BOOT consortium is the most important single factor in the success of an industrial BOOT solution. Thus, the implementation phase was studied by examining the type and number of actors needed in a BOOT consortium. While the consortium should include grantor, operator, suppliers, investors, lenders, constructors and users, the roles can be intertwined and every BOOT consortium is unique. The selection of the consortium partners was emphasised as a key element of success and the number of different actors should also be limited. The long time span of the BOOT solution highlights the relationship functionality between the consortium partners. Finally, with regard to the implementation phase, the case company was unclear about the financing aspects of the BOOT business model, mainly the ownership of the equipment/installation. The decision between loan and leasing agreements is also a key aspect of a successful industrial BOOT solution.

6.1 Managerial implications

Our study identified four managerial implications. *Firstly*, a supplier that aims to offer industrial BOOT solutions should focus on the skills and resources needed in the challenging business model. If the supplier organisation is able to learn, develop and acquire the capabilities required to design and deliver industrial BOOT solutions, this kind of business model will offer a great opportunity to differentiate itself from competitors. *Secondly*, based on the case evidence, it seems that the proposed industrial BOOT business model is most suitable for offerings to customers in developing

countries, mainly because of the different payment method. Although these customers might hold substantial (e.g. natural) resources, they might find it difficult to finance lump sum offerings. *Thirdly*, the role of a comprehensive feasibility study is emphasised with unique industrial BOOT solutions. The supplier needs to calculate and evaluate expected future demand in the customer's process. When all relevant risk aspects are identified, the risk and profit sharing calculations can be formulated. And *finally*, the decision to offer an industrial BOOT solution should be made carefully, based on the expected profits, and only if the precalculated risks are manageable.

6.2 Limitations and further research

The three main limitations of our study can be formulated as follows. *Firstly*, we have studied the BOOT business model in a strict business-to-business setting, more precisely in an industrial context. This differs from the traditional PPP context where there is always a private and a public participant involved. *Secondly*, the industry we focused on was the industrial process equipment industry and mainly customers in the developing countries. And *finally*, our case company is a medium-sized actor, to which an offer of this extent is a major investment. In the BOOT business model, the profits will be spread over the next 10–20 years, which has a major impact on the supplier's financial capability. For a larger company, the decision to move towards a BOOT business model could be easier to make but it might be impossible for a smaller company because of the resources required.

The study has identified aspects that would benefit from further research. It is evident that evaluating the financing methods of leasing and loan should be studied thoroughly. More specifically, it would be interesting to discover the differences for each alternative method in the transfer phase of a BOOT project. Furthermore, the need for cultural change and legal issues was not emphasised during the interviews and the reasons for these would be intriguing to explore. In sum, the industrial BOOT business model has the potential to increase the competitiveness of suppliers, at least in less developed markets, but the complexity of such a solution requires in-depth examination of the application in question.

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