



Hanna Luotola

# Designing Industrial Solutions in Value-Based Selling

Managing Uncertainty and Solving Wicked Problems of Customer Need



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# DESIGNING INDUSTRIAL SOLUTIONS IN VALUE-BASED SELLING

Managing Uncertainty and Solving Wicked Problems  
of Customer Need

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# ABSTRACT

Today a majority of industrial companies claim to provide solutions and produce customer value that surpasses the benefits of the traditional product-service offerings. However, providing and adding real value to the customer has seen to become more difficult for both off-the-shelf products and more complex, customized solutions with different levels of sales support. This change is creating a very different industrial business-to-business (B2B) sales environment, and business leaders need more than just the typical analytical skills to tackle these complex challenges during their sales efforts.

Motivated by this challenge, this dissertation brings together two separate theoretical backgrounds – design thinking, and industrial marketing and management – and concentrates especially on the intersection of the research on value-based solution selling with the research on solution design principles. The main research question is how can industrial companies design and sell value-based solution offerings? This research goal is achieved by examining the efforts of two selected industrial companies applying the value-based selling principles. These companies became both as the main data collection site and the arena for applying and testing the knowledge produced from the research.

The problem with current sales theories is their lack of approach for addressing real life business problems and their related uncertainty. This study thus goes beyond macro-level customer problems to demonstrate that the common industrial logic used for addressing and tackling customer problems in solution selling and co-creation is currently incomplete. It introduces a third view, abductive epistemology, for handling customer problems of value-based selling. Further, this research suggests that handling and even utilizing uncertainty is a key feature of the value-based sales process. Indeed, it has strong managerial implications for the existing ways of understanding how practitioners should handle uncertainty, wicked problems and the complexities of value-based selling. More specifically, it provides managerial guidelines to use to handle, understand, and solve those challenges that are often preventing investment decisions.

This study also developed knowledge that can drive industrial manufacturing business toward viable solutions business and customer value orientation. In practice, this research provides a new value-based selling technique for the sales force. It lets both customers and vendors maximize their returns and min-

imize costs. These value-based sellers utilize problem-solving methodologies that draw on design thinking and apply them to create greater business value, innovative new products, and more valuable services and solutions. The very reason for adopting a design thinking approach for solution design stems from uncertainty, introduced herein as a central facet of value-based selling.

As a theoretical outcome, the research demonstrates how value-based solution selling can be understood as an uncertainty management process. More specifically, this thesis shows that utilizing design thinking during value-based selling offers new ways to reduce the uncertainty of a solution.



## REFERAT

En stor del av dagens industriella företag påstår att de levererar helhetslösningar och producerar kundvärde som överstiger den nytta som traditionella produkter kombinerade med tjänster erbjuder. Emellertid, har det blivit allt svårare att leverera och öka verkligt värde till en kund genom både standardprodukter och mera komplexa, skraddarsyddna lösningar som innefattar olika grader av försäljningsstöd. Denna förändring skapar en helt annorlunda försäljningsmiljö mellan företag (B2B), där affärsledare behöver bemästra mera än de typiska analytiska kompetenserna för att övervinna de komplexa utmaningarna som uppkommer under försäljningsinsatserna.

Utgående från denna utmaning, för denna avhandling samman två olika teoretiska bakgrunder – designtänkande och industriell marknadsföring och ledning. Avhandlingen fokuserar speciellt på skärningspunkten mellan forskningen om värdebaserad försäljning av kundspecifika lösningar och forskningen om principer för utformningen av helhetslösningar till kundproblem. Den centrala forskningsfrågan lyder: hur kan industriella företag utforma och sälja värdebaserade kundspecifika lösningar? Denna forskningsfråga besvaras genom att undersöka insatserna vid två utvalda industriella företag som tillämpar principer för värdebaserad försäljning. Dessa företag blev huvudsakliga datainsamlingskällor, samt arenor där insikterna från denna forskning kunde testas och praktiskt tillämpas.

Problemet med existerande försäljningsteorier är att de saknar sätt att behandla verkliga affärsproblem i relation till närstående osäkerhet. Denna studie går därför utöver kundproblem på makronivå för att påvisa att den ordinära industriella logik som används för att behandla och ta i tu med kundproblem vid försäljningen av kompletta lösningar och samskapande, för tillfället är ofullständig. Studien introducerar en tredje uppfattning, abduktiv epistemologi, till att hantera de kundproblem som uppkommer vid värdebaserade försäljning.

Den egentliga orsaken till att omfatta designtänkande i utformningen av helhetslösningar till kundproblem härrör sig från osäkerhet, vilket här introduceras som en central del av värdebaserad försäljning. Ytterligare föreslår denna forskning att hantering av osäkerhet är en nyckelegenskap för den värdebaserade försäljningsprocessen. Visserligen, har det starka ledningssynpunkter för existerande sätt att förstå hur praktiker skall hantera osäkerhet, lömska problem samt komplexitet vid värdebaserad försäljning. Mera specifikt sagt, erbjuder

det riktlinjer för ledningen till att hantera, förstå, och lösa de utmaningar som ofta hindrar investeringsbeslut.

Studien utvecklade även kunskap som kan driva industriella tillverkande företag i riktning mot genomförbar affärsverksamhet kring leverans av färdigställda kundlösningar och i riktning mot kundvärdesorientering. I praktiken tillhandahåller denna forskning en ny värdebaserad försäljningsteknik för säljkåren. Den tillåter både kunder och säljare att maximera sina vinster och att minimera kostnader. Dessa värdebaserade säljare använder sig av problemlösningsmetoder som bygger på designtänkande, och tillämpar dem till att skapa mera framstående affärsvärde, innovativa nya produkter, samt värdefullare tjänster och helhetslösningar. Det teoretiska resultatet forskningen påvisar är hur värdebaserad försäljning av helhetslösningar kan bli förstådd som en process för att hantera osäkerhet. Mera specifikt, påvisar denna avhandling att användning av designtänkande vid värdebaserad försäljning erbjuder nya sätt att minska på osäkerheten vid affärsverksamhet kring helhetslösningar.

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## LIST OF PUBLICATIONS

The dissertation consists of a summary and discussion on the following four publications:

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- II. Hellström M., Wikström R., Gustafsson M., Luotola H. (2016). The Value of Project Execution Services: A Problem and Uncertainty Perspective. *Construction Management and Economics*. Volume 34 (4-5), pp. 272-285. <http://www.tandfonline.com/doi/full/10.1080/01446193.2016.1151062?scroll=top&needAccess=true>.
- III. Luotola, H., Hellström, M., Gustafsson M., Perminova-Harikoski, O. (2017). Embracing Uncertainty in Value-based Selling by Means of Design Thinking. *Industrial Marketing Management*. Volume 65, pp 59-75. <https://www.sciencedirect.com/science/article/pii/S0019850116302978>.
- IV. Liinamaa, J., Viljanen, M., Hurmerinta, A., Ivanova-Gongne, M., Luotola, H. and Gustafsson, M. (2016). Performance-based and Functional Contracting in Value-based Solution Selling. *Industrial Marketing Management*, Volume 59, pp. 37-49. <https://www.sciencedirect.com/science/article/pii/S0019850116301055>.

## AUTHOR'S CONTRIBUTION

**Publication 1:** The Value-based Sales Approach: The design Process, Tools, and Capabilities Needed to Create a Solution.

This publication was initiated by the author of this dissertation, who was responsible for the development of the value-based sales process, the larger part of the data collection and the writing. Conclusions and an analysis of the needed tools and capabilities for creating an industrial solution were developed, elaborated on, and discussed with the co-authors.

**Publication 2:** The Value of Project Execution Services: A Problem and the Uncertainty Perspective.

The publication was elaborated on by the lead author, Dr. Magnus Hellström. The author of this dissertation participated in formulating the research question, concept and research topic. The author was writing the publication, and she participated in data gathering.

**Publication 3:** Embracing Uncertainty in Value-based Selling by Means of Design Thinking.

The publication was initiated by the author of this dissertation, who had a leading role in the development of case research, reporting and larger part of writing. Theory building, writing and conclusions were undertaken together with the other co-authors.

**Publication 4:** Performance-based and Functional Contracting in Value-based Solution Selling.

The publication was elaborated on by the lead author, Dr. Johanna Liinamaa. The author of this dissertation was part of the research team and participated in the writing of the publication. The author participated in the design of the concept and the analysis of the results.

# ABBREVIATIONS

ANT	Actor-Network Theory
A-P	Anti-programme
AR	Action Research
OPP	Obligatory point of passage
P	Programme
PBC	Performance-based contracting
R&D	Research and Development
MoU	Memorandum of understanding
NPV	Net present value



# 1. Introduction

The majority of industrial manufacturing companies have turned away from the transactional business (DeVincentis, 1999) of stand-alone goods or services and shifted toward providing solutions (Davies, Brady, & Hobday, 2007; Tuli, Kohli, & Bharadwaj, 2007) by placing a stronger focus on customer value (Windahl, Andersson, Berggren, & Nehler, 2004). In particular, these solution providers claim they add more customer value with their solutions than traditional product-service offerings can provide. However, as these solutions are often combined with a mixture of products, services, and processes, many industrial companies have been forced to transform and change their ways of doing business (Vandermerwe & Rada, 1988).

Recently, industrial companies have started to pay attention to value-based selling and express the view that solution selling requires new kinds of problem recognition tools and sales techniques. Similarly, today value-based selling of solutions is a relevant theme that has produced an increasing amount of interest among academics (Terho, Haas, Eggert, & Ulaga, 2012; Töytäri & Rajala, 2015). According to Pöyry and Parvinen (2017), when customer value is integrated into sales work, it is called value-based selling. In general, value-based sellers seek to influence their customers' desire for value, which require the capability to quantify and communicate the value of their offerings to the customers (Storbacka, 2011; Terho et al., 2012; Töytäri & Rajala, 2015). Although the importance of demonstrating value in monetary terms has been acknowledged and value-based selling is assumed to increase B2B sales performance, the empirical evidence has shown that sellers still lack the capable value-based selling tools to quantify value.

According to Töytäri and Rajala (2015), firm selling activities are structured and prepared actions designed to understand a customer's business and influence that customer's buying processes. However, the sales research is mainly positioned to address already mature, product-dominated markets (Töytäri, 2015) while the solution business requires an approach wherein the sellers can demonstrate how their solutions constitute a response to a particular customer problem and ensure value capture for that customer's business (Tuli et al., 2007; Töllner, Blut, & Holzmüller, 2011; Windahl & Lakemond, 2006). Due to this inadequacy, the current sales research provides only limited guidance for how industrial firms can design solutions around problems and then communicate

that value during the sales process. This challenge was also noted by (J. C. Anderson, Narus, & Van Rossum, 2006), who argued that if firms do not understand and are able to communicate superior value propositions or address the real and concrete problems to a customer, then a supplier firm's actions will not affect customer business performance.

To solve this challenge, several authors offer (value) co-creation as an answer for successful solution selling. Recent theories on co-creation hold the promise of achieving greater value (see e.g. Cova & Salle, 2008; Edvardsson, Tronvoll, & Gruber, 2011; Jaakkola & Hakanen, 2013; Mele, 2011) and suggest that co-creation is the foundation to use for greater creativity and complex problem-solving (see e.g. Amabile, 1983; Hershey, D., & Walsh, 2000). In theory, co-creation contributes to having mutual belief in the value proposition of a solution, but as recent studies have suggested (Storbacka, Brodie, Böhmman, Maglio, & Nenonen, 2016), this concept of value co-creation seems to be a macro concept that lack enough empirical grounding and accurate operationalization. Therefore, there is a clear need to deepen the current understanding of co-creation, a theory that is based on Storbacka (2016), and then investigate the micro-foundations of value-based solution selling.

This study goes beyond macro-level customer problems to demonstrate that the common industrial logic used for addressing and tackling customer problems in solution selling and co-creation, hitherto portrayed as either deductive or inductive, is currently incomplete. The first approach, deductive ("push sales) departs from a company's current product and service portfolios, while the second approach, in contrast, is inductive ('pull sales'), wherein the preferred solution is (solely) derived from the customer's (communicated) existing needs. This current study introduces a third view for handling micro-foundations and customer problems with value-based selling and introduces an abductive epistemology. Abduction herein means that a supplier's sales force take on the role in the customers' business processes and goes beyond the wicked, underdetermined customer problems with the goal of constructing and reaching certainty (in other words, finding the solution for the customer) (Luotola, Hellström, Gustafsson, & Perminova-Harikoski, 2017). For such a purpose, suppliers need tools and mechanisms to show how the value of their offerings can be identified and communicated in terms of the problems they address. In particular, solution providers should develop a portfolio of customer problems to show the value of such problems, rather

than only a portfolio of their firm's products and services (Hellström et al., 2016).

In this study, the approach taken for addressing the complexity and uncertainty of solution selling stems from design thinking. The understanding of the benefits and applicability of that discipline evolved gradually during this research. In this thesis design research aims at producing results that can solve real-life problems and have a practical meaning for the business (Gustafsson & Tsvetkova, 2017). To date, however, there has been no predominant theory or a model put forth as such that can be used in the context of managing the uncertainty seen in value-based selling.

The assumptions of the compatibility of design thinking and industrial management and marketing disciplines are mainly based on the author's Master of Arts education and previous professional working experience as a service business designer. Based on these standpoints the validity and the applicability of using design methods in industrial business settings were tested and further refined during various research and development projects with industrial clients. Moreover, the usability of these applied design thinking principles were analyzed and discussed in each of the published papers part of this dissertation. The goal was to generate new actionable knowledge for the current value-based selling theory and practice. The next chapters offer an analysis of relevant topics to examine how industrial firms can design and sell value-based solution offerings.

## 1.1. Research Objectives

The review of literature and industry practice undertaken for this dissertation revealed several gaps in firm efforts to exercise value-based selling, value-co-creation, and solution business design. Certain of these inadequacies related to firms' capabilities to solve customer business problems and manage the uncertainty of value-based selling have been already identified. Therefore, the key objective of this thesis is to create new knowledge for how industrial companies can design and sell value-based solution offerings. The dissertation investigates the ideal design process that an industrial seller should adapt and related elements that the seller must consider to exercise value-based selling successfully. The empirical part of this thesis was conducted in the context of manufacturing, focusing on marine logistics and power generating functions.

The following topics illustrate the ongoing research areas and the need for development in the management field that are then further investigated and discussed in this dissertation.

***Conceptualizing the abductive sales approach for value-based selling.*** A shift toward solutions business has increasingly induced industrial sellers to use value-based selling and pricing strategies to market and monetize their offerings. However, it can be argued that industrial solution sellers face challenges when demonstrating the value of their market offerings in a way that this value affects their customers' business performance (Terho et al., 2012; Töytäri & Rajala, 2015). There is a need to conceptualise value-based selling as a sales approach to create a value-adding solution for the customer and secondly, find new mechanisms for successful problem solving between the solution parties. This goal means that value-based selling not only requires a different sales approach, but essentially also a different, abductive epistemology (Luotola et al., 2017).

***Value of problems for firm profitability.*** The existing literature does not describe sufficiently enough how the solution provider can tackle the critical barriers and solve customer problems that emerge while the solution is being formulated. As solution offerings are complex, it is often not clear what the actual problem is at the beginning of a sales situation (Dorst & Cross, 2001) or even what the most relevant problems actually are. Dorst (2007) further divides these problems into three different categories, namely, determined, underdetermined and undetermined, and calls for specific sales capabilities to reach out and solve different unexpected and uncertain situations. These sellers can then engage in a continuous search for complex problems to solve, as ultimately, that is where the added value resides. Due to this complexity, solution providers should develop a portfolio of customer problems to show the value of such problems, rather than portfolio of a firm's products and services (Hellström, Wikström, Gustafsson, & Luotola, 2016). Such problem portfolios can then become a key intellectual asset for solution providers (Cross, 2001; Hellström et al., 2016).

***Handling Uncertainty.*** The presence of uncertainty strengthens the need for a two-sided co-creation and abductive mode to use for value-based selling (Luotola, Ivanova-Gogne, & Liinamaa, 2017). The concept of uncertainty, however, does not yet seem to have as wide an influence in the industrial marketing literature as it does in the operations or general management literature (Luotola

et al., 2017). Due to this notion, it is necessary to integrate the concept of uncertainty found in the project management literature (Loch, DeMeyer, & Pich, 2006; Perminova, Gustafsson, & Wikström, 2008; Ward & Chapman, 2003) into the solutions selling and value co-creation discourse. This integration is crucial for handling and even utilizing uncertainty to establish certainty, which is a key feature of value-based selling.

In addition, the literature on value-based selling has as of late been criticized for being too much of a macro construct, while the actual appearance and manifestation of co-creation has still remained rather abstract (Storbacka et al., 2016). The value co-creation literature seems to focus on the general premises of co-creation at the expense of uncovering the (micro-level) value creation mechanisms and processes. Hence, Storbacka et al. (2016) proposed actor engagement as an operationalization of the otherwise fluid co-creation concept and further advance the field by exploring its micro-foundations. Due to these demands, the actor-network theory can offer a capable technique for mapping the controversies of co-creation with the goal of affecting the creation of certainty.

***Contracts as relational governance tools.*** An important success factor in the value-based selling of industrial solutions is the designing of an appropriate pre-contractual integration model that allows the seller and the buyer to align their individual sales and purchasing processes, their value perceptions, and value sharing arrangements (Liinamaa et al., 2016). However, even though the barriers to value-based selling have been identified, for example, by Töytäri, Rajala, and Alejandro (2015), only a few studies have yet investigated how contracts per se affect the successful implementation of performance-based solution sales and delivery. In this conception, contracts should be understood as relational governance tools that can have added value for business integration efforts. Moreover, value for a customer can be produced by using performance-based contracting (PBC) and value-based pricing (Liinamaa et al., 2016). This view highlights the need for a proper integration design when facilitating the value-based and legal selling of industrial solutions, as the use of PBC may otherwise be inhibited by the value sharing pattern entrenchment effect that Töytäri and Rajala, (2015) identified.

***The contributions of design thinking to value-based sales theory and practice.*** There is a need to investigate the contributions of design thinking to value based-selling and put forward a coherent and empirically grounded process

that accounts for and manifests uncertainty using the aspects of design. The exact formulation for how such solutions are designed in value-based selling is difficult, as solutions can be designed using various perspectives and disciplines and thus differing terminology. Based on these standpoints, the objective of this thesis is to examine the ideal value-based sales process that supports the formation of certainty and mutual understanding of value between the seller and the customer. In particular, the objective is to understand how a supplier's sales force can take a role as a value designer in a customer's business processes and go beyond the wicked, underdetermined customer problem and construct and achieve certainty (in other words, find a solution for that particular customer).

## 1.2. Research Questions

With the above-described observations in mind, this thesis poses the following research question:

**RQ: How can industrial companies design and sell value-based solution offerings?**

This question seeks to provide an understanding of how manufacturing companies should deploy value-based selling principles and strategies so their actions affect their customers' profitability (Terho et al., 2012; Töytäri & Rajala, 2015). The context of this research is mainly the seller organization's sales management unit, but the findings will also influence the activities of R&D, project management, solution development, and the legal department. The value-based sales logic and its related practices are targeted both for the management level of the companies and for the use of the sales managers in their daily work with their clients.

For the purpose of this empirical research, the main research question is divided into specific sub-research questions that are investigated through a review of the articles included with this dissertation (see Table 1). Each of the sub-questions brings new knowledge to the value-based selling literature and provides managerial guidelines for solution developers in their ongoing efforts to design and sell industrial solutions. In Chapters 1.2.1-1.2.4, the positioning of these individual publications is discussed for how each addresses the main research question.

The following research sub-questions were posed in the four articles included in this dissertation:

**Table 1.** Sub-research questions in this dissertation

<b>SUB-RESEARCH QUESTIONS</b>	
Sub-question 1	What tools and capabilities are needed to create a value-based solution?
Sub-question 2	How are customer problems manifested in the offerings and the delivery processes of a project supplier?
Sub-question 3	How is uncertainty handled in value-based selling?
Sub-question 4	How can an industrial solution seller commercialize its solution for value-based selling techniques when using a highly advanced performance-based contract as the pricing device?

### 1.2.1. Publication 1: The Value-Based Sales Approach: The Design Process, Tools, and Capabilities Needed to Create a Solution

The first article explores how industrial sellers that wish to deploy value-based selling techniques should change their ways of doing business. The publication suggests that the key element of value-based selling is that the supplier understands customer business problems, and has the ability to demonstrate the profit impacts of their solution for the customer.

The findings show that companies lack the tools and managerial capabilities to transform their organization into one that can resolve customer problems. The publication contributes to the main research question and research sub-question 1 by introducing a value-based sales approach that enables industrial companies to address customer problems and enhance customer certainty regarding the presented added value.

When writing the first article of this dissertation “The Value-based Sales Approach – the Design Process, Tools and Needed Capabilities to Create a Solution”, certain preliminary design principles for the value-based sales approach and the connected methods that can assist companies in addressing their customer problems and enhance customer certainty were considered and tested in real-life company projects. The learning from these research and development activities led to the assumption that design thinking can actually guide the process for identifying, co-creating, and confirming customer perceived value. This finding is in line with several other outlooks (e.g. Brown, 2008; Fraser, 2010; and Miettinen, 2017) further suggesting that the benefits of design thinking can properly embrace the understanding of a customer’s business environment and problems. Simultaneously, the first draft of the sales

design process and its relevant tools were developed for the thesis in collaboration with the case companies.

### 1.2.2. Publication 2: The Value of Project Execution Services: A Problem and Uncertainty Perspective

The second article shows that the value of project execution services essentially rests in the problems those services solve. In particular, such value can be identified in the front end of the project where it should be, but seldom is, and weighed against project risks.

The goal of this article was to investigate how contractors and suppliers exercise value-based selling, and how that focus contributes to answering the main research question of this thesis. More specifically, the publication addresses the sub-research aspect of question 2 and suggests that project and delivery management services can address both internal and external problems. While both aspects may be beneficial, only solutions to the latter issue create value for the customer and thus must become the prime objective for successful productization efforts.

This publication also offers managerial contributions and outlines a three-step process for developing solutions. Further, this publication presents a created service configurator tool to better enable the identification and communication of the value of these project services. Moreover, the article introduces “problem portfolios” as a way to segment customers when selling services.

For this article design thinking provided methods to use to examine how suppliers can approach customer value by looking for problems that create uncertainty in the underlying investment and match them to suitable services. A service configurator was designed to cope with uncertainty and create certainty in the investment with the help of these particular services. During the writing process, however, it was realised that rather than focus on explicit customer needs, value-based selling should use the problems that exist in the context of the underlying investment as the point of departure during the early sales process. Therefore, the value of design thinking became evident, as the problems of value-based selling are often ill formulated, and conflicting values can make the organizing of solution more complicated (Rittel & Webber, 1973). Moreover, it was realized that problems should be understood in a broad context as being not only those that threaten to impair the project by increasing costs, but also those that threaten to reduce the potential value of the project (Hellström et al.,



2016). For such a purpose, design thinking offers the capability of dealing with ill-defined “wicked problems” for which there rarely is no single solution and even the nature of problem is unknown (Buchanan, 1992).

### 1.2.3. Publication 3: Embracing Uncertainty in Value-Based Selling by Means of Design Thinking

The third publication outlines the view that service delivery and solution selling is striving to achieve increased value through co-creation. However, the concept of value co-creation is a macro concept that lacks empirical grounding and accurate operationalization. This publication also responds to sub-research question 3 by suggesting that handling uncertainty during value-based selling requires a new approach that does uncover the micro-level processes of co-creation.

This article became the cornerstone in the attempt to understand how design thinking serves its purpose of handling uncertainty in value-based selling. The article extended to the value co-creation literature by suggesting that design thinking and actor-network theory can be used to explore how certainty evolves between a seller and the buyer. Moreover, during this research period it was understood that solution selling and value co-creation both require a different, abductive epistemology to address the uncertainty in contrast to the two very common industrial logics, hitherto portrayed as either being deductive or inductive. Though, as Martin (2009) suggests, successful businesses should balance analytical skills (inductive and deductive) as well as intuitive novelty in a dynamic interplay that this author calls design thinking, and at the heart of design thinking is an abductive logic.

### 1.2.4. Publication 4: Performance-Based and Functional Contracting in Value-Based Solution Selling

This publication investigates the challenges that value-based sellers encounter when designing a performance-based contract and commercializing value capture models. Its empirical investigation shows that those value-based sellers that wish to deploy value sharing pricing models must overcome a number of specific barriers.

The publication answers sub-research question 4 by suggesting that commercializing a solution requires a new functional contracting process that runs parallel to and yet complements the existing sales process. In particular, these

functional contractual techniques will help to coordinate the negotiation process, affect customer expectations, and support the implementation of needed changes to customer attitudes and organizational practice.

This research discusses the multiple barriers' hampering solution sellers' value-based sales efforts. The research suggests that certain legal-technical problems when creating performance-based contracts will likely complicate sellers' desire to use advanced value-based pricing techniques and capture a share of the value their offering produces. Secondly, the analysis of empirical data shows that many of the barriers result from an insufficient integration of seller and buyer organizations. Third, the investigation shows that the appropriate theoretical framework for developing solutions to the challenges of value based selling and pricing is under-theorized.

During the writing process of this article, it became clear that the functional contracting technique became a necessary device for stabilizing both customer perceived certainty and value creation. When the purpose of design thinking was to guide sellers on how to identify, co-create, and confirm customer perceived value, then the contracts became functional mechanisms to agree and settle on that value contractually. Therefore, it was understood that functional contracting could impact certainty, as it puts the sellers in charge to ensure that value is created while the role of lawyers is to interlock the interoperability of those processes contractually within two (or more) organizations with the aim to stabilize the customer perceived certainty. However, this required a new working mode for the industrial seller organizations to achieve a proactive cross-functional integration of legal, sales and product development functions and expertise in the seller's business strategy and sales processes (Liinamaa et al., 2016). Moreover, as legal topics are often difficult to relate to, design thinking brings tangible entry points and visualization to understand the principles, restrictions, and relations of the actors within the overall sales and customer journey (Beelen & Westerouen van Meeteren, 2017).

## 2. Theoretical Foundations

### 2.1. Background

The majority of industrial manufacturing companies have turned away from the transactional business (Rackham & DeVincentis, 1999) of stand-alone goods or services and moved toward providing solutions (Davies et al., 2007; Tuli et al., 2007), in particular by focusing on customer value (Windahl et al., 2004). Several definitions of what implies a solution already exist in the literature (see e.g. Cantù, Corsaro, & Snehota, 2012; Storbacka, Windahl, Nenonen, & Salonen, 2013). Storbacka (2011 p. 699) regards solutions as “longitudinal relational processes, during which a solution provider integrates goods, services, and knowledge components into unique combinations that solve strategically important customer specific problems, and is compensated on the basis of the customer’s value-in-use”. In addition, such solutions are defined as personalized packages of service, support, education, and consulting that may differ in scale and scope and their degree of integration between these components (Gailbright, 2002). In addition, solutions are seen as ensuring higher value than stand-alone products (Davies et al., 2007; Nordin & Kowalkowski, 2010; Tuli et al., 2007). Moreover, many solution providers tailor their offerings to support the lifecycle of the customer’s investment, including finance, design, and services so as to operate and maintain the system during the lifetime of these solutions (Davies et al., 2007).

Such a complexity of offerings challenges the design activities, while the uncertainty regarding varying customer value perceptions, fairness of value-sharing patterns and market disruptions is altering the traditional industrial management and governance models. In particular, industrial sellers have expressed a need for a new and novel kind of solution development tools and value-based selling techniques (Luotola et al., 2017).

To solve these barriers to efficient solutions delivery, scholars in the management field have suggested that the effective integration of multiple elements of a solution is key to achieving efficient industrial solutions delivery (Davies & Brady, 2000; Davies, Brady, & Hobday, 2006). Kirsilä, Hellström, & Wikström (2007, p. 715) argue that participating organizations must coordinate and adapt their activities on several levels and use multiple tools to “bring or join together a number of things so that they move, operate and function as a harmoni-

ous unit.” Moreover, compared to the traditional goods- or product-dominant business logic (Vargo & Lusch, 2004), migrating toward an industrial solution business model that “is characterised by collaboration that involve several functions of both the buying and selling organization” (Storbacka, 2011, p.699) entails several shifts and repositioning of the current sales and marketing theories.

The existing theoretical views (e.g., those expressed on value-based selling, value co-creation, integrated solutions, and process view for developing solutions, etc.) are important advances in understanding how organizations create their offerings. They lack clarity, however, about what is actually meant by making solutions functional and how design activities can practically be utilized in a business context. There has been some research into how professional designers actually do design, but further efforts are still needed (Kimbell, 2011). This dissertation shows both the need and the importance of creating an explicit link between management research and design practice.

The concrete benefits of design thinking for management research have been under-theorized, although a few exceptions can be found. The importance of the design process has been recognized in the field of new service development (Scheuing & Johnson, 1989; Zeithaml, 1988) as a guiding tool for redesigning existing services (Berry & Lampo, 2000). Pinhanez (2009) proposed that the design focus in developing customer-centric solutions delivers better control of the production process. Edman (2009) examined the connection between design thinking and service-dominant logic (Vargo & Lusch, 2004) and argued that design thinking offers viable methods and tools to support managers who want to create service-based offerings.

Within management, this interest in design has two main strands: (1) investigating the role of design within the innovation process and new product development, and (2) thinking of management as a design science rather than as a natural science (Kimbell, 2011). With regard to the former, Kimbell (2011) suggests that design is a key to innovation because it encompasses how to create new concepts and new knowledge (Hatchuel & Weil, 2009), and it often provides a structured, creative, and reflective process to use (Ulrich & Eppinger, 1995). Designers often use an ethnographic approach for that process to understand customers’ experiences from their views and then involve them in co-creating better services (Kimbell, 2011).

Despite the recent advances in understanding value-based selling, the current research suggests that significant gaps remain. The authors of management literature have discussed the relevance of design to business planning, but there has been little effort to engage in precise research into the different theories of design (Menor, Tatikonda, & Sampson, 2002). In addition, the connection between design thinking and industrial selling, to a great extent, has remained an understudied area. Therefore, an interdisciplinary approach is the key to explore how companies can design and sell industrial solutions, thereby merging the two disciplines of design thinking and management research. In this dissertation, the design thinking literature is used to better understand whether professionals who take on design thinking as their specialty can bring something new to the existing sales and solutions theory and practice and how they can do so.

The existing research has not elaborated, for example, on 1) what makes a quantifiable and commensurable value to a customer, 2) which definitions of problems are relevant in value-based selling, and 3) how is value stabilized during the sales and functional contracting process through the use of design?

The contention of this dissertation is that an important success factor for the value-based selling of industrial solutions is the capability to design a functional solution that will require the seller and the buyer to align their sales, purchasing, and contractual processes, value perceptions, and value sharing arrangements. Different customers will have varying organizational interfaces, and they also quantify and measure value using different tools, have varied decision-making sequences, and use different earning models. Therefore, a well-functioning integration model has an important role to play for facilitating successful value co-creation in industrial solutions (Grönroos, 2008; Vargo & Lusch, 2004). Moreover, as Storbacka (2013) suggested, the value focus for business planning and execution inevitably changes the existing solution platforms, as the needed companies' capabilities and management practices can be considerably different when they are compared to the traditional product business.

These above-mentioned shortcomings reflect a deep-rooted lack of attention being paid to design within the management and organization fields, resulting in a gap between the research and development of traditions in both management research and design disciplines. At a conceptual level, this thesis identifies the topical management themes of value-based solution selling and

provides a useful theoretical lens for designing industrial solutions. The next literature chapters outline the necessary shifts and repositioning of the capabilities and structures of industrial firms for them to be able to design and sell value-based solution offerings successfully.

## 2.2. Design Thinking

Over the past few decades, the design profession has begun to take shape and play a larger role in business development. In particular, the attempt to apply design in this fashion has created a sudden demand for clearer and more definite knowledge of design thinking and its impacts on management research (Dorst, 2007). According to Lockwood (2010, p. 11), “design thinking is basically a human-centred innovation process that emphasises observation, collaboration, visualization of ideas, and concurrent business analysis that ultimately influences innovation and business strategy.” The objective of design thinking is to involve customers, designers, business practitioners, and researchers in an integrative process that can then be applied to products, services, and business models. According to Lockwood (2010) the term “design thinking” is often referred to as applying designer sensibility and methods to problem solving, but it should also be noted that design thinking is not a substitute for either professional design or the art and craft of designing. Rather, it is a methodology for innovation and simplifying complex phenomena. Similarly, Dorst (2010) outlined the view that design thinking provides tools and techniques to use to consider issues and resolve problems thoroughly, which is a reason why the concept has been applied to both business and social issues.

In recent years, design seems to have shifted toward service design research field. Kootstra (2009), defined service design as an integration of design thinking and strategic management – thus, a cross-disciplinary approach to management. Moreover, according to Ostervalder, Pigneur, Bernarda, and Smith (2015) design thinking allows organizations to design and deliver concrete value propositions, and these used tools of design thinking result in cost savings, additional revenues, increased customer loyalty, new sales opportunities, and higher margins and speeding up of the innovation process (Miettinen, 2017). Service design has recently taken an interdisciplinary approach and combines different methods from various disciplines (Stickdorn, 2010). Therefore, service design provides a boundary spanning way of thinking about business issues and the means to help resolve those issues. Moreover, the latest research

directions for service design emphasizes the importance of measuring the business impact and value (see Touch point, Vol. 9, 2017) and changed the directions toward strategic issues. This direction, therefore, is now an important link to the research of value-based selling.

Especially in the context of selling solutions, industrial companies have noted that executing the transition to become a solutions provider required more than just new managerial tools and methods. Instead, a new approach is needed that would allow the diagnosis of current industry problems, envisioning innovative solutions and developing the knowledge for how to turn the current product-dominant business into solutions-focused business practice. Such an approach requires constructive, experimental, and collaborative research agendas (Tsvetkova, 2014). Meeting the demands of solution selling design thinking is today seen as providing appropriate methods to use for the existing entities as well as constructing and realizing new entities (Denyer, Tranfield, & Van Aken, 2008).

### **2.3. Value-Based Selling**

In industrial solution sales, the seller's focus is on the added value the offering provides to the customer. Haas, Snehota, and Corsaro (2012, p. 102) outline the importance of understanding and communicating the added value during the sales process and have stated that "skilled selling" involves an in-depth "understanding of the customer with its markets and operations." In this paradigm, marketing is an activity that 1) should be pursued by the whole organization and integrated with other activities of the company, and 2) is aimed at increasing the adaptability of the firm to its market by adjusting its organizational attitude and practices to market conditions (Avlonitis & Gounaris, 1997). Thus, effective market orientation requires that the seller company understands the market, and also the capability to distribute knowledge about that market within the firm, and develop strategies and plans that apply this gathered knowledge (Kohli & Jaworski, 1990).

The value-based sales approach has appeared as both a field of research and an effective strategy to use to aid companies in succeeding in competitive markets (see e.g., Rackham & DeVincentis, 1999). Certain aspects of value-based selling are relatively well known. Terho et al. (2012) provided the basic conceptual framework for value-based selling. Value-based selling is a proactive marketing practice. In it, sellers typically focus on communicating and demon-

strating the financials that the seller's solution offers to the customer instead of simply seeking to offer a lower price than their competitors offer.

The research shows that solution providers do have challenges when demonstrating the productivity impact of their solution on their customer's business performance, and indeed also a prerequisite for value-based selling (Töytäri & Rajala, 2015). This deficiency is peculiar, as several authors a decade ago already acknowledged the importance of enhancing value capture for the customer (Ulaga & Eggert, 2006) and suggested that suppliers should become a part of the customer's own strategy (see e.g., Anderson, Narus, & Van Rossum, 2006; Hinterhuber & Bertini, 2011). Moreover, customers not only expect suppliers to cut costs, but also emphasize the suppliers capability to demonstrate the financial benefits of an investment (Grönroos, 2008; Storbacka et al., 2013). This finding is supported by several authors, and further as Töytäri & Rajala (2015) also suggest, there is a value quantification that requires both quantifiable and commensurable value elements to be considered.

Recent empirical research indicates that sellers often encounter a number of challenges (Liinamaa et al., 2016), and it suggests that value-based selling requires a specific set of organizational capabilities, some of which are hard to achieve. Sellers must foster a distinct mindset in their sales organizations, which is then consistently supported by management. They must also develop new sales tools and approaches tailored to value-based selling. Customers are also unlikely to be receptive to value-based selling efforts, as value sharing is not always accepted "as a legitimate logic of value exchange" (Töytäri & Rajala, 2015, p. 109). Another study (Töytäri et al., 2015) further identified a large number of institutional and organizational barriers to value-based selling. These barriers include, for example, problems in gaining access to influence with customers, thus affecting customers' value perceptions, and the perceived fairness of such cost-based pricing patterns (Liinamaa et al., 2016).

One of the key factors that challenges value-based selling are integration problems (Rajala & Töytäri, 2015). According to Liinamaa et al., (2016) influencing customer value requires that both the seller and the customer organizations coordinate and adapt their activities, so that the seller gains access to "customer's management", is able to affect the mindset of those in "power", and can orchestrate key incentives within the customer organization at the right time during the sales process. Secondly, to affect how the customer perceives that value, the seller has to somehow gain access to the customer's pre-existing val-



ue understanding and functions and the detailed business performance data to overcome any potential distrust and reluctance to quantify that value (Liinamaa et al., 2016). Third, the seller must be able to alter the already established value-sharing fairness patterns. For that purpose, performance-based contracting offers a results-oriented contracting method and new revenue-sharing mechanisms for true value-based selling (Liinamaa et al., 2016).

To meet these identified challenges of value-based selling, in the next chapters on the literature, the necessary elements of value-based selling are discussed in greater detail.

### 2.3.1. Demonstrating the Financial Impacts of a Solution

As argued by Rackman and DeVincentis (1999) if a company is to be successful, it has to create value for its customers and also be able to communicate that value. However, in the solutions business, the ability to grant profitability to a customer changes the existing company's platforms, as the complexity of a firm's capabilities and its management practices are considerably different in solution business than in the traditional product business (Storbacka et al., 2013). Congruently, academics have started to stress supplier capability and/or its inability to demonstrate the financial benefit of an investment in concrete terms and fit suppliers solution offering to their customer's business model (Grönroos, 2008; Storbacka et al., 2013). This finding is further supported by Töytäri and Rajala (2015) who suggest that value quantification requires both quantifiable and commensurable value elements.

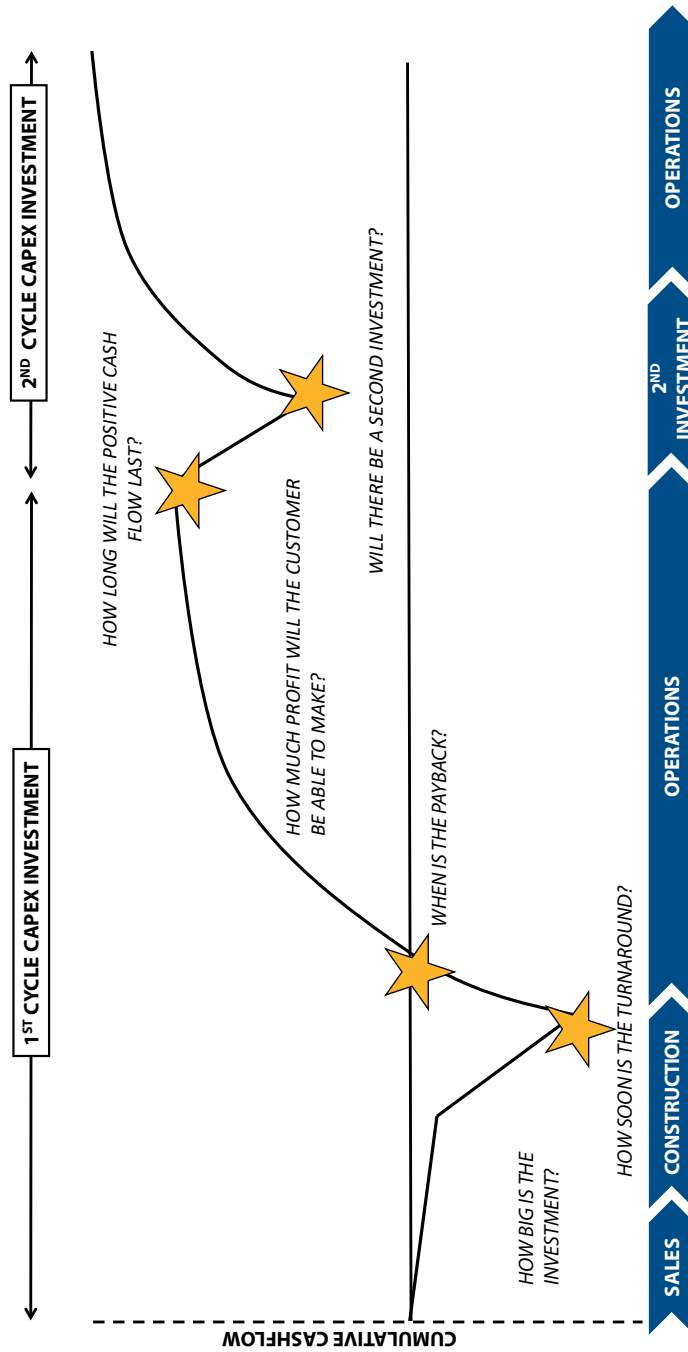
Even though authors in the management research field have noted the importance of showing value (also in quantifiable terms), there remains a need for more thorough understanding of what makes value for a customer. First, customer value functions are difficult to map, as financial performance drivers can vary from customer to customer and also display complex correlation structures (Liinamaa et al., 2016). Secondly, customers' do not always underscore the proposed value-creation and value-capture models, as the industry has entrenched practices that force customers to adopt a distorted understanding of the earning potential of their installed base (Liinamaa et al., 2016). This kind of ambiguity means that customers often receive a value proposition of their earnings based on the theoretical technical capacity of the installed base instead of the actual financial performance potential (Luotola et al., 2017). A reason for these inadequacies can be found in noting how value is defined.

Recently, academics have suggested that the value of a solution and its services essentially rests with the problems they solve. In particular, such value can be identified in the project front-end (the preliminary project stage when developing the project definition), where it can be weighed against project risks and problems (Hellström et al., 2016). Therefore, the need for more concrete demonstrations of an investment's value requires new tools that can be utilized at the beginning of the sales situation.

One of the most common project valuation tools that can quantify an investment's lifecycle value is the net present value (NPV) technique (Brealey, Myers, & Allen, 2014). NPV is a concrete example of the financial capabilities needed by integrated solution providers (Davies et al., 2006). NPV can also be used to illustrate some of the core ways through which a supplier can add value to an investment project. A supplier can have an impact on most, if not all, of these variables when using the net present value (NPV) formula (see Figure 1); indeed NPV is among the most commonly used investment evaluation techniques (Brealey et al., 2014). A supplier can readily affect, e.g., investment cost (capital expenditure) and time and operational expenditures, thereby ultimately addressing the economic value of a solution. With a separate service, the financial impact is often more indirect, but it works precisely by deferring project risks, i.e., by avoiding delays, cost increases (capital expenditure) and quality flaws (which can potentially affect both operational expenditures and revenues in the NPV formula). The NPV formula (in its simplest form) is presented in the equation below.

$$NPV = -CAPEX + \sum_{t=0}^N \frac{Revenue - Cost}{(1 + i)^t}$$

- CAPEX = Capital expenditure for the facility
- n = lifetime of the facility
- Revenue = revenue from the operations of the facility
- OPEX = Operational expenditures for running the facility
- i = interest rate



**Figure 1.** The mechanism to use for demonstrating a supplier's impacts on a customer's investment.

### 2.3.2. Adding Value by Solving Customer Problems

To understand how suppliers can make profits for their customer's business, one must understand the risks and uncertainty that solution creates. With the wide provision of solution offerings available, value proposition will include a number of risks (Nordin, Kindström, Kowalkowski, & Rehme, 2011). In the manufacturing industry, these solutions are often unique and rather complex designs (Davies et al., 2006) which is why their offerings tend to become rather customized (Sawhney, 2006). In addition, any increased service orientation comes with the risk that the supplier is not remunerated for all the services it provides, whether as increased customization, product service bundling, or extended scopes of offering (Nordin et al., 2011).

To be cost efficient, industrial sellers need to design and provide solution offerings that are well-structured, e.g., based on so-called "naked solutions" that can be extended by using add-on modules (Anderson & Narus, 1995) or an industrialization of the back office (Reinartz & Ulaga, 2008). On the other hand, such itemization and standardization of services can provide increasingly less valuable solutions to customers in that they do not any longer precisely meet the specific customer problem or need. Finding the correct bundle or configuration that is best for a specific customer is indeed a challenge. Moreover, to be sellable, manageable, and repeatable, there needs to be a limited number of configurations at the outset (Hellström et al., 2016). The service marketing literature typically portrays this development as a transition that occurs from the manufacturing of goods to the delivery of services (e.g., Oliva & Kallenberg, 2003).

Although solutions to customer problems tend to become customized, not everything has to be unique, nor is the only alternative for a completely standard solution. A key concept in any customization is having a "configuration" that searches for a solution to a customer problem. According to Hellström et al. (2017, p. 223) "configuration can be seen as an engineering activity wherein certain configurations ('constellations') of a product or a system are developed by choosing from a platform of more or less standard modules or building blocks". In addition, the configurator allows the solution providers model product/service configurations that correspond to a specific customer's needs or problem (Piller, 2005). Being able to achieve the necessary knowledge of the correct bundle of products and services further requires knowing how to utilize the customer as a value co-designer.

### 2.3.3. The Micro-foundations of Value-Based Selling

Töytäri and Rajala (2015) emphasized that value quantification requires both quantifiable and commensurable value elements. Still, as Storbacka et al. (2016) pointed out, both researchers and managers still struggle to show concrete value demonstrations. A reason for this difficulty can be found in the ways firms actually are practicing value co-creation. The idea is often portrayed in terms of abstract macro-level concepts, such as sales capability, value-generating activity, and organization capabilities, but lack full explanatory power (Foss & Lyngsie, 2014). For this reason, Storbacka et al. (2016) proposed micro-foundational research as a bridge to engage more actors in empirical value research. They suggest that value co-creation requires a greater focus on the micro-foundations that underpin the macro constructs as well as finding ways to anchor that research to macro-level strategy and organization theories. Such specific information on customer value-creation elements will require new collaboration patterns, close to what Viio and Grönroos (2016) define as sales adaptation. In the model provided by Viio and Grönroos (2016) sellers adapt their processes and operations to match those of their customers to better identify the problems and thus demonstrate a more precise problem-solution fit for the offering. Still, being able to engage the customer in any joint value-creation forces all the parties to share solid, concrete, and verifiable business data as well as their financial performance drivers (Terho et al., 2012).

A concept that is close to such micro-foundations originates in the Actor-Network Theory (ANT) (Latour, 2005). The purpose of ANT is to serve as an analytical framework to identify and act on micro-level problems that can appear during the value-based sales process (Luotola et al., 2017). This theory offers tools that can be used to describe the socio-technical dynamics that can influence value-based sales concept development and provide an approach for precisely understanding how firm actions shape the customer business process. Another tool taken from ANT is the socio-technical diagram (Latour, 2005), which can be used to capture the ongoing dynamics of these sales processes. This diagram lets sellers identify and map which of the micro-level actors in a network support or oppose the business system enrolled in the programme or the anti-programme of a solution. This mapping supports the empirical understanding of how opposing actors (anti-programmes) can be solved and how supporting actors (programmes) can be strengthened during the sales process. Indeed, these programmes and anti-programmes can be compared to

micro-foundations as they are the observed “actors” of the value co-creation activities found in value-based sales (Luotola et al., 2017).

## 2.4. Design Thinking Meets Value-based Selling

Due to an obvious ongoing managerial need, this dissertation describes how an idealized, value-based sales process and an abductive sales approach was designed based on certain recognized similarities found in 15 sales cases (see Figure 7). This finding manifests a selling technique that supports the formation of certainty and a mutual understanding of value.

Table 2 summarises the main theoretical background identified during this research. The framework includes identified needs in the industrial management and marketing literature that are needed for building the theory on value-based selling and shows how design thinking can support what value-based selling seeks to accomplish.

### 2.4.1. Design Thinking As a Process for Problem Solving

This research shows how solutions are designed during the value-based sales process and demonstrates the need to broaden the common and typical understanding of industrial solutions development within the management and marketing literature. Thus, in addition to the views expressed in management research, key features of service innovation, service design, and the design thinking literature are reflected as well as the most relevant process views that also benefit solution sales, are summarised in the following section.

In management research, (Storbacka, 2011, p. 699) outlined the view that industrial solutions are defined as “longitudinal relational processes, during which a solution provider integrates goods, services, and knowledge components into unique combinations that solve strategically important customer specific problems and is compensated on the basis of the customer's value-in-use.” Some studies have investigated certain distinct solution process stages (Davies et al., 2006; Tuli et al., 2007) but these studies tend to view solutions as linear, dyadic processes (e.g., Ceci & Prencipe, 2008; Sawhney, 2006) that ignore the impacts of the business environment and the involvement of multiple parties.

Shoctack (1982) introduced one of the earliest ideas presented regarding the conceptualization of service processes. The author proposed that documenting and following the service delivery process was a crucial method for

**Table 2.** The theoretical background for designing and selling value-based solutions.

<b>THE THEORETICAL BACKGROUND NEEDED FOR DESIGNING AND SELLING VALUE-BASED SOLUTIONS</b>		
DESIGN CRITERIA USED FOR ACHIEVING FUNCTIONALITY	<b>Identified needs in the industrial management and marketing literature for building theory on value-based selling</b>	<b>How does design thinking support what value-based selling seeks to accomplish?</b>
ABILITY TO DEMONSTRATE AND CREATE VALUE BY SHOWING HOW THE SOLUTION SOLVES A CUSTOMER PROBLEM	Suppliers should be capable of <b>demonstrating the financial benefits of an investment in concrete terms</b> and fit their solution offering to their customer's business model (Grönroos, 2008; Storbacka et al., 2013).	<b>Design thinking allows organizations to design and deliver concrete value propositions</b> (Osterwalder et al., 2015). These tools of design thinking result in cost savings, additional revenues, increased customer loyalty, new sales opportunities, and higher margins and speed up the innovation process (Miettinen, 2017).
	<b>A solution is a response to a customer's problem</b> (Stremersch et al., 2001) or <b>solves a customer's problem</b> , sometimes even before that customer has considered its own products and service requirements (Davies et al., 2007).	<b>Design thinking offers practical tools for problem solving</b> (Buchanan, 1992) and helps companies to overcome problems that prevent the creation of meaningful and innovative value propositions (Miettinen, 2017).
	<b>Customer value-creation and value functions are difficult to map</b> , as financial performance drivers vary from customer to customer and display complex correlation structures (Liinamaa et al., 2016)	<b>A problem "configurator" lets solution providers to model product/service configurations that correspond to a specific customer's needs or problem.</b>
	<b>A "skilled selling" involves an in-depth "understanding of the customer with its markets and operations"</b> , which means that the seller understands and can communicate the added value of their offerings to the customer (Haas et al., 2012).	<b>Design thinking provides specific tools and mechanisms to let the seller become a value designer</b> (Luotola, Ivanova-Gogne, & Liinamaa, 2017). Such a seller has an important role to play in leading the design process and dealing with "wicked problems" (Dorst, 2007).
	Solutions are usually complex, so <b>it is often not clear what the precise problem is</b> (Dorst, 2007). Rittel and Webber (1973) compare the ambiguity associated with "wicked problems" to uncertainty, as these issues are not always obvious and explicitly known at the beginning of the design process or a sales situation.	<b>Design thinking gives the capability to deal with "wicked problems"</b> for which there is no single solution or even the nature of problem is unknown (Buchanan, 1992). The value of design is evident when the problems are ill formulated, and conflicting values make the organizing of a solution more complicated (Rittel & Webber, 1973).
	The solution concept should <b>go beyond an explicit customer need or problem</b> (Adamson, Dixon, & Toman, 2012).	In design thinking, the solution does not arise from the existing markets; instead, <b>the act of designing works to identify new markets and greater economic value (Romme, 2003).</b>

THE THEORETICAL BACKGROUND NEEDED FOR DESIGNING AND SELLING VALUE-BASED SOLUTIONS		
ADOPTING ABDUCTIVE EPIS-TEMOLOGY FOR VALUE CO-CREATION	<p><b>Service and solution selling should build on (value) co-creation</b>, during which all value functions are defined by the seller and the customer and realized via the customer's value generating processes (Vargo &amp; Lusch, 2004).</p>	<p><b>Designers co-create solutions to problems</b> by using an iterative, reflective process wherein problems and solutions can co-evolve (Dorst, 2007; Dorst &amp; Cross, 2001).</p>
	<p><b>There is a need to increase and improve reciprocal interdependencies</b> when firms move to solution offerings (Windahl &amp; Lakemond, 2006). In solution selling, neither the supplier nor the customer can formulate the solution to a "wicked problem" alone (Rittel &amp; Webber, 1973).</p>	<p><b>A socio-technical diagram (Latour, 2005) can be used to capture the dynamics of the sales processes.</b> This diagram lets sellers identify all reciprocal interdependencies and map which micro-level actors either support or oppose the business system.</p>
	<p>Two types of solution sales processes can be distinguished: <b>(1) a deductive approach (push sales)</b> that departs from a company's current product and service portfolios (Biggemann, Kowalkowski, Maley, &amp; Brege, 2013) and <b>(2) an inductive approach (pull sales)</b>, where the preferred solution is (solely) derived from the customer's explicitly communicated existing needs (Davies et al., 2007; Tuli et al., 2007).</p>	<p>Design thinking provides a framework that lets sellers apply a value-based selling process wherein reasoning and epistemology is abductive (Alvesson &amp; Sköldbberg, 2010). <b>This abductive approach lets customer and supplier formulate a solution together</b> (Luotola et al., 2017).</p>
	<p><b>Solution providers must be able to coordinate and adapt their activities on several levels and use multiple tools to "bring or join together a number of things so that they move, operate, and function as a harmonious unit"</b> (Kirsilä et al., 2007, p. 715).</p>	<p>Designers will explore a wide range of connections and actions in everyday practices and investigate how different types of connections affect the structure of a solution (Buchanan, 1992). <b>Designing a solution is, therefore, a reflective practice in which professionals move between different framings of problems, as they go about solving them</b> (Schön, 1983).</p>
	<p>Several studies have investigated distinct <b>solution process stages</b> (Davies et al., 2007; Tuli et al., 2007) but these studies tend to view solutions as linear, dyadic processes (Ceci &amp; Prencipe, 2008; Sawhney, 2006) that <b>ignore the impact of a business environment and the involvement of multiple parties.</b></p>	<p>Design provides the frameworks for creating a structured creative process (Ulrich &amp; Eppinger, 1995). In such a process, <b>designers are often using an ethnographic approach to understand customers' experiences in their own terms and involving customers' in value co-creation</b> (Kimbell, 2011).</p>



THE THEORETICAL BACKGROUND NEEDED FOR DESIGNING AND SELLING VALUE-BASED SOLUTIONS		
TACKLING THE MICRO-FOUNDATIONS OF VALUE-BASED SELLING	<p>Storbacka et al. (2016) have pointed out that <b>practitioners struggle to show the concrete value demonstrations for their customers, due to a current practice of value co-creation</b> that has been criticized for being too much a macro construct at the expense of uncovering (micro-level) value creation mechanisms and processes.</p>	<p><b>Design thinking supports the goals of value co-creation at the concrete actor level.</b> Value co-creation can be observed via the programme/anti-programme concept (Latour, 2005) by identifying several programmes and anti-programmes, that actor level co-creation will produce (Luotola et al., 2017).</p>
	<p>Micro-foundational research is a bridge used for engaging actors in empirical value research suggesting that <b>value co-creation requires more of a focus on the micro-foundations that underpin the macro constructs</b> and also ways to anchor that research to macro-level strategy and organization theories (Storbacka et al., 2016).</p>	<p><b>Actor-Network Theory (ANT) (Latour, 2005) serves its purpose as an analytical framework to use to identify and act on the micro-level problems' appearing during the value-based sales process.</b> This theory can be applied as a creative tool for understanding how firms' actions shape customers' business processes and value-creation (Luotola et al., 2017)</p>
HANDLING UNCERTAINTY	<p><b>Constructing certainty requires re-consideration and sense-making of all the elements that may impact a solution</b> via a joint effort between the supplier and its customers (Perminova et al., 2008).</p>	<p><b>Design as a "reflective practice" deals with messy, problematic situations that are implicit in the</b> intuitive processes that practitioners often do bring to situations of uncertainty (Schön, 1983).</p>
	<p><b>Co-creating a solution is a process of change that involves managing high levels of uncertainty;</b> there is an obvious importance to the reflective processes to be able to foresee potential business dangers and opportunities to the fullest possible extent (Schön, 1983) (Schön, 1983).</p>	<p><b>Design provides a framework for making sense of complexity,</b> where in several clients and decision-makers have conflicting values and the ramifications of the system are confusing. While reflecting on and making sense of a situation in the process of co-designing it, the involved actors start to see both the situation and the process from a different perspective (Luotola et al., 2017)</p>
	<p>Certainty can be achieved if the following criteria are met: <b>1) indications of the effects of contractual performance</b> for the customer; <b>2) a value capture or pricing model</b> that is distinct from charging a simple fixed price; and <b>3) a focus on incentivizing appropriate performance</b> (Liinamaa et al., 2016).</p>	<p>A functional contracting process and a new contractual technique guides the sales process, impacts customer expectations, and helps implement changes to the organizational practice (Liinamaa et al., 2016). <b>Design thinking provides new mechanisms for stabilizing the facts that enable all parties to agree on the content and documentation for final contracting,</b> as the knowledge of the case emerges and certainty settles in precisely (Luotola et al., 2017)</p>

the designing of a service offering. A visual representation of that process was named the “blueprint” of a service design. A blueprint represents what happens in front of the customer that is engaging with service personnel and service “evidence” and also behind a “line of visibility” where others support the service delivery (Kimbell, 2011). The blueprint lets developers and researchers grasp the intangible world of interactions and make actions tangible (i.e., through prototypes, illustrations, and sketches) by moving from interactions to experience (how customers value and experience the service or a solution) and then moving from those experiences to commercialized solutions. Recent empirical work that has studied professional sellers (i.e., value designers’), and their approach to designing solutions (Luotola et al., 2017) moves Shostack’s (1982) work on blueprints forward to show how creating blueprints helps design a multi-interface sales process and then how those blueprints (i.e., activities) help multi-functional teams generate new opportunities for innovation (Bitner, 1992).

Several authors have introduced new service development processes (NSD) that have been adapted from the service innovations literature for use in the industrial manufacturing context. Kowalkowski, Brehmer, and Kindström (2009) presented a four-stage framework for offering development based on the following stages: Market sensing, development, sales, and delivery. Each phase of this framework process is beneficial to pass through, and the unique implications and experience of each step should be carefully evaluated. Kowalkowski, Brehmer, and Kindström (2009) further concluded that service development necessities different competences than goods-dominant processes do, such as the ability to understand the value-creating logics of the customer. Therefore, a better framework for understanding how products and services coexist within the same firm is still required. Indeed, Menor et al.’s work (2002) discuss the requirements for new service development through research opportunities and identifying new challenges. The authors concluded that the benefits of NSD include: 1) enhancing the benefits of new offerings; 2) attracting new customers to the firm; 3) improving the loyalty of existing customers; and 4) opening new market opportunities for the firm.

In contrast to management research, design thinking offers a broad scale of process views for different purposes that are grounded in the design mode. In that tradition, designers co-create solutions to problems via an iterative, reflective process, where both the problems and the solutions co-evolve (Dorst,

2007; Dorst & Cross, 2001). A design approach examines activities based on the perspective of how to better achieve a flow of experiences in concrete situations, thereby making these experiences more intelligent, meaningful, and satisfying (Buchanan, 2001). In recent years, some educators and practitioners have argued that a common aspects of many designers is that problems and opportunities are framed using a human-centric viewpoint. They use visual methods to identify and create new ideas as well as engage customers and other stakeholders to design the preferred solution (Brown, 2008).

In the service design literature, Moriz (2005) divides his framework for developing services into six stages: Understanding, thinking, generating, filtering, explaining, and realizing. Similarly, the British design agency, IDEO, divides its process into three main stages: 1) understand and observe, 2) visualize and refine, and 3) implement. Understanding and observing builds a strategic framework by gaining precise insights into what people want, what is feasible for the business, and what is possible using technology. During the second stage, “visualize and refine”, the final concepts are developed through iteration, brainstorming, and prototyping. Based on all of these insights and findings, ideas are then developed and tested. During the stage called “implement”, the final concept is translated and implemented as products, services, and solutions. All of these stages are crucial to address in every service design process.

Similarly, Sanders (2005) identified a three-stage approach for interacting with customers during the design process, namely, to say, make, and do. The stage “make” is associated with co-design. In interviews, researchers and practitioners listen to what customers “say” and ask questions to understand and interpret the phenomena in question. Through observations and monitoring, one learns what the customers “do” i.e., how they use the products, services, and systems, so the researchers can identify the key problems. In meetings and workshops, customers and suppliers then jointly explore and articulate those studied findings and “make” a solution for the problem with the goal of identifying the best value for the customer. This co-creation activity between the front line of business that delivers and specifies solution components and the customers who will use the solution becomes situated understanding that is at hand to address the preferred understanding (Steen, Manschot, & De Koning, 2011).

According to Moriz (2005), the area not specifically considered in a typical service design process, when compared, for example, to service innovation, is the area of strategic thinking and planning. Whereas in the service design liter-

ature, the focus of development activities emphasizes service development activities; in design thinking, that is understood as more of a strategic approach, and the attention is often paid to the design process and its connected tools, mechanisms, the needed designer's capabilities. Hence, the focus is not on concrete activities, but rather more on understanding how designers can actually reach their pre-defined targets and outcomes through design. Brown (2008 p. 88) metaphorically described the design process "as a system of spaces rather than a predefined series of orderly steps." Thus, the process architecture is not linear, as it is in most business activities, but rather abductive, which occurs by moving back and forth between various tasks and allowing flexibility during solution development (Brown, 2008).

#### 2.4.2. Designing a Solution to a "Wicked" Problem

Within the management literature, many authors propose that a solution is a response to a customer problem (Stremersch, Wuyts, & Frambach, 2001), or it solves a customer's problem even before the customer has considered its own products and service requirements (Davies et al., 2007). This view is in line with the dictionary definition of a "solution, which is something that is used or done to deal with and end a problem or something that solves a problem, or the act of solving something" ("Merriam-Webster Dictionary on-line," 2017)

For such problem-solving purposes, design thinking can offer capable tools (Buchanan, 1992). The value of design thinking is evident here, especially where the problems in a customer's business environment are ill-formulated, and conflicting values make the organizing of a solution much more complicated. Buchanan (1992) explained the kind of design that is capable of dealing "wicked problems" (Rittel & Webber, 1973) for which there is no particular solution and where different parties have their own motivations for defining the nature of the problem (Kimbell, 2011). Designers will explore a wide range of connections and actions in everyday practice and investigate how different types of connections will affect the structure of a solution (Buchanan, 2001), making it a reflective practice wherein professionals move between different framings for problems as they go about resolving them (Schön, 1983).

The key element that makes design thinking applicable in the solution sales situation is that in design thinking a solution does not arise from the existing markets; instead, the actual act of designing seeks to identify new markets and economic value (that does not yet exist, e.g., Romme, 2003). Therefore,

according to Luotola et al., (2017) design is seen to support what the concept of value-based selling aims to accomplish (Storbacka et al., 2016; Töytäri & Rajala, 2015), namely, to achieve the goals of value-creation at the concrete actor level and then have an approach for solving the problems in that business situation for the customer.

Solutions are, however, usually complex, and they are often not even clear in terms of having identified the precise problem (Cross, 2006). Rittel and Webber (1973) compared the ambiguity associated with “wicked problems” to uncertainty, as issues are not always obvious and explicitly known at the beginning of a design situation. More specifically, the solution concept must go beyond an explicit customer need or problem (Adamson et al., 2012). This means that industrial sellers can add value to a customer with their offerings, expertise, technologies, and capabilities when they can show how the problems they solve add value as higher revenues, process optimization and/or optimised operating expenditures. In this way, the requirements for the solution arise from the customer’s actual business situation (Adamson et al., 2012) and the need arises from the fact that the customer begins to see the supplier’s offering as a feasible solution that can generate greater economic value to their own business (Luotola et al., 2017).

This dissertation pays special attention to the wicked problem approach, which was originally formulated by Rittel and Webber during the 1960’s. It was used as an applied design method for solving managerial problems and later further developed by several design professionals. Rittel and Webber (1973) defined a wicked problem as

*“...a class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing”*

Rittel’s definition (1973) is very applicable to identifying “wicked problems” in a sales situation as a process of reflecting and acting on problematics that can place managers in a situation where they must deal with complexity, while they still lack the relevant tools for such problem-solving. This view is supported by several scholars who argue that if these problems are complex, ill-defined, or wicked, and are not identified at the beginning of the sales situation, then deductive limited views become inadequate (Amabile, 1983). Dorst (2007) fur-

ther divided these problems into three different categories: Determined, underdetermined, and undetermined (see Table 3).

When dealing with undetermined problems i.e., “wild cards” that are surprising and may even happen unexpectedly (Steinmüller, 2003), the seller often does not have the needed tools and capabilities to solve such complexities based on previous experience. The effect of a wild card can also be tremendous, since it does not fit the usual frame of reference and thus undermines the usual concept of the ordinary, normal way of doing things and makes the concepts we already know even more doubtful (Steinmüller, 2003).

**Table 3.** Problem categories (Dorst, 2007) and definitions (Dorst, 2007), and a concrete problem situation in the value-based sales process.

<b>PROBLEM CATEGORY</b>	<b>DETERMINED</b>	<b>UNDERDETERMINED</b>	<b>UNDETERMINED</b>
DEFINITION OF PROBLEM	Problems are known facts, business goals, and key challenges within business processes.	These problems cannot be determined at the beginning. The interpretation of a problem is thus ill-defined, and the possible solution to the problem can only be decided during the design process.	The problems are unexpected, i.e., wild cards (Petersen, 2000) that are ill-formulated, so information is confusing, and the business process involves several clients and decision-makers that have conflicting value drivers.
NEEDED SELLING CAPABILITY	As the problem becomes explicit, the parties have the needed tools and capabilities to solve them.	This “wickedness” of a problem requires a more iterative, less identifiable problem-solving approach and greater design capabilities.	The seller should be able to handle the uncertainty of an unexpected business situation. The seller who is solving the “wicked” problem targets the process based on his or her own capabilities, abilities, and creativity. The seller needs to adapt to the role as a value designer.
A CONCRETE PROBLEM SITUATION IN THE VALUE-BASED SALES PROCESS	An energy company knows that shipping goods to a construction site can be challenging. However, both the seller and the customer are certain that such problems can be solved using the suppliers’ skills and previous experience.	The marine customer does not believe the productivity impact of the solution and is hesitant to share needed business information. Finding the solution to this problem requires commitment to continuous co-creation and information sharing before the parties can reach a point of certainty.	In a marine sales case, the establishment of a new shipping alliance between ship owners and ship operators produced an unexpected and undetermined problem. The parties have no previous knowledge of how to create a contract model for fair value sharing. The seller and the customer need to make several iterations of the calculations for full economic benefit before the parties can reach certainty.

Therefore, the seller's capability to reach out and solve unexpected events indeed does require the ability to act as a value designer. Such sellers have an important role to play in leading the design process and dealing with both the underdetermined and undetermined problems (Dorst, 2007). These sellers by using their insights and gathered facts can impact the customer's ways of measuring and seeing the business benefits (Adamson et al., 2012). In other words, value designers are not afraid to push customers away from their comfort zones in order to encourage greater reflection. Moreover, any uncertainty is not seen in a negative light; rather, it is seen as a source of competitive advantage, if only managed accordingly (Perminova et al., 2008).

Although the interface of solution business is complex and uncertain, it will increase the chances of economic benefit if both parties agree to the collaboration. This "wickedness" of a problem, means that the cause of any uncertainty can be unknown and thus requires an iterative, less identifiable problem-solving approach (Amabile, 1983). Design provides a framework for making sense of complexity, wherein several clients and decision makers have conflicting values and wherein the ramifications of the whole system are thoroughly confusing. While reflecting on and making sense of the situation during the process of co-designing, the actors start to see both the situation and the process from a different perspective. What was considered uncertain earlier may indeed become a fact or even an opportunity. Thus, designing value is not about uncertainty reduction. It is about uncertainty management in the sense that the point of certainty/uncertainty is moved clearly into the actor network.

#### 2.4.3. Abductive Epistemology for Value Co-creation

In industrial solutions and value-based selling, the seller's focus is on the benefits the supplier's offering will provide to the customer (Liinamaa et al., 2016). Using this focus, suppliers strive to create a better return on value for the customer by providing more comprehensive offerings that go beyond the traditional goods and product offerings (Ulaga & Reinartz, 2011). At the same time, the customer's buying functions have generally become more value-focused (Agndal, Axelsson & Lindberg, 2007). Yet it is also acknowledged that customers tend to have a different perception of value than suppliers do (Lefaix-Durand & Kozak, 2010). Tuli et al. (2007) acknowledged this disparity between the perceptions of both parties and suggested that suppliers do not understand

to the necessary degree the precise business environments and unique requirements of their customers.

Several authors provide (value) co-creation as a means of finding a solution to a customer problem (Ramírez, 1999; Vargo & Lusch, 2004). In the ideal situation, co-creation contributes to a mutual belief in the value proposition of a solution. Value functions are not identified and created only by the seller; they are co-created by the seller and the customer and realized during the customer's value generating processes (Grönroos, 2008). To date, scholars have argued that in co-creating there is a greater chance to go beyond the explicit problems and focus on solving those problems that are ill-defined. However, such problems often address complex issues, and thus, they cannot be easily described in a concise or complete manner.

A majority of the studies that have explored value co-creation have focused on companies' providing physical goods or services (Cannon & Homburg, 2001; Ulaga & Eggert, 2006; Ulaga & Reinartz, 2011). Only a few studies have discussed value co-creation in the solution business (Hakanen, 2014; Pekkarinen, 2013; Storbacka et al., 2016) or in value-based selling.

In value-based selling where customers expect the best available total solution and long term benefits for their organization (Töytäri & Rajala, 2015) the seller organization faces increased pressure to impact the customer's profitability. This goal means that increased focus on customer value-creation is seen as driving industrial sellers away from being not just customer-focused, but instead toward providing comprehensive offerings through total customer value management (Keeney, 1992).

However, several challenges have been observed that can prevent the successful implementation of value co-creation strategies in value-based selling. In the current thesis, the different co-creation modes for value-based selling and their features are compared. Table 4 provides an overview of these approaches.

As mentioned earlier, the current epistemology behind value co-creation during sales is either based on a deductive view, typically known as "push sales" that departs from a supplier's own product and service portfolio. Another common approach is based on an inductive view, known as "pull sales" that departs from the customer's spelled out request and existing needs (Davies, Brady, & Hobday, 2007; Tuli et al., 2007). The term "push" stems from the idea that sellers are attempting to promote and push their products and services at customers. This view is in line with the original conceptualizations of solutions that



**Table 4.** Characterizations of the three different sales epistemologies.

<b>SALES EPISTEMOLOGY</b>	<b>DEDUCTIVE</b> (push-sales)	<b>INDUCTIVE</b> (pull-sales)	<b>ABDUCTIVE</b> (value-based sales)
TYPE OF OFFERING	Product and service portfolios offered by the seller (Biggemann et al., 2013).	Bundles of products and services that address a customer need (Davies et al., 2007; Tuli et al., 2007).	Customer problem is reflected against sellers' offering portfolios and capabilities.
PROBLEM TYPE	Customer problem is assumed by the seller that believes their offering can solve a customer problem. (Davies et al., 2006; Miller et al., 2002)	Customer believes the seller's offering solves their problem. (Tuli et al., 2007; Töllner et al., 2011; Windahl & Lake- mond, 2006)	Neither the supplier nor the customer can formulate the problem at the beginning. Problem is both wicked and ill-defined (Rittel & Webber, 1973)
FOCUS OF VALUE-CREATION	Seller's focus is on a customer's value to a firm's profit. Value-creation for a customer is often ignored (Blattberg & Deighton, 1996; Clerand & Bruno, 1997)	Customers expect that sellers are capable of demonstrating how their solutions constitute a response to their problem and ensure value capture for their business (Tuli et al., 2007; Töllner et al., 2011; Windahl & Lake- mond, 2006)	Seller's focus is on the value creation given to a customer (Vargo & Lusch, 2004), as well as capturing a fair share of the value that is created (Hinterhuber & Bertini, 2011)
APPROACH USED FOR DESIGNING A SOLUTION TO A PROBLEM	The seller organization formulates the needed solution based on its understanding and capabilities.	The customer formulates the solution based on the capabilities it believes are available from the seller.	Solution is co-created by the seller organization and the customer (Grönroos, 2008). The customer's problems are reflected in terms of the seller's offering portfolios and the seller's capabilities.
EXAMPLES OF THE THREE DIFFERENT SALES STRATEGIES	This situation is common for those manufacturing companies that typically have counted on high engineering skills to provide the best possible machinery for their customers.	This is a typical situation for procurement processes that are based on tendering engineer-to-order supply chains of large and complex capital goods wherein the purchasing organization undertakes the procuring of goods and services from suitable suppliers.	The situation is typical of value-based solution seller organizations that integrate complex sales settings with many stakeholders in both the supplier and the customer's business environment.

address the supplier's intention to identify its customer's business problems and then provide a solution that is constituted from a combination of goods and services (Davies et al., 2006; Miller, Hope, Eisenstat, Foote, & Galbraith, 2002).

The deductive push sales strategy has its origins in the goods-dominant logic, as it concentrates on manufacturing and distribution activities and considers value to be created by the company and consumed by its customers (Vargo & Lusch, 2004). The business performance focuses on the value captured by a seller organization (Adner & Zemsky, 2006; Bowman & Ambrosini, 2000) and often ignores value-creation for the customer (Blattberg & Deighton, 1996; Clerand & Bruno, 1997). This situation is common for those manufacturing companies that typically have counted on high engineering skills to provide the best possible machinery for their customers.

Inductive pull sales, on the other hand, takes the opposite approach, as it emphasizes a process-centric view of solutions that focuses on the customer relationship in order to understand the customers' needs and problems (Tuli et al., 2007; Töllner et al., 2011; Windahl & Lakemond, 2006). In that strategy, sales departs from a customer's spelled out request, and the role of a salesperson then is to ask questions to get the customer to reveal the needs and problems they have and the outcomes they desire (Hunter, 2016). In "pull" sales, the customer strives to find a suitable business offering when they have a business problem or need the products and services a specific supplier offer. Ideally, the customer comes to believe the offerings company have are the ones they have to buy as they believe it solves their business problems. Moreover, when the customer believes this as well, price becomes less of an issue (Hunter, 2016).

The inductive view originates from the service-dominant logic (Vargo & Lusch, 2004) and suggests that business performance should focus on the value creation delivered to a customer. In this view, customer value is a subjective perception determined by the customer (Cantù et al., 2012; Zeithaml, 1988) and evaluated relative to the competitive offerings (Ulaga & Reinartz, 2011; Windahl, Andersson, Berggren, & Nehler, 2004). This strategy is typical for procurement processes that are based on tendering engineer-to-order supply chains of large and complex capital goods wherein the purchasing organization undertakes the procurement of goods and services from suitable suppliers.

Value-based-selling indeed contains elements of an inductive pull sales approach, as it departs from only understanding the customer's business situation (Terho et al., 2012) and instead emphasizes the development of attractive value propositions (Terho et al., 2012; Töytäri & Rajala, 2015); yet, "skilled selling" involves an in-depth understanding of the customer and its markets and op-

erations (Haas et al., 2012 p. 102). Value-based selling behaviour can thus be defined as:

*“...the degree to which the salesperson works with the customer to craft a market offering in such a way that benefits are translated into monetary terms, based on an in-depth understanding of the customer’s business model, thereby convincingly demonstrating their contribution to customers’ profitability”* (Terho et al., 2012, p. 178).

When the problem and the solution are evident to both parties, then the deductive and inductive approaches serve their purpose by enabling the best cost-based offering, which is why there is no need for a value-based sales approach. However, these situations are not addressed in this current thesis. The focus of this research is on the effort to integrate complex sales settings with the many stakeholders within both the supplier and the customer’s business environments. Thus, each sales case consists of a group of stakeholders that have novel types of problems and economical motives – thereby creating an uncertainty that sets forth the necessity to use value-based selling.

According to Martin (2009) the model for value-creation in business requires having a balance between two philosophies. One is analytical thinking that harnesses two forms of logic – deductive reasoning and inductive reasoning. The goal of this model is mastery through rigorous, continuously repeatable analytical processes and analyses. The opposing school of thought is intuitive thinking, which is centered on creativity and innovation. This viewpoint highlights the notion that too much analysis drives out innovation, and offerings should spring from the capabilities of a designer. The proponents of this thinking are creative instinct and unanalyzed insight, referred to as the “art of knowing without reasoning” (Martin, 2009, pp. 6)

However, Martin (2009) also believes that neither analytical or intuitive thinking alone is enough to ensure optimal business performance. Instead, the successful business will balance analytical mastery and intuitive originality in a dynamic interplay called design thinking; at the heart of that design thinking is abductive logic. The concept originated with Charles Sanders Peirce (1934) who believed that it is not possible to prove any new thought, concept, or idea in advance: all new ideas can be validated only through the unfolding of future events. Thus design thinking enables the organization to balance analytical and intuitive thinking.

In value-based selling, abductive approach takes as its starting point the fact that neither party has the necessary certainty and understanding of the required solution at the beginning of the sales situation. This scenario means that value functions are identified, and the solution is co-created between the seller organization and the customer (Grönroos, 2008). The approach originates in service-dominant logic and deepens the understanding of value co-creation (Vargo & Lusch, 2004). Moreover, the presence of uncertainty and the complexity of the offering is handled using a dyadic perspective (Terho et al., 2012) that integrates the customer's business situation and problems as reflected against the seller organization's offering portfolios. The situation is typical of value-based solution seller organizations (Terho et al., 2012) that handle uncertain and complex sales settings with many stakeholders in both supplier and customer business environments.

#### 2.4.4. Handling Uncertainty

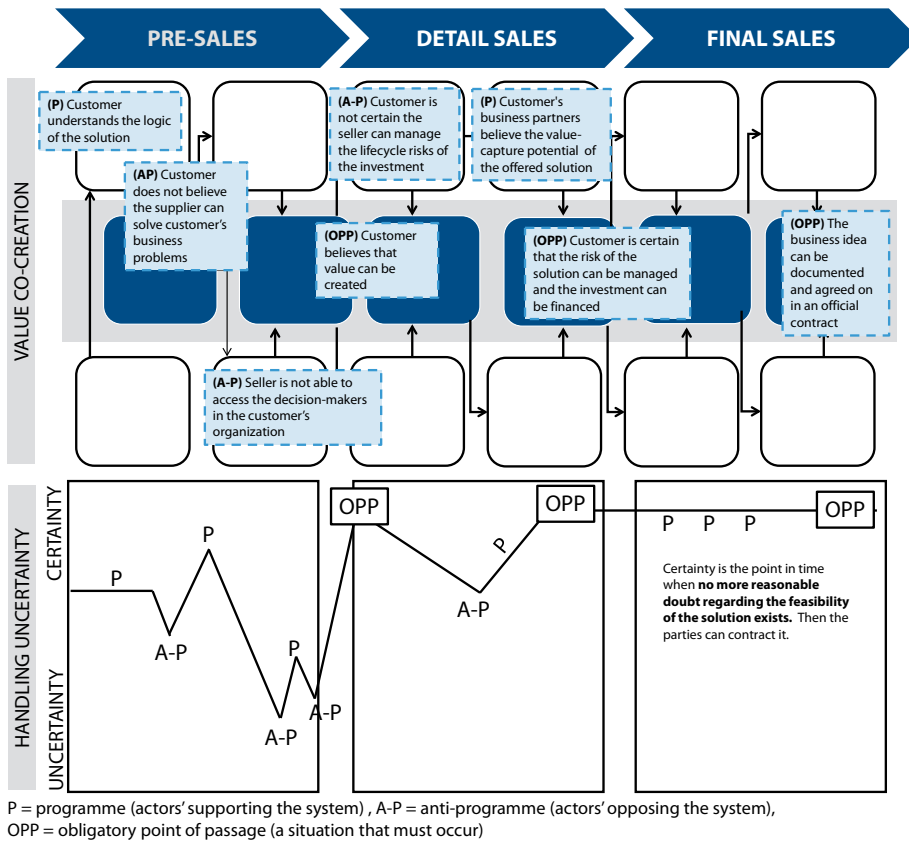
The idea of value-based selling can be compared to the management of uncertainty (Loch & Pich, 2006; Perminova et al., 2008; Ward & Chapman, 2003). Whereas information collection and processing is generally offered as a means for managing uncertainty (Winch, 2015; Winch, Usmani, & Edkins, 1998), it does not serve as a remedy for the uncertainty that stems from ambiguity (Loch et al., 2006; Turkulainen, Kujala, Artto, & Levitt, 2013). Instead, constructing certainty (for example, regarding a functional solution) requires both reconsideration and sense-making of all the elements that may impact it in any joint effort between the supplier and its customer (Perminova et al., 2008). While the beginning of the sales situation is rather uncertain, as the problem of the customer's business situation and the customer's goals might be not clear or perhaps even misinterpreted, the interaction and co-creation processes must take on the role of reflective and abductive uncertainty management. Thus, the preferred solution and its requirements become certain to all the parties, as the value of the solution is first verified by the customer, and then a solution construct is carefully designed to fulfil the requirements of the business stakeholders.

The challenges when implementing these design approaches can be explained by the fact that solutions are complex, uncertain (Perminova et al., 2008), and include several controversies that conflict with other actors as well as the naturally encountered resistance and opposition found in the environ-

ment (Markowski, 2008). Using Latour's (2005) terminology, there is a constant oscillation between the identification of unanticipated anti-programmes or ill-defined problems and any related problems that later become an established fact, that is, a programme. These heterogeneous relationships produce and reshuffle all kinds of actors, including objects, the subject human beings, machines, systems, ideas, organizations, inequalities, scales, and geographical arrangements (Callon, 1986). This situation adds new complexity, as the number of elements and relationships between the actors is both rather high and uncertain in terms of the above-mentioned controversies.

Value co-creation between suppliers and their customers is a reflective process with the goal of creating a certainty about an offering that will generate value for both parties. At the same time, co-creation creates an uncertainty in terms of the validity of the controversies and the conflicts related to the solution. This situation is a case of being able to handle undetermined problems (cf. Dorst, 2007). It means that in value-based selling, the initial assumptions of the parties may be challenged, so that what was taken for granted can become questionable or uncertain and vice versa. Following the logic of Wittgenstein then (1986), achieving the uncertainty state assumes that the well-known facts that constituted the basis of the situation and were to be considered certain and known are not valid anymore. To reach certainty again, the actors need to reflect, re-consider, and make sense of the facts at hand. Although the individual actor's level is usually the starting point for such reflection (Weick, 1995), uncertainty at the organizational level is not the sum of individual perceptions. Rather, the perception of uncertainty impacts the way in which these activities are actually performed (see also Gailbright, 2002).

Co-creating a solution is a process of change that involves managing high levels of uncertainty. Further, there is an obvious importance in reflective processes, as they can foresee potential business dangers and opportunities to the fullest possible extent (Schön, 1983). Weick, (1995) sees uncertainty as a condition of sense making that can be transformed into either certainty or opportunity – in other words, a value-adding solution. This dual view of uncertainty is especially true when considering the point that sense-making implies dynamic, flexible, adaptive processes (Weick, 1995). In this respect, design thinking is a form of sense making, an approach that can be used to manage the uncertainty related to value creation processes and value-based selling. Figure 2 illustrates this described logic, i.e., how uncertainty can be handled in the value-based selling of solutions.



**Figure 2.** Handling the uncertainty found in value-based selling

### 2.4.5. The Performance-Based Contract and the Functional Contracting in Value-Based Selling

Studies on industrial solutions and value-based selling suggest that solution providers are likely to adopt a pricing strategy that captures a portion of the value created by the solution (Storbacka, 2011; Terho et al., 2012). Performance-based contracts seem to be appropriate devices for such pricing strategies (Liinamaa et al., 2016). According to the Chartered Institute of Supply and Procurement document (2012, p. 3), PBC is defined as “a results-oriented contracting method” that focuses on the outputs, quality, or outcomes that may tie at least a portion of a contractor's payment, contract extensions, or contract renewals to the achievement of specific, measurable performance standards and requirements”. This definition highlights three crucial aspects of PBC: 1)

an emphasis placed on the effects of contractual performance for the customer; 2) a value capture or pricing model that is distinct from charging a simple fixed price; and 3) a focus on incentivizing appropriate performance. These three aspects were placed in the business model transformation context by Ng et al. (2013), who argued that the increased use of PBC is a result of the transition from product business to solutions delivery and the transition from a goods- or product-dominant logic to service-dominant business logic. However, even though the barriers to value-based pricing and value-based selling were identified, for example, by Töytäri et al. (2015), there is no research today on how these contracts per se affect the successful implementation of a performance-based solution delivery that has a value-based pricing mechanism.

Consequently, the high-level uncertainties related to value-creation and value-capture logics as well as identified business dangers and opportunities for incentivizing appropriate performance have led to the need to create a functional contracting process that can be used to manage uncertainty. This need means that functional contracting should give a sales manager the opportunity to actively explore and embrace encountered uncertainties and facts and at the same time keep the sales and functional contracting process systematic, but still flexible (Liinamaa et al., 2016). In this conception, contracts may and should be understood as relational governance tools that may have added value for instance, for the business integration efforts.

Contracts, contracting, and negotiations have been extensively discussed in both the managerial and the legal literature (Liinamaa et al., 2016). However, interdisciplinary accounts that merge, for instance, the management and legal perspectives with contracting are relatively few and limited in scope. Neither does contracting have an explicit link to design theories. In the context of value-based selling, the functional approach to contracting opens up a view on contract practices within which value-based selling and PBC are also located. In recent years, both management and contract scholarship have evolved to acknowledge that contract uses may eclipse the actual implementation of the safeguarding function.

### 3. The Research Design

This chapter presents the research design and methods employed for this dissertation. The research context and real life examples of two industrial case companies and their main research problems are first introduced. Then, explanations of the research process and the timeline are offered, followed by a deeper description of the main methodological standpoints and the approaches utilized in the dissertation. This aspect is followed by a discussion on the reliability and validity of the produced knowledge and concepts. The specific methods and means of analysis are separately described in each of the publications central to this dissertation.

#### 3.1. The Research Context: Designing and Selling a Value-Based Solution

In the studies that are central to this thesis, the efforts of two industrial manufacturing companies, Alpha and Beta, to commercialize their value-based offerings were followed. Both companies are globally operating engineering-intensive capital goods suppliers. The companies were looking for commercial solutions that go beyond conventional product and service sales to solve a larger scope of customer problems. For such a purpose, these companies were attempting to utilize a value-based selling approach to market their newly developed solution offerings. However, the value-based approach was a challenge for the sales force and their modes of operations from the start. Both companies were struggling to design, communicate, and implement the added value of their new solution offering. It became clear that even if both studied companies had a viable market, they were unable to capitalize the value of their complex solution offerings due to the limitations of their current linear and deductive product-focused sales strategies. The companies realized that to overcome these difficulties, they would be forced to rethink some of their organizational interfaces, such as sales force, legal, business development and marketing, to create better value-quantification tools and processes and approaches based on actual financial facts.

In Alpha and Beta's efforts to provide value-based solutions for their customers, both companies believed that their solution(s) could bring added value to the industry and to their customers. However, it became clear during the research process that developing a value-based sales process would not only



alter their sales techniques and tools, but it would also further change their solution sales strategies, including their pricing- and revenue- sharing models and contracting. Moreover, the new selling techniques forced the companies to ponder their commitment to giving value guarantees for their product and service offerings.

The first case study company, Alpha, is providing integrated solutions for global maritime transportation and offshore industries. Alpha's case is described in the following articles central to this thesis, namely, Article 3 - "Embracing Uncertainty in Value-Based Selling by Means of Design Thinking"; Article 4 - "Performance-Based and Functional Contracting in Value-Based Solution Selling"; and Article 1 - "The Value-Based Sales Approach: The Design Process, Tools, and Capabilities Needed to Create a Solution".

Alpha had developed a cargo solution offering that consisted of two parts. The first part was an upgrade of several products and systems, and the second, a value-based warranty management service for the customer's installed base. Alpha's solution supports customer asset performance in terms of increased capacity and productivity potential. In other words, the focus is on the customer and vessel life-cycle cash flow. The solution addresses both the mechanical performance and the usability of an installed base. In an ideal situation, Alpha's solution would have significant influence on customer revenues by also improving a ship's second-hand value that is, ensuring its best total investment efficiency and lifetime profitability.

However, Alpha's new value-based solution offering required changes in the organization. First, it required the introduction of new selling and contracting approaches: A value-based sales process (see Article no. 3), and a performance-based, functional contracting process (see Article no. 4). As value-based contracts are complex and can disrupt established industry patterns, a customized sales process that accounts for the specific challenges that relate to introducing a novel contract was required. To address these challenges, Alpha and the researchers jointly designed a value-based, modular selling process and a performance-based, functional contracting process. In addition, the application of a new value-based sales process and its tools to facilitate value creation between the buyer and the seller was developed.

Another company, central to this dissertation, was Beta. It is a market leader in the energy sector. The company is typical equipment (OEM-) supplier that has expanded its equipment supplies to full-fledged, engineered turnkey solu-

tions for different customer segments. The company offers a variety of product scopes between these two extremes. Beta's case is presented in two articles in this dissertation, namely, Article 3 "Embracing Uncertainty in Value-Based Selling by Means of Design Thinking" and; Article 2 - "The Value of Project Execution Services: A Problem and Uncertainty Perspective".

The former article refers to the development of Beta's new offering for the energy market in Europe. This solution essentially enabled profitable power generation in a market where profits generally are soaring due to the introduction of intermittent energy sources. Their value proposition was rather attractive for larger electricity companies that generally were hit hardest by increasing wind and solar energy production. Essentially, the offered solution enabled these companies to generate every time when demand was high enough, but without generating energy when it was unprofitable. To arrive at a feasible investment case, this solution also required additional close co-operation between the seller and the buyer.

The latter article, "The Value of Project Execution Services: A Problem and Uncertainty Perspective" references Beta's efforts to configure customer solutions based on problem portfolios in delivery projects. Beta realized that to 50% of their deliveries consisted of other than physical material and equipment. However, until the services were combined with the product scopes in various constellations, the company felt it was not able to market and sell the added value provided through its services. One of the biggest challenges was for the sales force to be able to budget service elements included in the offers. Another challenge was that it was unclear to the company's customers what those services actually contained. Hence, some customers required higher service levels than what the company had quoted them. In addition, the added value to a customer remained unclear (in the worst case, the company lost a competitive bid to a competitor with a narrower service scope than the company's price level demonstrated). To create more value (both for themselves and for their customers) the company was developing project services as a complement to their core offerings. However, the company faced challenges in order to market, communicate, and sell the value of any intangible services. To identify and communicate the customer value of such services, a service configurator that could serve that purpose as a decision support tool was developed in collaboration with the company.

## 3.2. The Research Approach

As the theoretical background of this research is cross-disciplinary, when combining the literature from industrial management, marketing and design thinking, I needed to consider a research methodology that would allow some flexibility. I chose to follow the principles of action research, combined with design thinking, in order to obtain more in-depth insights on specific areas of interest. Such a cross-disciplinary approach was chosen, as it derived well from the the nature of the research setting and would let me understand how industrial firms can design and sell value-based solution offerings. Solution concept development, value-based sales-, and the negotiation processes as well as the development of a problem portfolio, therefore, became the sub-development themes of the study.

There was also a need based on industrial practice to use action research to follow the principle of dual objectives (practice and theory) when creating new knowledge on solutions (Chein, Cook, & Harding, 1948; Susman, 1983). Similarly, Möller et al. (2015) argue that sales research should be furthered by looking at activities from the standpoint of action research. Such an approach gives the researchers and the practitioners the means to form a specific understanding of the contextual specific contingency factors that affect customer value perceptions and thereby address the customers' business goals and performance measures. This approach also allows for certain micro-level experimentation and real-time observation of what business managers actually do in real-life terms (Möller & Parvinen, 2015).

According to Clark (1980, pp. 151–152), “action research enables social science to discharge its dual responsibility of contributing to scientific discovery and the solution of practical problems by applying the elements of action research that are the explicit set of values, concepts and methods that together make up a theory of research and practice.” In other words, in action research, researchers attempt to make scientific discoveries, while at the same time, they seek to solve practical problems by adopting the three original activities of action research, namely, action, research, and training (Lewin, 1946).

Recently, authors in the field of business studies (Gustafsson & Tsvetkova, 2017) introduced a research approach called “transferrable business studies” that aims at transferring research results as innovations or other knowledge that can be utilized to benefit both society and the organization. These authors

further argue that transferrable results should be produced within an actionable or pragmatic research paradigm that is fully suitable for solving real-life problems, rather than simply generating only explanatory or descriptive knowledge.

It was obvious that in this instance the research team needed an approach that allowed the researchers to create prescriptive knowledge about the ideal value-based sales process that could lead to action offering improved results (Gustafsson & Tsvetkova, 2017). In addition, to be able to guide the case companies to act in uncertain and changing business situations and achieve a desired state, certain methods were required that would lead to constructive knowledge (Lehtiranta, Junnonen, Kärnä, & Pekuri, 2015). According to Kasanen et al. (1993) constructive research starts by identifying a practical and relevant research problem, and indeed, that approach suited the purposes of this particular current research well.

The main problem for the case companies was their lack of understanding of the needed value-based selling mechanisms and capabilities as a way of selling value. These were new for these companies and the industry, as well as being a still evolving field of research area for academics. The companies lacked the capable tools, arguments, and processes for selling their offerings, which is why the involvement of researchers was so crucial. They could provide new insights and construct new theories to support the companies' efforts to develop and market their offerings more effectively.

The role of the researcher in this research was to understand the problems inside the context (Schein, 2008) and, together with the customer, then generate actionable knowledge (Gustafsson & Tsvetkova, 2017). First, the researchers set the stage for diagnosing the problem and the ways to solve it (Schön, 1995). As the context and understanding of the solution evolved, new problems emerged that then needed to be tackled. This approach enabled the practitioners at the case companies to explore and act on emerging knowledge, thus generating actionable data (Coghlan, 2000). Although practitioners can have reasonable knowledge of the incumbent context, the role of the researchers becomes more important, as new knowledge emerges and the project moves according to the plan into unknown territory (Gustafsson & Tsvetkova, 2017). However, actionable knowledge is still constantly produced and sometimes overturned throughout the research process. Therefore, the actual outcome of the research is only reached when all the key parts of the system are stabilized to the point that the practitioners are able to proceed by taking certain action

based on the knowledge generated (Coghlan, 2000; Schein, 1993; Schön, 1995). In this study, the theoretical framework for the value-based selling of solutions, the (empirical) fieldwork conducted by the sales force and the case analysis evolved simultaneously. Hence, the theoretical framework for solution selling was able to be both documented and verified on a regular and consistent basis.

During these companies' efforts to design a new value-based sales concept, the researchers provided insights for how to guide the solution design process and supported the client companies to identify different types of problems, challenges, and opportunities during the sales cases. The goal was to make the customer certain of the business case. In the thesis, design thinking was adopted to complement typical action research methods, as the mode of design thinking research is typically considered a constructive process that involves professional designers, practitioners, and researchers, and further, other relevant stakeholders are needed to develop a holistic and systemic understanding of the phenomena being studied (Kimbell, 2011). Moreover, design thinking was used in this instance to realize the emancipatory intentions of the case company and their customers. More specifically, design thinking provided a precise framework for better understanding how industrial sellers can overcome the problems related to their value-based sales activities.

### **3.3. The Empirical Research Process**

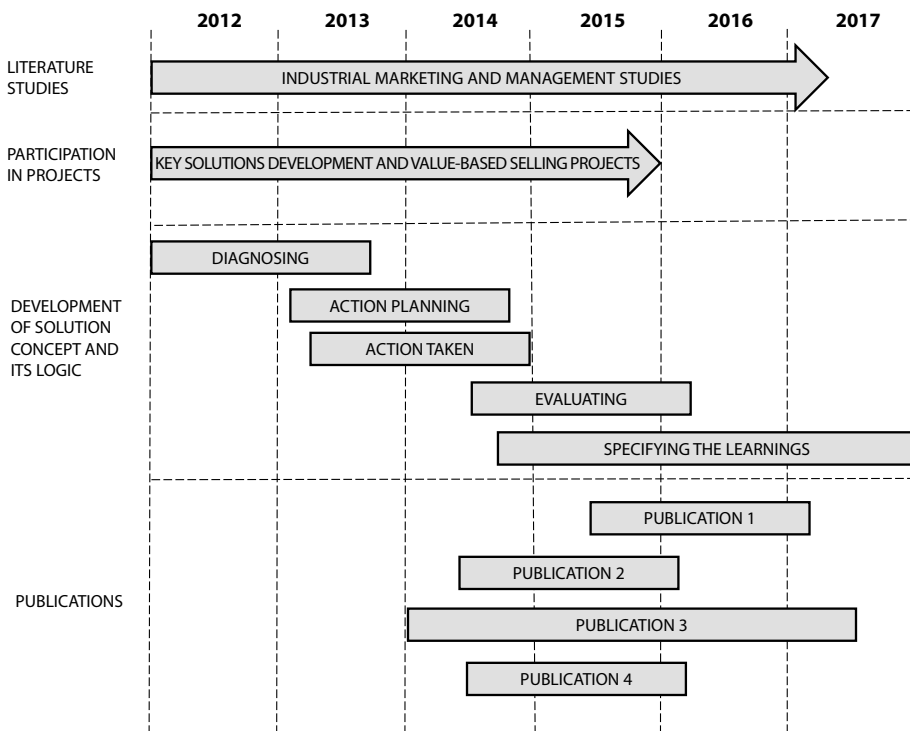
As discussed in Chapter 3.1, this research was conducted by participating in three partially overlapping projects during 2012-2016 with two industrial manufacturing companies (see Figure 3 for the timeline). The aim of these projects was to create a commercialized concept for value-based solution sales and a process for selling and contracting that concept.

Action research tradition was applied in this study to support the execution of the research activities. The research was conducted in the following five common action research phases: Diagnosing, action planning, action taking, evaluating, and specifying learning (Susman, 1983). The researchers started an active collaboration on the sales process with Alpha in 2012, which ended at the end of 2015, and with Beta starting in 2012 and continuing until 2016.

During the collaboration with the main stakeholders, the parties conducted several workshops and meetings on the different stages of the solution design process. The primary stakeholders involved in this study were the supplier companies, Alpha and Beta, their customers, and certain key actors. In addition,

other actors in the socio-materialistic sense (Callon, 1986), such as third party suppliers, environmental aspects, markets, and legislation, were impacting the direction of sales. As the understanding of the solution practice and theory expanded, the researchers helped the company test new ideas with their customers.

In both cases, the sales teams consisted of sales personnel and university researchers. The team received support from other functions as well, including R&D, Business Development, Engineering, and Marketing. Typically, one key account manager was responsible for the sales case development, while engineering supported the sales manager with product knowledge. The business development department made the needed economic calculations in collaboration with the sales manager (using data received from the customers).



**Figure 3.** The research timeline for dissertation

### *Diagnosing the Problem*

The sales team started the empirical research process with the identification of the business problem and recognizing the need for a solution (i.e., the diagnos-

ing phase) from the viewpoint of each company. Several empirical problems were obvious for both companies at the beginning of the research process. The sellers had difficulties (1) embedding the idea of value-based selling and pricing logic, as in value-based selling, the value capture and pricing model are distinct from charging a simple fixed price (the entrenched practice in the industry); 2) emphasizing the effects of contractual performance for the customer; 3) how to incentivize appropriate performance; and 4) how to productize services and design solutions around the goal of solving the problems. These noted empirical problems were in line with the main theoretical research problems for this dissertation, namely the insufficient current sales approach, the process, and the tools for selling and designing value-based solutions offerings. The practitioners learned that they needed to develop better micro-level understanding of their customer's value functions and financial performance drivers and find new ways of working so as to turn their resulting understanding into functional contracting clauses and pricing mechanisms that could be agreed to in a performance-based contract (Liinamaa et al., 2016). Moreover, as Hellström et al., (2016) argued, research is currently lacking on the productization of project management services and solutions.

To handle the diagnosed problematics, the collaboration between practitioners and researchers began by reviewing the existing sales processes, sales tools, and practices in both companies. In addition, the researchers attended internal workshops and development meetings at both Alpha and Beta. Researchers reviewed the companies' existing sales processes and attended internal brainstorming and development meetings at Alpha and Beta to have in-depth discussions on their customers' business and market drivers.

#### *Action Planning For Solving the Problems*

After diagnosing the problems regarding the entrenched practices of value-based selling, the researchers considered the actions necessary to solve the problems. The objective was to help the company develop a value-based sales concept, a first draft of the new value-based sales and contracting process, new value-based sales arguments, and a plan for sales activities. Sales, contracting process design, a marketing plan, and contract development were conducted simultaneously.

The working process was iterative, and several meetings with each firm's sales, business development and technical representatives were conducted to draft the concept for a solution. The companies started to deploy and com-

municate this developed newly developed solution business concept for their customers so as to verify the first draft of its value propositions. Both companies conducted sales training and development workshops and reviewed the solution sales progress regularly.

### *Action Taking*

After the internal development of value-based selling, the sales teams selected the course of action. Once the first blueprints were finalized, the companies began to deploy the approach in order to commence a pilot and evaluation of the sales process and the contracts it had developed.

The researchers participated in customer meetings where the aim was to gather the customer business drivers. In addition, the researchers held weekly meetings with the sales managers and business developers and gathered both any programmes and anti-programmes that were affecting and/or guiding the sales progress.

### *Evaluating*

The concept of a solution and a value-based sales process was evaluated based on customer feedback and sales-progress follow-up. To observe and facilitate that piloting, the researchers participated in customer meetings, conducted debriefing sessions and sales training workshops with the companies' representatives and reviewed the sales progress follow-up reports. Researchers gathered feedback and development needs from the Alpha and Beta sales personnel, technical departments, management, and customer representatives, which allowed them to act on identified issues in the value-based sales process. Based on that feedback, the research team revised the sales plans and the value-based sales process. Feedback and reactions from the company's sales personnel, solution designers, legal department, and customer representatives allowed the researchers to identify the salient, but recurring, issues in the solution offerings, the sales and contracting process designs, and further modify the blueprints. These modifications resulted in significant revisions to the blueprints, process categorizations, and sequencing.

### *Specifying the Learning*

After revising the value-based sales process, the researchers focused on specifying the learning, which involved two scattered processes and to a large degree an overlapping in time. The practical learning process with the case company was characterized by iterative refinements of the researchers' understanding



of the company, its position, the possibilities and limits of the practical instruments it attempted to deploy, and the theories that were used to make sense of them. This required the researchers to identify commonalities and discrepancies in the experiences of both companies with the different sales cases and to elaborate on the scientific findings further once the value-based sales process was designed. That process was also incremental. The researchers followed up on the sales progress on a case level basic and gathered together the commonalities across different sales cases. The project resulted in a value-based sales process that was utilized via several iterations, as more information on the needed sales techniques, capabilities, and needed actions evolved.

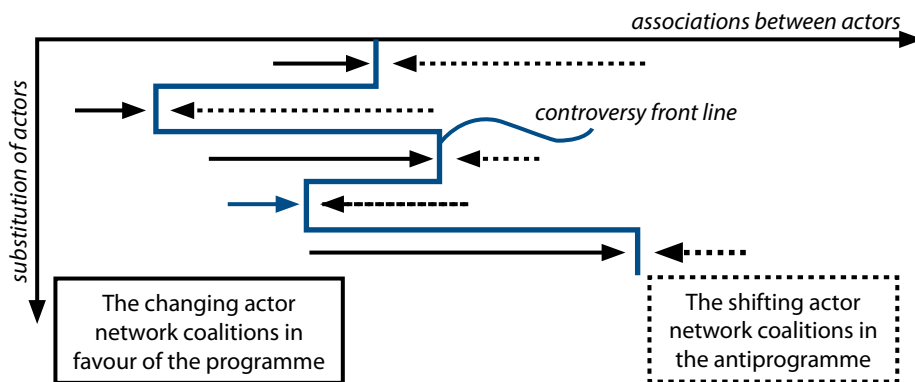
### 3.4. Data Analysis

The data analysis was conducted by the researchers' participating in value-based sales process development in collaboration with the practitioners from the companies, Alpha and Beta. The researchers documented the entire solution and sales process development. The key data for the study consisted of memorandums and field notes from both the internal (between researchers) and external (between researchers and clients) meetings that would have been collected anyway as part of the intervention. In addition, flip chart notes, concepts, sketches, and financial calculations were collected in parallel with the intervention, but these were used for research purposes only. In particular, this type of intervention role played by the researchers affected what data was available for collection, and the history, context, and politics of the intervention that became important for complete interpretation of that data (Huxham & Vangen, 2003).

The documentation was also used for designing the solution sales process and was essential for managing any uncertainty to ensure that the design process remained on track. In terms of the action research process, the data were collected during the first four stages by focusing on the action taking stage, which described the actions of the development of value-based sales and the functional contracting processes.

An Actor-Network Theory (ANT) was utilized as the analytical framework to identify and act on problems that were appearing during the sales process. Controversy mapping, as introduced by Markowski (2008) describes the logic for handling these problems (see Figure 4). ANT offers a rich vocabulary that can describe the socio-technical dynamics that influence solution creation and provide an approach for understanding how social action shapes technology and

how technological innovations shape social action (Callon, 1986). The term “actor” is taken from the Actor Network Theory and the definition by Latour (2005), who suggests that the term “actor” denotes both human and non-human actors, which in a network take the shape that they do in relations with one another. Following Latour’s (2005) definition, the actors in this study included not only the business actors, but also all the elements that shaped the solution business environment. For example, the pricing of the solution offering was considered as one of these actors. If the pricing model was not profitable for a customer, then the price would belong to an anti-programme. However, if the seller and the customer were able to find a functional pricing model that was accepted by both parties, then that particular actor was enrolled in the programme.



**Figure 4.** The principles and process of controversy mapping (Markowski, 2008).

A socio-technical diagram was used to capture the dynamics of the sales processes (see Table 5). Using that diagram, it is possible to identify and map which actors in a network are supporting or opposing the system enrolled in the programme or anti-programme of a solution. This mapping brings the researcher closer to understanding how the opposing actors (anti-programmes) can be tackled and how supporting actors (programmes) can be strengthened. Indeed, these programmes and anti-programmes can be compared to micro-foundations, as they are the “actors” of value co-creation activities observed in value-based sales. The sales stages are a direct result of these observations being grouped into categories. In general, the process can be longer or shorter, but in the specific case of value-based (solutions) selling our empirical data suggests that all these points need to be passed (however, in some cases,

they are easier to overcome than in other cases, thereby implying that a specific point or stage can be passed rather quickly).

Moreover, it is possible to observe how the certainty of value is manifested when the actors reach the obligatory passage point (OPP). This is a concept normally associated with the Actor Network Theory (Latour, 2005), and it refers to a situation that must occur for the customer to accept the value that has been attributed to it by the seller organization. The OPPs in Table 5 are marked with a framed cell. In a sales situation, OPP can be either a supporting actor, which strengthens the customer’s certainty for the benefits of the solution (a

**Table 5.** An example of a socio-technical diagram in a sales situation

		PROGRAMMES (P) AND ANTI-PROGRAMMES (AP)	SALES CASES										
SALES STAGES	P & AP NUMBER	P = PROGRAMME AP = ANTI-PROGRAMME CL = CASE LOST CS = CONTACT SIGNED FRAMED CELL = THE MOST CRITICAL OPP	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10
			PROBLEM DEFINITION & VALUE DEMONSTRATION	A1.1	Argument 1	AP	P	P	P	P	AP	AP	P
A1.2	Argument 2	CL		P	P	P	P	P	AP	P	P	AP	P
A1.3	Argument 3			CL	P	P	P	P	AP	P	P	P	P
A1.4	Argument 4				CL	CL	AP	P	P	P	P	P	P
A1.5	Argument 5						CL	P	AP	P	P	P	P
SOLUTION TO A PROBLEM	B1.1	Argument 6						AP	P	P	AP	P	P
	B1.2	Argument 7						P	P	P	P	AP	AP
	B1.3	Argument 7						CL	P	P	P	AP	AP
	B1.4	Argument 8							CL	P	AP	P	P
	B1.5	Argument 9								P	P	P	P
	B1.6	Argument 10								P	P	AP	P
REACHING CERTAINTY	C1.1	Argument 11								CL	AP	P	P
	C1.2	Argument 12									AP	P	P
	C1.3	Argument 13									CL	P	AP
	C1.4	Argument 14										P	P
	C1.5	Argument 15										CL	CL

reached certainty), or an opposing actor, which can (in the worst-case scenario) end the sales negotiations (too high an uncertainty).

Whereas ANT can be used as a framework for revealing the programmes and anti-programmes, design thinking provides guidelines for how to lead the process of tackling the anti-programmes and improving their certitude/credibility. This combination gives industrial sellers a powerful tool to use to understand where the biggest anti-programmes and controversies are found in the sales process and to monitor how the certainty of a solution has already evolved during that process.

### 3.5. Validity and Reliability of Produced Knowledge

The aim of this research is to produce new knowledge for how industrial companies can design and sell value-based solutions offerings. Therefore, this kind of research agenda required an approach that allowed the researchers to change their existing situations into desired ones and provide new knowledge that is characterized as actionable. This focus means that real-life challenges should lead to changes in business practices and validity, and the relevance of this knowledge is measured in terms of its actionability and practical meaning for the businesses (Gustafsson & Tsvetkova, 2017).

The nature of this thesis relates to the non-positivistic qualitative research tradition, which is why the typical validity criteria of positivist social science are inappropriate (Susman & Evered, 1978). According to Bryman and Bell (2003), the validity and reliability of quantitative research are important criteria when assessing and establishing the quality of that kind of research. Instead, in qualitative research Mason (1994) argues that reliability, validity, and generalizability are different kinds of measurements of quality, rigour and the wider potential of the research, which are thereby achieved according to certain methodological and disciplinary conventions and principles. However, as the methodology of this thesis follows the principles of constructive action research, both validity and reliability should refer not just to whether you are “observing, identifying, or measuring what people say” (LeCompte & Schensul, 1999). Instead, validity and reliability should be invested in terms of the tight connection and inseparable involvement of the researcher and other stakeholders in any of the changes to the situation that are being researched and then changed (Huxham & Vangen, 2003).

This practice creates certain challenges for theory building that do not arise in the same way as they do for those positivistic research approaches that collect data and draw on theory without ever influencing the situation being studied (Huxham & Vangen, 2003). Most of the traditions related action research have agreed on the following specific goals: 1) the generation of new knowledge; 2) achievements of action-oriented outcomes; 3) the education of researchers and practitioners; 4) results that are relevant to the local setting; and 5) sound and appropriate research methodology (Susman & Evered, 1978). In addition, Herr and Anderson (2015) have identified five validity criteria for the goals of action research that were also applicable for use in this current dissertation (see Table 6):

**Outcome validity.** One test of the validity of action research is the degree to which the actors occur that leads to the resolution of the problem that caused the need for the investigation in the first place. According to Greenwood and Levin (1998), this criterion is described as workability, and the authors link it to John Dewey's notion of pragmatism. According to Watkins (1991), action researchers often fail at correctly diagnosing the problem or the implementation of a solution strategy, despite the fact that it may or may not resolve the addressed problem. Outcome validity is also a synonym for the successful outcome of the project (Herr & Anderson, 2015). In the current research, it was important to acknowledge the fact that rather than just solving the customer's explicit and determined business problem, the solution development team (the researchers and the sales force) had to reframe the problem in a more comprehensive way that often led to the identification of new set of questions and problems. This ongoing reframing of problems led to a spiraling dynamic that characterizes the process of creating a solution over a sustained period of sales.

**Process validity.** This aspect evaluates to what extent the problems are framed during the process and solved in a manner that contributes to ongoing learning about the system. It means that outcome validity is actually dependent on process validity, as when, for example, the process is unsound or superficial, the outcome will reflect it (Herr & Anderson, 2015). Therefore, in this research, it was important to regularly consider whether the "findings during the process, e.g., newly introduced pricing logic" were actually valid and had a practical meaning for the business outcome. These findings, therefore, were the result of reflective cycles and ongoing problematization of the actors and their

practices that were under investigation. According to Argyris et al. (1985), that process of reflection should include looping back to re-examine the underlying assumptions behind the problem definition.

**Democratic validity.** This aspect refers to research that is done in collaboration with all stakeholders who have a role in the problem or solution under investigation (Herr & Anderson, 2015). Moreover, collaboration in an action research study refers to having multiple perspectives and interests that are taken into account and realizing that all stakeholders are part of the insider community to bring relevance to this type of research. In this research, problems emerged from the industrial business context and the developed solution needed to function in that context and generate value for the stakeholders inside that particular community.

**Catalytic validity.** Lather (1986, p. 272) argues that catalytic validity is “the degree to which the research process reorients, focuses and energizes participants towards knowing reality in order to transform it.” In action research, the main parties, i.e., the researchers, practitioners, and other participants, must remain open to refining their opinions of reality as well as their view of their own role in the development activities (Herr & Anderson, 2015). In this research, the role of the researchers and our case companies’ sales force was to produce relevance and practical meaning (Gustafsson & Tsvetkova, 2017) for the industrial business community in which the researchers made a spiraling change on their own and their participants’ understanding of the studied context and its problems (Herr & Anderson, 2015).

**Dialogic validity.** According to Herr and Anderson (2015), dialogic validity is similar to democratic validity, but it differs in that the focus is less on broad inclusion than on validation (both during and after the study) of the used method, its evidence and findings, which all should resonate with a community of practice. In this research, the solution evolved as an outcome of a “collaborative inquiry,” and the solution was a result of critical and reflective dialogue with the research team, the practitioners, and the necessary industry stakeholders.

**Table 6.** The five validity criteria for the goals of action research used in this dissertation. Modified from Herr and Anderson (2015)

<b>VALIDITY CRITERIA</b>	<b>DESCRIPTION</b>	<b>EXAMPLE OF HOW CERTAINTY WAS FORMED IN THE SALES SITUATION</b>
OUTCOME VALIDITY	Evaluates which actors' actions lead to the resolution of the problem that caused the need for the investigation in the first place.	Certainty was formed when the seller was reframing the problems that led to the identification of new set of questions and problems. This ongoing reframing of problems enabled the seller to settle and stabilize the sales situation, while the use of performance-based contracts influenced the mutual confidence in the value potential.
PROCESS VALIDITY	This aspect evaluates to what extent problems are framed during the process and solved in a manner that contributes to ongoing learning about the system	The problems were identified using controversy mapping. This allowed the sellers to consider whether the findings during the process had a practical meaning for the business outcome. The sellers were responsible for designing the practical meaning by continually problematizing the customer's business situation and demonstrating the value of those problems under investigation.
DEMOCRATIC VALIDITY	This aspect refers to research that is done in collaboration with all the stakeholders who have a role in the problem or a solution already under investigation	The sellers needed to handle multiple perspectives and interests from several stakeholders that connected to the development of the solution. Problems emerged from the stakeholders' business, and the developed solution needed to function in that context and generate value for the stakeholders in that particular community.
CATALYTIC VALIDITY	Catalytic validity is the degree to which the research process re-orient, focuses and energizes participants toward knowing reality in order to transform it	The sellers were striving to produce a practical meaning of solution value for the customer's business by monitoring the actors that were both opposing or supporting the formulation of solution. The stakeholders' certainty in the return on value increased when the sellers were transforming and reorienting the business case, while also handling the uncertainties of the sales situation.
DIALOGIC VALIDITY	This process validates (both during and after the study) the used method, its evidence and findings, which should resonate with a community of practice.	The certainty of value and the solution evolved as an outcome of co-creation between the seller and the customer, but requiring an input from certain third parties.

The above described validity criteria for action research are close to how validity in design thinking is actually defined. Similarly, in design thinking, Dorst and Cross (2001) argue that design research should be seen as serious and rigorous research activities on design (ways of thinking, process, and products) that are conducted by a researcher in accordance with research standard procedures. In contrast, Roth (1999) argues that as design in and of its nature often overlaps with its social context, it must act as a source of interpretation for its users. In this respect, Roth asked for subjectivity to be included, not just objectivity as proposed by Cross. Moreover, she argued that researchers should consider a qualitative and participatory research model for design. She argued that human-centered design research should include those who will also use the product or system to provide a framework for achieving solutions that are more successful. In addition, design contains a participatory process and often facilitates rapid development that actually results in a better product, system, or solution. Similar to Roth, Carroll (2006) argued that the design approach should consider an active participatory process during the entire process of design activities, wherein the users actively set design goals and plan prototypes as opposed to the more conventional methods that involve users only after the initial concepts, visions, and prototypes are decided and created.



## 4. Research Contributions

The main findings and results of this dissertation are presented in four research publications and summarized in this chapter. Its research contributions are then synthesized to create an overall picture of produced knowledge as that knowledge relates to the value-based selling of industrial solutions.

### 4.1. Addressing the Research Questions

To be able to address the main research question, namely, how can industrial companies design and sell value-based solution offerings, all articles in this thesis connect to the development and selling of industrial solutions, but also handle these topics from their individual viewpoints. It also discusses the four sub-research questions and presents the main findings and results for each of the articles.

The common structure of value-based sales process is presented in Publication 1. Further, the tools and capabilities needed to create a value-based solution are explained. The main findings of Publication 1 are summarised in Section 4.1.1.

Then, answering the second sub-research question or how customer problems are manifested in the offerings and the delivery process of a project supplier, the idea of having a portfolio for customer or industry problems is discussed in Publication 2 in Section 4.1.2.

The uncertainty aspect of value-based selling and the new abductive epistemology needed to address uncertainty are discussed in the third article (in Section 4.1.3.). It examines the sub-research question for how uncertainty is handled in value-based selling.

The answer to the fourth sub-research question regarding the required functional contracting process largely builds on the findings of Publications 1 and 3 because the value-based sales process and the design process are the key cornerstones of a performance-based contract model that can allow for incorporating functional contracting mechanisms and tools.

Table 7 illustrates the main outcomes of this dissertation that evolved during the research process when the research questions were addressed in the individual publications.

**Table 7.** The main results of the dissertation.

MAIN RESULTS OF THE DISSERTATION	PUBLICATION			
	1	2	3	4
The needed approach and process for designing and selling value-based solution offerings	x		x	x
The needed tools for and capabilities of value-based selling	x	x	x	x
The approach and tools needed to address the value of the customer problems manifested in the offerings		x		
Ways to handle uncertainty in value-based selling			x	x

#### 4.1.1. The Design Process, Tools, and Capabilities to Create a Solution (Publication 1)

*Sub-research question 1: What are the needed tools and capabilities to create a value-based solution?*

##### *Background*

Publication 1 demonstrates how a solution provider differs significantly from an industrial product manufacturer. The authors suggest that the main challenge is the fact that solution sales necessitate value-based selling techniques. To succeed in solution sales, sellers have to change their way of doing business by seeking to understand customer problems and communicating how that different solution generates higher profits for the customer. The principles of the value-based sales approach, design thinking, and the connected tools that aid companies to address customer problems and enhance customer certainty are also presented. Moreover, design thinking is applied to guide the process for identifying, co-creating, and confirming customer-perceived value. The sales process and its relevant tools were developed in collaboration with the case company, Alpha.

##### *Findings*

The findings of the study show that the companies lack the tools and managerial capabilities to transform their organizations into those that solve cus-

tomer problems. In particular, transition toward the value-based selling of solutions is a complex and extensive attempt that requires the supplier firm to develop new capabilities, engage in proactive sales, and apply various tools to enable a value co-creation process with the customer. To aid companies when they are creating a solution for their customers' problems, the researchers developed a value-based sales approach. The following list summarizes the benefits a company can achieve by applying this developed approach (Luotola et al., 2017):

- Gradual organizational change to a more value-oriented mindset in the sales force and the rest of the company.
- Ability to better understand the industry and customer logics and develop a de facto valuable solution.
- Decreased customer uncertainty and improved business relationships by engaging in a value co-creation process and delivering a solution that meets the customer needs (both implicit and explicit), and solves relevant market problems.
- Improvement in the supplier-customer interaction and the ability to develop relevant arguments and pricing models that are based on solid verifiable data that considers the entire business ecosystem.
- The modularity and step-by-step nature of the sales process allows for gradually breaking the industry logic and ingraining instead the suppliers' innovative understanding of how the market should work.

#### 4.1.2. The Value of Project Execution Services: A Problem and the Uncertainty Perspective (Publication 2)

*Sub-research question 2: How are customer problems manifested in the offerings and the delivery process of a project supplier?*

##### *Background*

Publication 2 investigates how suppliers can approach solutions more systematically for the delivery process of capital goods. The data were gathered from a large EPC-contractor (case company Beta) to show that customer problem

portfolios (that were created during the investigation) can be used to segment the market and limit the number of relevant solutions.

One of the main targets of the research project underlying this publication was to develop an argument for optimizing the scopes of supply from the viewpoint of the entire customer investment project. Another purpose was to develop proven guidelines for the case company so as to meet a demanding service request from the customer. A third, but less important, target was to develop add-on service packages (e.g., the EPCM-type). This target was considered less important, as the company had no interest in just hiring manpower, but rather considered their services most valuable when integrated with other service and product elements.

*Findings*

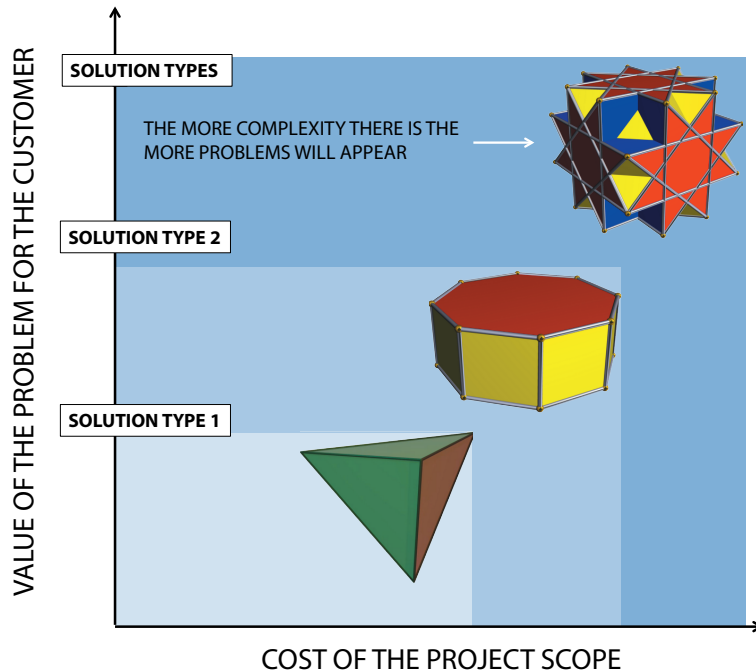
Table 8 summarizes the key findings of how delivery management services can best bring benefits to the customer problem manifested in the offerings

**Table 8.** Key findings from Publication 2 (Hellström et al., 2016)

Key focus on external problems	Project and delivery management services address both internal and external problems. While both may be beneficial, only solutions for the latter create value for the customer and thus become the prime objective of the productization efforts.
Benefit of a service to the investment NPV	The benefit of project and delivery management services can to some extent be evaluated based on their impact on the net present value of the investment and how solving the specific problem will affect the investment NPV.
Service contributes to certainty	Each service can be seen as contributing to the certainty of achieving a certain cost or time target.
Focus on problem bundles	Suppliers should, instead of matching individual services to customer needs and problems, look at larger wholes, i.e., problem bundles that can be solved using a bundle of integrated services.
The value of handling complexity	The value of a solution is not necessarily measured in terms of its scope (vertical or horizontal), but rather in terms of the complexity of the problems being addressed.

A key finding of this article is that a true solution provider should develop a portfolio of customer or industry problems rather than a portfolio of individual products and services. Indeed, sellers need better tools to demonstrate the

relationship between project costs and the value that a solved problem delivers. The idea of using a “polyhedron map” as a solution is introduced as a way of designing that solution. In the model, value for a customer is created through three different solution types: Solution Type 1 (the pyramid) and Solution Type 2 (the octagon) in Figure 5 are both seen as settled solutions that are then included in Solution Type 3 (polyhedron).



**Figure 5.** The relationship between cost, value, and the complexity of a problem.

An organization (suppliers and clients alike) whenever executing a certain solution is likely to experience a learning curve, such that overtime does become a commodity. In this sense, leading suppliers should engage in a more or less continuous search for more complex problems to solve, as doing so is ultimately where the added value rests at the same time as the costs for a more standard solution continue to decrease.

The act of designing should strive to match problems with existing products and services and the capabilities of the involved parties. After defining the main customer business problematics, suppliers while using their solution/

problem portfolios can co-design a functional solution together with the customer and other industry players.

One of the major stated challenges was the fact that it was unclear for the studied case company's customers what the services actually contained. Some customers required higher service levels than the company quoted, whereas others opted out the services as their added value remained unclear (or in the worst-case scenario, the company actually lost a competitive bid to a competitor with a narrower service scope when the company's price level appeared). Therefore, any scope formation between a supplier and its customer should be based on careful risk assessment. As the case company was not able to communicate the content and added value of its delivery services, the customers made scope splits that were not necessarily good for the project in question.

### *Results – A Service Configurator*

A concrete tool for identifying customer problems resulted in the idea of including a service configurator tool. The logic behind the configurator was to create a tool for supporting the estimation of different service level needs, both during the sales phase and the delivery phase.

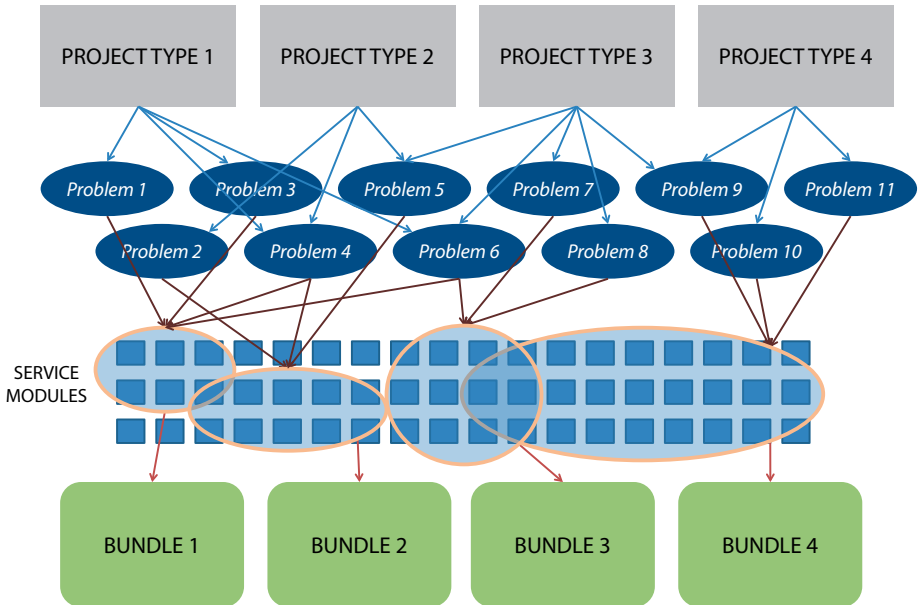
The following roadmap for creating service levels was thus established:

1) ***Establishing the naked solution.*** The company's service offering is itemized into a number of separate services, i.e., different service modules from which a complete solution can then be developed.

2) ***Developing the right bundles.*** The connections between the project prerequisites and the project outcomes are mapped. The average value of the project services is examined, as well as an understanding of which services tend to be most problematic and how the different problems and services connect and co-evolve as the "bundles" are defined.

3) ***Configuring the customer specific solution.*** Figure 6 illustrates the logic of the configurator. The main blueprint of this configurator is defining different (common) project types. These project types are then connected to certain reoccurring problems. By determining what problem correlates with what service module, one can create a chain of dependencies that culminate in different service bundles that then can play a central role in the project.

The process for configuring the different problems starts with the identifying the common project types that exist in the company, i.e., what prerequisites and settings are constantly reoccurring on a general level? Once a suitable set



**Figure 6.** The configurator concept (Hellström et al., 2016).

of projects is defined, the next step is to create methods for linking the new project to a pre-defined project type. The solution chosen for the case company herein was to define a set of questions based on what kind of challenges (i.e., problems) were likely to occur in the given project. These questions can be answered by both sales and delivery in order to connect the new project with a certain project type. Likewise, these answers can generate another set of possible problems that may occur in the project, i.e., “problem bundles”.

Providing sales with an overview of what potential problems may appear during the project period enables them to adjust both the quotation and the contract based on certain possible risks. On the other hand, if a project is already in the delivery phase, the Project Manager can use the configurator to gain hints on what services have a high risk of failing and take appropriate measures to limit those factors.

The goal for the configurator is, therefore, not for it to generate a plan for the project automatically, but rather provide all the actors with both advice and hints. This goal is achieved by defining different service bundles and how they affect each other (both inside the bundle and between bundles). The initial service bundles should of course eventually be configured and integrated into customer specific solutions, i.e., Step 3 of the roadmap.

### 4.1.3. Embracing Uncertainty in Value-Based Selling by Means of Design Thinking (Publication 3)

*Sub-research question 3: How is uncertainty handled in value-based selling?*

#### *Background*

Publication 3 makes an empirical grounding to the concept of value co-creation by investigating and deepening the current understanding of industrial solution development and value-based selling. The publication explains for how industrial solution sellers resolve the set of customer problems that are connected to the solutions being offered.

To uncover the micro-level processes of co-creation, 15 sales cases for the two industrial firms, Alpha and Beta, were examined via the lens of uncertainty management. Design thinking and actor-network theory were used to explore how certainty evolves between a seller and a buyer. The main argument is that the common industrial logic for addressing and tackling customer problems in solution selling, hitherto has been portrayed as either deductive or inductive, but is still incomplete. Research shows that solution selling and value co-creation both require a different, abductive epistemology in order to address this uncertainty. The study also offers an empirical extension to the value co-creation literature.

In this research, a typical action research process was used that proceeded through five phases: Diagnosing, action planning, action taking, evaluating, and specifying learning (Susman, 1983). An active collaboration on the sales process started with Alpha in 2013 and completed at the end of 2015. With Beta, that effort started in 2012 and continued until 2016.

#### *Findings – Identified Programmes and Anti-Programmes for Each Sales Case*

When undertaking this research with Alpha, Beta and their business network, 29 common programmes/anti-programmes were identified. These are listed in Table 9. In the publication, the authors showed how the companies solved the programmes and anti-programmes of two representative sales cases from Alpha and Beta and explained the stepwise process that occurred between the customer and the supplier. In addition, an ordinary cross-case analysis on the similarities between these sales cases was offered.



**Table 9.** The supporting and preventing actors observed for value-based selling in each case (Luotola et al., 2017)

SALES STAGES		PROGRAMMES (P) AND ANTI-PROGRAMMES (AP)	SALES CASES															
P & AP NUMBER		P = PROGRAMME AP = ANTI-PROGRAMME CL = CASE LOST CS = CONTRACT SIGNED O = ON-GOING FRAMED CELL = THE MOST CRITICAL OPP	ALPHA, CASE 4	BETA, CASE 11	BETA, CASE 9	BETA, CASE 12	BETA, CASE 15	BETA, CASE 14	ALPHA, CASE 3	BETA, CASE 10	BETA, CASE 8	BETA, CASE 7	BETA, CASE 13	ALPHA, CASE 5	BETA, CASE 6	ALPHA, CASE 1	ALPHA, CASE 2	
PROBLEM DEFINITION & VALUE DEMONSTRATION	A1.1	Sales manager has the necessary value-based sales tools and arguments for different customer types	AP	P	P	P	P	AP	AP	P	P	P	P	P	P	AP	P	
	A1.2	Sales manager believes the business case	AP	P	P	P	P	P	AP	P	P	AP	P	P	P	P	P	
	A1.3	Seller has proven references for sold solution offerings	AP	P	P	P	P	P	AP	P	P	P	P	AP	P	AP	AP	
	A1.4	Customer understands the logic of the solution	P	P	AP	AP	AP	P	P	P	P	P	P	P	P	P	AP	P
	A1.5	Customer believes the productivity impact of a solution	CL	P	AP	P	AP	P	AP	P	P	P	P	AP	P	AP	P	
	A1.6	Customer accepts the supplier as a value co-creator		CL	AP	AP	AP	P	AP	P	P	P	AP	P	P	P	P	
	A1.7	Customer understands the benefits of sharing information on its commercial operations, value drivers, and business problems			CL	AP	AP	P	AP	P	P	P	AP	P	P	P	AP	
	A1.8	Customer believes that the solution concept is more feasible when compared to the standard industry offering				AP	AP	AP	AP	P	P	AP	P	P	AP	P	P	
	A1.9	Seller can translate flexibility discussions into economic, fact-based value demonstrations				CL	CL	AP	AP	P	P	P	P	P	P	P	P	
	A2.0	Customer is motivated to invest							CL	AP	AP	P	AP	P	P	AP	AP	
SOLUTION TO A PROBLEM	B1.1	Customer is receptive to the idea and integrate it with its main business stakeholders								P	AP	P	P	AP	P	P	P	
	B1.2	Customer's technical personnel are competent enough to review and make clear and precise the profitability calculations								P	P	AP	AP	P	AP	P	P	
	B1.3	Customer's business partners believe the value-capture potential of the solution								P	P	AP	AP	AP	AP	P	P	
	B1.4	Customer is receptive to the idea of value-sharing and willing to find a workable revenue-sharing mechanism								P	AP	P	P	P	P	AP	P	
	B1.5	Integration between the technical and the business departments is working								P	P	P	P	P	P	P	P	
	B1.6	Seller is able to reach decision-makers in the customer's organization									P	P	P	P	P	P	P	
	B1.7	Parties are able to co-create a working technical commercial solution								AP	AP	P	AP	P	P	AP	P	
	B1.8	Customer has verified the value-based pricing and revenue-sharing mechanisms								AP	AP	AP	AP	AP	AP	AP	AP	P
	B1.9	Customer management is unified in the decision to invest								AP	P	AP	AP	P	AP	P	P	
REACHING CERTAINTY	C1.1	Customer accepts the supplier as a full- solution provider								CL	P	P	P	AP	P	AP	AP	
	C1.2	The scope of the solution is clear									CL	CL	O	P	P	P	AP	
	C1.3	The investment financing and governing mechanisms agree												P	AP	AP	P	
	C1.4	Customer is certain it can get faster payback for the investment using the supplier's solution												CL	AP	P	P	
	C1.5	Seller can guarantee productivity impact of the solution for the customer's business													AP	P	P	
	C1.6	Customer is certain that the seller can manage the lifecycle risks of the investment														P	P	P
	C1.7	Customer is certain that value-based revenue- sharing mechanisms will produce additional revenues														O	P	P
	C1.8	Customer is willing to contract with seller for the investment															CS	CS

*Findings – A Cross-case Analysis*

Table 10 demonstrates that observed programmes and anti-programmes were to a great extent similar within and across the two firms (and industry sectors) that were examined. The table shows a broad spectrum of sales cases from the less successful to the more successful ones. To illustrate this point, Table 9 shows how many programmes were overcome during the sales process, that is, how far down the road toward a final deal did each case actually proceed. Additionally, the most critical programmes that supported the sales progress are listed in Table 10. Based on this sorting and an analysis of the nature of the encountered programs, four distinct themes or phases were identified that contributed to a clear certainty during the sales processes (cf. addressing a research question: How does certainty evolve?). Indeed, these themes also constituted key obligatory passage points (OPPs) of value-based sales that are needed for sales to succeed.

**Table 10.** The most critical programmes that supported the sales progress of the 15 sales cases (Luotola et al., 2017)

THEME	MOST CRITICAL PROGRAMMES	REPRESENTATIVE CASES
Value potential can be demonstrated, and value can be created	<ul style="list-style-type: none"> <li>• Customer understands the logic of the solution (A1.4)</li> <li>• Sales manager believes the business case (A1.2)</li> </ul>	2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 14 1, 2, 5, 6, 8, 9, 10, 11, 13, 12, 14, 15
Risks of the solution can be managed	<ul style="list-style-type: none"> <li>• Seller can reach the decision-makers in the customer's organization (B2.1)</li> </ul>	1, 2, 3, 5, 6, 7, 8, 10, 13
The investment can be financed	<ul style="list-style-type: none"> <li>• Customer is certain that seller can manage the lifecycle risks of the investment (C1.6)</li> </ul>	1, 2, 6
The business idea can be documented and agreed on in an official contract	<ul style="list-style-type: none"> <li>• Customer is certain that the value-based revenue-sharing mechanisms will bring in additional revenues (C1.7)</li> <li>• Seller can guarantee the productivity impact of the solution for the customer's business (C1.5)</li> </ul>	1, 2 1, 2

The first theme relates to whether the value potential can be demonstrated and the value thus then created. This theme covers Programmes A1.1 - A2.2 (as denoted in Table 9). It was the most prominent in Case 2 when Alpha's Director of Customer Solutions posed the following productivity promise to the ship owner customer in 2012:

*“We have a tool for simulating the most profitable business case with a given vessel information and availability. This means that we can calculate the increased utilization rate for the ship. Therefore, you can offer a better contract for a ship operator”.*

This element was a decisive one, as it led to the realization that the customer understood the solution concept and could see the cash flow potential. Beta’s sales cases, however, proceeded fast from the beginning, as their customers saw the benefits of the solution concept (A1.4 in Table 9) and accepted the supplier as a value co-creator (A1.6 in Table 9). Another important programme that supported the sales progress, especially in Case 1, was when the customer understood the benefits of sharing information with Alpha on their own commercial operations, value drivers, and business problems.

In two of Alpha’s cases (Cases 3 and 4), it was obvious that the sales manager did not believe the business cases (A1.2 in Table 9). The sales team had trouble convincing the customer, as the sellers often felt they were left without guidance on how to communicate and demonstrate the value of the solution offering. In the above-mentioned cases, this aspect was a critical OPP, as the sales manager was not confident enough to handle any uncertain situation because the problems and facts were uncertain and even to some extent still unknown.

Second, the risks of the solution can be managed, which became an obvious theme throughout programmes B1.1 – B1.9 (as denoted in Table 9). Especially, in Case 1, this theme was a major barrier, and it was first realized when the customer outlined that they were not confident about the proposed revenue-sharing strategies.

*“Pricing and revenue sharing is a problem for us as how do we get money from the liner as they do not believe the added cash flow potential. Changing the current practice requires new performance KPI’s and new definitions on how performance can be measured and communicated”.*  
*[Director, Ship-owner, 2014]*

Alpha was finally able to overcome the anti-programme when it designed new pricing models that clearly outlined the customer’s generated value from the proposed solution. The researchers also observed two cases from Beta (Cases 13 and 7) wherein the risks actually played an unexpected, contrary role (B1.2 in Table 9). In both cases, the supplier managed to convince the customer of the

value of the (technological) solution. However, this OPP was a critical one, as Beta eventually lost the deal to its competitor, because both customers weighted CAPEX higher than they did the other capabilities. It was later discussed that Beta's sales managers should have, on the one hand, communicated the risks inherent in the project more clearly and, on the other hand, demonstrated Beta's distinct ability to manage these risks. In essence, uncertainty was not used fully to Beta's advantage.

Third, how the investment can be financed covers programmes B1.1- C1.8 (as denoted in Table 9). The financing of the investment proved to be crucial in the Beta cases where the market risk was significant. To address this issue, the governance structure of the projects was redesigned, so that the division of roles matched the ability and incentive of each stakeholder to manage these risks. This focus meant including new actors that traditionally would not be part of an investment such as this one.

Fourth, the last theme, the business idea can be documented and agreed on in an official contract that is derived from the programmes C1.1- C1.8 (as denoted in Table 9). In cases where the customer signed the deal (Cases 1 and 2), Alpha could settle those defined solution specifications with the customer and include key verifications in the final contract model: Profit gain, pricing, and scope of the solution, which for Case 2 were decisive OPPs. However, sometimes the customer did not believe in the feasibility of the solution (the OPPs in Cases 11, 8, and 7), but was still willing to continue the negotiations, as the sales manager stabilised the situation by introducing an argument that made the doubt regarding the expected solution very reasonable.

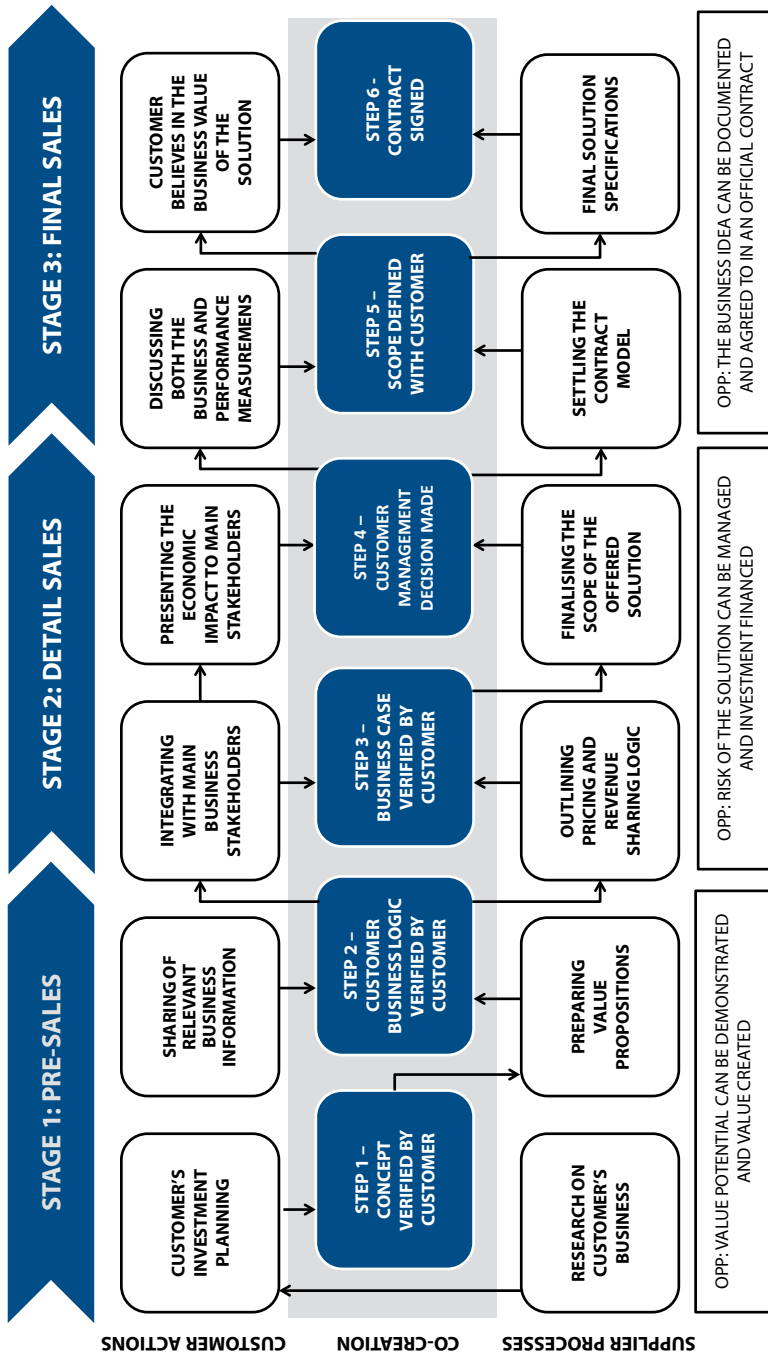
In some of these sales cases, the negotiations ended or paused, as there were still unsolved problems, for example, those regarding the earning logic and profit sharing mechanisms (in all cases except for Cases 1 and 2). In some other cases, the customers were uncertain of their roles and responsibilities regarding the implementation of the solution (Cases 10, 13, and 1). Because of this issue, drafting a complete contract and finally settling the solution become impossible.

### *Results – The Value-Based Sales Process*

Due to an obvious ongoing managerial need, an idealized, value-based sales process was designed (see Figure 7) based on certain recognized similarities in the 15 sales cases (see Table 9). The created selling technique supported the formation of certainty and a mutual understanding of value.

The value-based sales process was divided into three main phases, each of which included two sub-phases as shown in Figure 7. Vertically, the process further differed for the actions taken by the supplier, the actions taken by the customer, and the actions in which co-creation was manifested. The themes identified in this cross-case analysis constituted obligatory passage points that were required in order to proceed to the next stage of the value-based sales process. As indicated above, the proposed process was simplified.

- **The first phase, problem identification, and value demonstration (Pre-sales)**, involves the supplier and the customer by setting a problem formulation and having the solutions interface together. The main goal and the first obligatory point of passage are intended to make the customer feel confident in the value potential of the solution. After the customer verifies the financial impact of the solution for its own business, then the parties can move on to the next sales stage.
- **The second phase, designing a solution for a customer problem (Detail-sales)** involves increasing the customer's commitment to the proposed solution, which is realized when the customer starts to see that the solution exists in a given business environment and trusts that the supplier is able to provide that solution through their offerings. Moreover, getting the customer to feel confident about the seller's abilities to manage the risks of the solution is an obligatory point of passage for the detail-sales phase. When all parties believe that the solution can be financed and the governance structure is settled, then the most critical obligatory points of passage have been reached. After this understanding occurs, the sales case is transferred to the management level in the customer's organization
- **The third phase, reaching certainty (Final-sales)**, involves outlining the final scope and specifications of the solution with the customer as well as outlining the final contract model and signing it. Reaching such a certainty necessitates that the uncertainty and complexities of the solution are well settled, and mutual confidence in the value of the solution is gained, that is, the prerequisite for reaching the last obligatory point of passage is achieved. Then the agreement can be signed.



**Figure 7.** The value-based sales process demonstrates how the certainty of the value potential is established through co-creation (Luotola et al., 2017)

#### 4.1.4. Performance-Based and Functional Contracting for Value-Based Solution Selling (Publication 4)

*Sub-research question 4: How can an industrial solution seller commercialize its solution with value-based selling techniques when using a highly advanced performance-based contract as the pricing device?*

##### *Background*

Publication 4 contributes to the efforts of the case company, Alpha, which was attempting to introduce value-based selling and pricing model to market its new solution offering. The study explores the challenges that solution sellers often encounter while developing value-based sales processes and implementing value-based pricing.

While the study confirms the earlier research on the barriers to value-based selling and pricing, the article introduces a new legal-technical contract design and its integration problems as an important, but previously unknown, barrier. A functional contracting process as a solution for value-based sellers to overcome the barriers that arise from the lack of pre-contractual integration efforts was identified. The study highlights the role of contracts as barriers to be overcome by legal sales efforts when implementing value-based selling and pricing strategies. Further, the study stresses the value of functional contracting for pre-contractual integration.

##### *Findings*

Alpha encountered several challenges when designing and commercializing the performance-based contract and their attempts to commercialize the value capture model. This realization led the researchers to believe that value-based sellers who are wishing to deploy value sharing pricing models must overcome a number of barriers. The research also resulted in key empirical findings that are summarized below in Table 11.

**Table 11.** Key findings of Publication 4, summarized from Liinamaa et al., (2016)

BARRIERS TO VALUE-BASED SELLING AND PRICING	<p>The company had trouble gaining the access to influence its counterparties within customer organizations, as the company faced budget constraints, had limited negotiation authorization, or lacked the capacity to change established mindsets.</p> <p>The industry had entrenched practices that were forcing customers to adopt a distorted understanding of the earning potential of their installed base. The customers often received a significant portion of their earnings based on the theoretical technical capacity of the installed base instead of actual financial performance.</p> <p>Customer value functions were difficult to map. The financial performance drivers varied from customer to customer and also displayed complex correlation structures.</p> <p>The suppliers had trouble justifying a new pricing model, as the customers perceived the traditional cost-plus approach as the legitimate approach and communicated their strong preference for paying a fixed price.</p>
LEGAL TECHNICAL BARRIERS	<p>Legal-technical problems when drafting performance-based contracts will likely handicap sellers who wish to use advanced value-based pricing techniques and capture a share of the value that their offering produces.</p> <p>Performance-based contracts are not feasible. The revenue and costs are dependent on 1) mechanical performance; 2) usability of the installed base; 3) market conditions; 4) features of the customer value capture and pricing models; 5) the particular uses for which the customer chooses to deploy the installed base; and 6) the customer's operational capabilities.</p> <p>Turning the resulting understanding of the customer's value functions into functional contracting clauses and a pricing mechanism in a performance-based contract added more complexity.</p>
INTEGRATION PROBLEMS	<p>Many of these barriers result from insufficient integration of the seller and buyer organizations</p> <p>Supplier was failing to coordinate and adapt to its own and its customers' activities.</p> <p>The required integration model did not exist to allow the supplier to gain access to the customer's management and thereby affect the mindset of those in "power".</p> <p>Fair value sharing patterns were difficult to develop. Especially, orchestrating the incentives within the customer organization, gaining access to the customer's pre-existing value understanding and business performance data, and overcoming potential distrust and the reluctance to quantify value were notable challenges.</p>



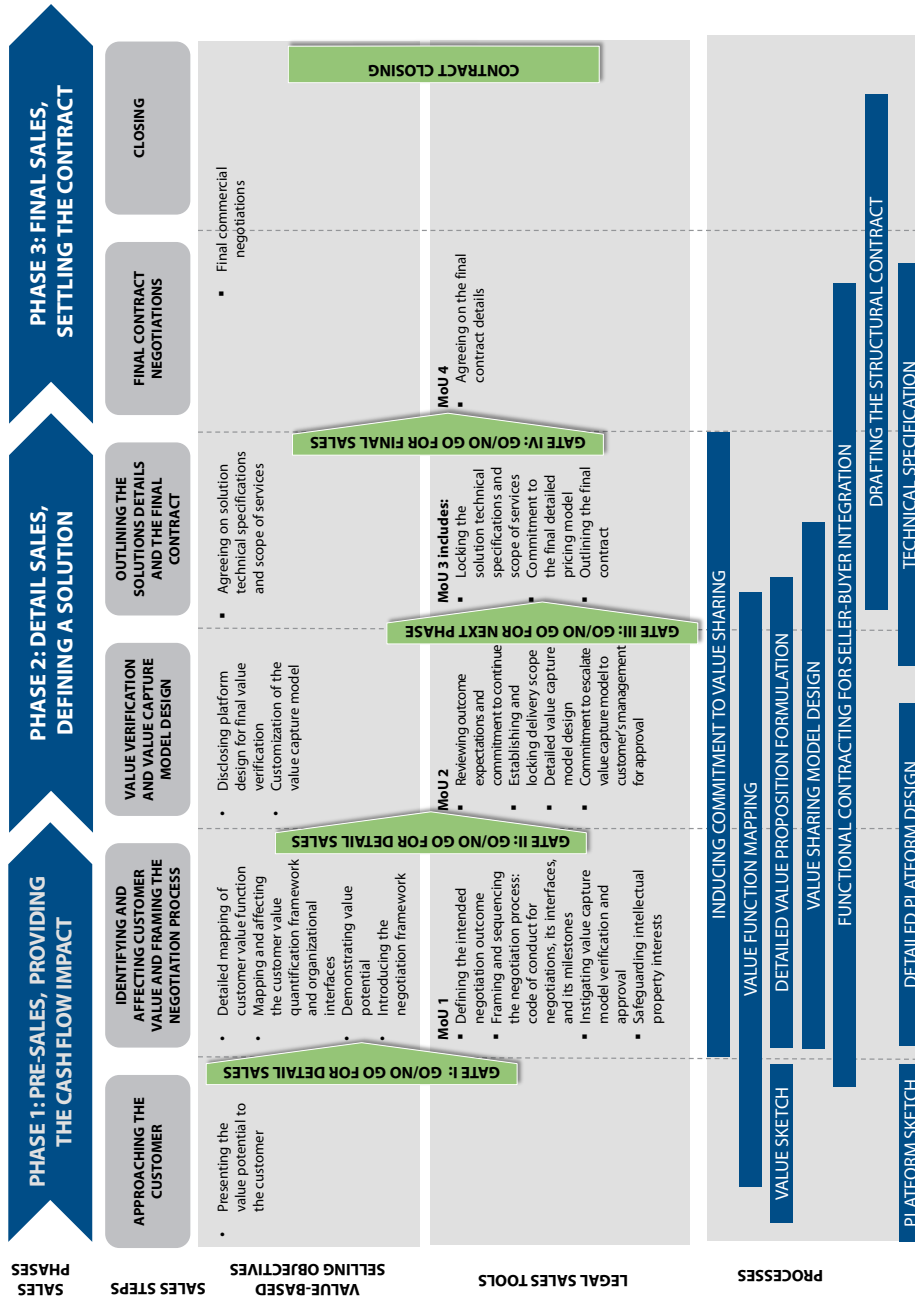
The identified barriers made it necessary for Alpha to be able to change the typical structure of the commercial negotiations. The industry standard stated that negotiations were conducted between sales and purchasing staffs, and lawyers typically became involved after agreement on commercial terms is reached. However, in solutions sales and in Alpha's case, the normal contracting framework was not working anymore. It made the marketing of the new pricing model difficult and allowed customers the possibility to backtrack from value-based pricing at any time. At the same time, Alpha realized that under the new sales process, it would have to consciously market its performance-based contract, make sure it was understandable to customers, and structure the sales process to force an early commitment to the pricing model from those same customers. Consequently, the contracts had to be a focal issue in the sales process. The usual relational and formal integration mechanisms, however, did not help in attaining these goals.

### *Results*

To achieve Alpha's objectives, the researchers and Alpha co-created a new functional contracting process to run parallel to and complement the sales process (Figure 8). The process utilized functional contractual techniques to coordinate the negotiation process, affect customer expectations, and implement changes to customer attitudes and its organizational practice. The process consisted of the use of a memorandum of understanding (MoUs) that was utilized as contractual instruments. The MoUs were sequential and customized to match and address the specific challenges the company now expected to encounter at each phase of the sales process.

MoU 1 serves a number of purposes. First, it structures the future negotiation process by setting "gates" (i.e., milestones) through which both Alpha and the customer can track their progress toward securing a final contract. Second, MoU 1 communicates the terms on which Alpha is willing to negotiate with the customer. MoU 1 is also an internal commitment device for Alpha to use when the gates are integrated as KPIs into Alpha's management system. Third, the memorandum serves as a strategic business intelligence tool. If the customer is not willing to sign the MoU, which binds the parties, then Alpha gains important information on both the motivation and the interests of the customer.

MoU 2 was designed to address a particular problem that was distinctive to Alpha. The company often managed to convince the customer's front-line



**Figure 8.** The value-based sales process and the functional contracting process (Liinamaa et al., 2016).

employees of the functionality of its offering, but the customer's decision-making parties reneged on the emergent agreement because the pricing model was not acceptable. This issue often resulted in sales resource misallocation and potentially the loss of intellectual property if the technical plans were shared. MoU 2 attempted to force the customer to accept the pricing model, which Alpha expected to be a major barrier for the customer's Board of Directors. The sales process then only continues with those customers who agree to the pricing model concept and acquire the agreement principle from their Board of Directors.

MoU 3 governs detailed commercial contract negotiations. It is signed after the customer makes its investment decision and commits to the pricing model. MoU 3 also contains the final delivery scope, the final pricing model, and the final details of the performance measures.

MoU 4, in turn, documents the remaining contractual issues to which the firms agree before finally closing the definitive agreement.

## 4.2. Moving Towards the Abductive Sales

Often the development of a new solution is likely to take place in those situations where technologies and products evolve rapidly, introducing several uncertainties, while at the same time, involving several stakeholders with conflicting values and motivations. This circumstance confronts the sellers with major challenges. To make the situation even more complicated and uncertain, in many solution sales cases, it may not even be clear what the ideal sales approach will or should be for a new solution.

In this kind of business situation, the design problems are 'wicked'; in other words, no optimal solution can be found in advance. For solving such problems, design thinking provides a new mindset for exploring complex problems and finding new opportunities in a world full of uncertainty. Therefore, the intuitive and abductive epistemology of design thinking lets sellers explore the questions *what is*, and then imagine *what could be* the future solutions. This kind of approach requires the capability to adapt forward looking thinking to things that do not yet exist (Romme, 2003) and make those things explicit to others in the form of both an offering and a contract.

The main contribution of this research is describing the benefits of design thinking and abductive epistemology for value-based selling. This research provides new knowledge in the field of industrial management and market-

ing as well as service design practice by describing how certainty does evolve during value co-creation. Even though the concept of value co-creation has been comprehensively studied and explained in both streams of literature and in particular in service design, where a toolbox to map customer journeys and to handle touchpoints during the service processes has been developed, the exact definition of the concept has remained inadequate. Where in the service design literature, the managerial focus emphasizes service development and co-creation activities, in design thinking, those issues are understood as more of a strategic approach, and the attention is often paid to the design process and its connected tools, mechanisms, and needed designer capabilities. Hence, the focus is not on concrete activities, but rather more on understanding how designers can actually reach their pre-defined targets and outcomes through the designing process.

In answering the main research question of this dissertation, namely, how can industrial companies design and sell value-based solution offerings, it was important to form a clear understanding of what design thinking principles are and how they can be applied to an industrial sales organization. The action research setting provided a valued approach to use to investigate the problems inside this context (Schein, 2008) and then, together with the customer, then generate actionable knowledge. In the cases central to this dissertation, the design of the solution took place during the value-based sales process, and it resulted in a set of research findings that were connected to supplier offerings, needed strategic abilities, and processes. The method for designing a solution differs, therefore, from the existing product and service sales situations in the way that solution underscores value co-creation, wherein the scope of the solution and its certainty will develop during the different stages of the sales process (Luotola et al., 2017).

The following research findings and design criteria have been identified to use to reach the desired goals of value co-creation in value-based selling (see also Figure 9):

**1. Adapting design thinking and abduction to value co-creation,**

- a. Ability to co-create solutions to problems using an abductive sales process where problems and solutions can co-evolve,
- b. Ability to adapt design thinking principles and tools,

## 2. Ability to handle uncertainty,

- a. Handling uncertainties in a sales situation, as uncertainty prevents customer readiness to see the value potential of a solution,
- b. Seller identifies and acts on micro-level problems (programmes and anti-programmes that are appearing during the value-based sales process,
- c. Using performance-based contracting as a device for value capture and customer perceived certainty

## 3. Tools needed to demonstrate the value of problems

- a. Tools needed to demonstrate the value of problems, as customers become confident when they realize that the seller is able to solve their problems and impact the value-creation potential,
- b. Ability to balance analytical and intuitive tools to ensure optimal business performance.

### *1. Adapting design thinking and abductive epistemology to value co-creation*

This thesis suggests that an organization that strives to apply design thinking to solve the problems of businesses must understand the principles of abductive reasoning. Instead of the two dominant logics, deductive that reasons from the general to specific and inductive that reasons from the specific to the general, abductive logic is based on wondering what could possibly be true (Martin, 2009).

In deductive sales practice, also known as “push sales”, a seller takes as a starting point the firm offerings and ponders the sales targets in advance. In other words, the seller tries to sell certain predefined products and services to the customer and draws conclusions on the necessary sales activities and benefits for the customer accordingly. Moreover, push sales strategies focus around advertising heavily to try to convince the customer to buy (Hunter, 2016). This strategy works well for lower cost goods or in situations where customers can make a fast investment decision, but it does not in situations of large capital investments, i.e., for projects with greater uncertainty. The seller believes that

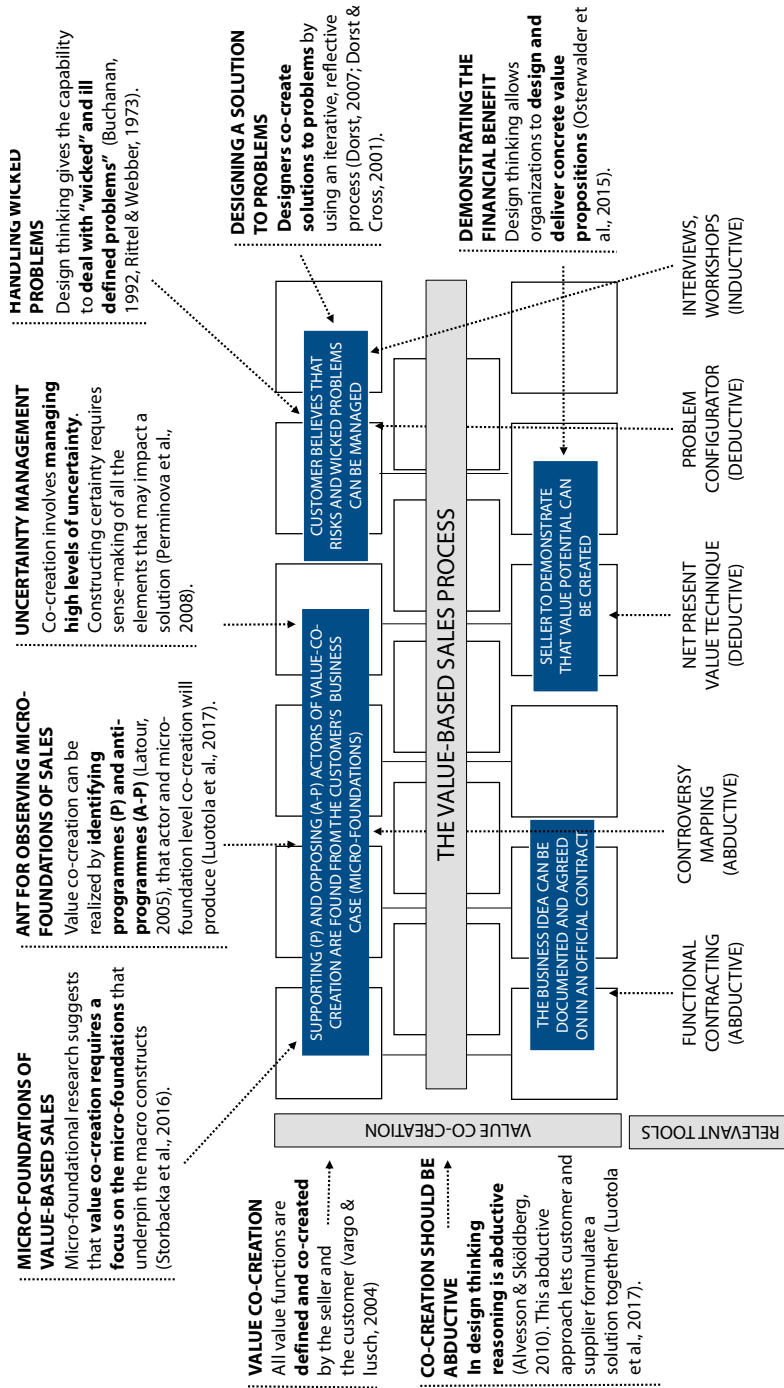


Figure 9. The key elements of value-based selling

he knows the customer's needs and problems and is certain that their offerings add value to the customer's business performance. This approach, therefore, requires having the availability of previous research findings on the nature of the customer's business and requires to some extent more data on the customer's business processes.

An inductive way of selling, also known as "pull sales", begins with the identified business needs as defined by the customer, which the seller then conceptualizes, and defines the offering that best suits that customer's needs. The seller acquires information about the customer during the sales process by discussing, interviewing, documenting, and drawing on these aspects a solution that best suits that particular customer.

Inductive reasoning in the sales situation means that the seller collects observations and makes predictions and generalizations based on findings of the customer's existing business needs and problems. For example, if a salesperson approaches a new customer, and does not know that customer's organization, industry, or business problems, a new sales strategy is developed that includes how and where to acquire that information. Then the seller turns to the customer to search for information on their requirements. Based on this knowledge, the seller interprets what problems their product portfolio could solve in that customer's business.

According to Martin (2009) these companies often chose to embrace either analytical or intuitive thinking as the primary approach for value-creation. Companies dominated by analytical thinking have one important advantage, namely, they can build size and scale. However, they are built to maintain the status quo. This means that they are structured to operate as they always have and be resistant to the idea of redesigning themselves and their business models over time. In contrast, in organizations that are dominated by intuitive thinking, innovation comes rapidly, but growth and longevity represent extreme challenges. These firms do not have the capability to systematize what they do, so they wane without intuitive leaders.

This study shows that neither analytical nor intuitive thinking alone is enough to ensure optimal business performance. Instead successful businesses will balance analytical mastery and intuitive originality in a dynamic interplay called design thinking (Martin, 2009); at the heart of that design thinking is the use of abductive logic (Peirce, 1934).

*“Design-thinking firms stand apart in their willingness to engage in the task of continuously redesigning their business. They do so with an eye to creating advances in both innovation and efficiency – the combination that produces the most competitive edge”* (Martin, 2009)

In the case of a novel solution business model, knowledge what creates the value to a customer is drawn based on a hunch, where the idea of a solution is still uncertain, or as Martin (2009) suggests, even still a mystery. At this stage, the seller is speculating about what are the problems in the customer’s business that can be solved with our solutions, or how can we solve such uncertain problems?

The sales process continues in a step-by-step process with the customer with the aim of forming a guiding principle (Peirce, 1934). In practice, that guiding principle is a rule of thumb that helps narrow the field of inquiry and work the uncertain problems down to a manageable size. At this stage, the seller already has some investigated knowledge on the value potential of their offerings that can be used to reflect on the findings of the customer’s business. The companies can, therefore, make estimations on likely cost savings, earnings potential, or rough productivity growth calculations to use in further sales negotiations.

The guiding principle in one of the company cases offered in this dissertation was that the seller believed that there was a need of markets for container vessels with a higher loading capacity, as the existing container systems did not provide the maximized loading capacity. The company knew they had the needed technology to provide the solution, but they lacked proof of value. Therefore, the company realized that this guiding principle as such offered no guarantee that using the company’s products and services would produce a certain result or value. Rather, the idea contained the vague promise that using the solution in the customer’s business context might be better than not using it. When the business context was further studied, with sufficiently thorough and organized exploration of all the possibilities, a clear understanding emerged. The sales manager was able to develop a valid rule of thumb that guided him and the customer toward a viable solution. Thus, the understanding had advanced from an uncertain idea (e.g., what are the problems in the customer’s business that can be solved using the company’s solutions) to a rule of thumb (main problems are known) that now precisely explained how the problems could be solved.

However, this understanding by the seller company still represented an incomplete, but advanced, understanding. What was previously an uncertain



hunch or an undetermined problem had become an idea for a new emerging innovation.

Moreover, the capabilities of the sales personnel might impact the progress of value-based selling, as some sales managers remained stuck in the existing, purely analytical, deductive ways of selling, while others could handle uncertainty and master the guiding principle. In addition, the seller had to have a profound understanding of the industry, market changes, and the still needed capabilities in order to demonstrate the value of the problems in a concrete way. At this stage, there was no pre-existing, concrete guidelines for how value-based selling should be managed and bring forth. Instead, the sales progress relied on the capability of a seller to explore all the possibilities for what might be a valid solution.

As an example of a shipping case, the company had no proof that their solution would influence the customer's cash flows, but they did not lack insights. At the time, the guiding principle (customers wanted container vessels with a higher loading capacity) was first proposed, no one could prove whether the value increase was possible to provide the firm the products and solutions. The company was only able to make concrete financial calculations and performance measurements, but when the business idea was tried in practice, and the parties understood it, the desired and valid result occurred.

When the seller, together with the customer, put the guiding principle into operation and refined it intensively, it converted the solution from a general rule of thumb to a fixed formula – now a value-based sales process. A value-based sales process delivers guidelines to the seller on how to follow the sequences of steps they embody to produce a particular result. In practice, the value-based sales process is an explicit, step-by-step procedure for solving a problem. The value-based sales process differs from a guiding principle in that it offer a structured guidelines to the sales personnel for how to prepare for the unknown during the sales activities. It is simplified and structuralized, to the degree that sellers can deploy it with more or less successful efficiency. Therefore, the complexities of value-based selling are mastered through the process of simplification.

## *2. Ability to handle uncertainty*

The value-based sales process that was created during this research illustrates how the certainty of a solution and its value potential is established through

co-creation (see Figure 7). It also captures the abductive logic, that is, how the supplier's sales force takes on the role of the customers' business processes and goes beyond the wicked, underdetermined customer problems with a goal of construct and reach certainty (in other words, find a solution for the customer).

At the beginning of the sales process, the sellers first find and are then given a set of problems to examine and seek what solution will make the best sense in economic terms and enable productivity for its business actors. As shown in Figure 10, at the beginning of the sales situation, the understanding of the problems (caused by the programmes and anti-programmes) and its solution is limited; some problems are already known, and these include known facts, business goals, and expected challenges that are related to the business process. Dorst (2007) termed such problems as the determined ones. In this situation, the seller, and the customer have no reason to doubt the underlying facts that can constitute a solution. Moreover, they are aware of what is ahead of them, and they have the needed working tools and capabilities to solve those problems.

For example, in Beta's case, shipping the goods to the site could be challenging, which still does not mean it was an uncertain situation. In contrast, the sales situation became uncertain when the customer, for example, did not believe that the supplier was able to solve their business problems, an anti-programme (see Table 9). To proceed with the sales process, the sales manager should actively explore and embrace the encountered facts and arguments and make the customer feel fully confident of their company's capability to provide value and solve their customers' problems.

As the sales process proceeds, new information, programmes, and anti-programmes bring forth problems that were not known in the prior situation. As this previously unknown information enters the emerging sales process that once was balanced, these new findings can change the sales situation in different ways. The new knowledge usually causes uncertainty, as its meaning and relation to other facts is often unclear. The new knowledge may resolve an existing uncertainty by clearly tipping the scales in favour of one interpretation over another. It can also make a fact even more uncertain by adding a third plausible interpretation in addition to the two competing earlier interpretations. Moreover, it can upend an existing certain fact by suddenly introducing an argument that makes doubting that fact reasonable. It can also simply strengthen an ar-

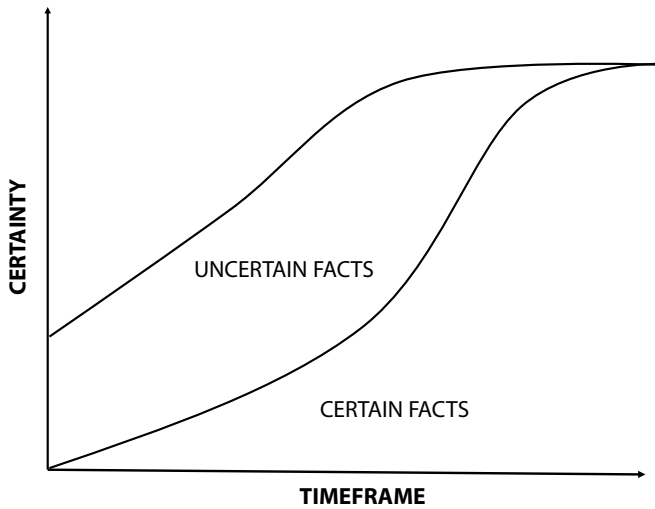
gument that was already accepted as an undoubtable fact, in which case the additional, previously unknown knowledge will not be given much attention.

In one of Alpha's sales cases (Case 1 introduced in Publication 4), the critical unknown anti-programme was caused by the existence of a new shipping alliance between the ship owners and ship operators. Alpha and the customer had to make several iterations of the calculations regarding the economic benefit, as when one fact was introduced, the already stabilized and sales situation become uncertain once again, e.g., the more stakeholders that were involved in the alliance contract, the fewer additional cash flows could be generated for the contract parties. Finding the solution to this problem took several iterations, meetings, and workshops before the parties reached the desire point of certainty with no reasonable doubts remaining regarding either the revenue sharing or the pricing model.

An experienced sales manager, however, will always know how to prepare for the unknown. Even though that manager does not precisely know what issues will arise, he or she will know what kinds of situations tend to appear. The sales manager will, therefore, prepare well in case any of these unique and new situations do arise. Then he will already know how to handle them.

One of the main identified capabilities of a sales manager is that he or she is able to adapt to, handle, and stabilize any uncertainty that produces an obligatory point of passage (OPP); otherwise, the sales negotiations could lead to an end. In a sales situation, an OPP can be a supporting actor that strengthens the customer's certainty for the benefits of the solution (reached certainty). An example of a supporting OPP is when a customer becomes finally certain that the seller can manage the lifecycle risks of the investment (see Figure 10). That OPP can also be an opposing actor that can (in a worst-case scenario) end the sales negotiations (due to too high an uncertainty) (Luotola et al., 2017). Moreover, a key element in settling and stabilizing the sales situation is the proper use of performance-based contracts that can influence and cement a mutual confidence in the declared value potential.

This process of settling facts, and proceeding through OPP's continues until there are no more credible uncertainties left, at which point both the co-creation and the negotiations conclude. This is the point when the knowledge of the project is certain beyond any reasonable doubt (the right-hand side of Figure 10). Certainty beyond a reasonable doubt means no serious uncertainties or facts can be called upon that will question or disturb the final outcome of the project.



**Figure 10.** The emergence of certainty in a value-based sales process (modified from Hellström et al., 2016).

### 3. *The needed techniques and tools for value-based selling*

The empirical investigation in this research suggests that the certainty and functionality of a solution emerges through co-creation during the actual sales process. More specifically, a sales process should combine both analytical, (deductive and inductive toolsets) as well as creative thinking (abductive tools). This combination allows the seller to identify the essential facts and also the wicked problems in an uncertain sales situation. The tools that are central to handling uncertainty during value-based sales are listed in Table 12. The most important tools for the sales success are those discussed in the paragraphs that follow Table 12.

**Table 12.** The relevant techniques and tools for value-based selling

LIST OF TOOLS	THE SALES LOGIC			BENEFITS OF USING THE TOOL
	Deductive	Inductive	Abductive	
Problem configurator	x			The tool leads to reducing any uncertainty caused by new problems found in the customer's business
Functional contracting techniques			x	The use of functional contracting techniques works as an instrument for setting milestones by which both the customer and the supplier can track their progress toward certainty and a final contract.
Net present value (NPV) technique	x			The seller indicates that they can help the customer to avoid problems and risks' affecting both operational expenditure and revenues in the NPV formula.
Controversy mapping			x	Controversy mapping can help the sales force unravel the issues in the customer's business, understand their complexity, and identify the nodes of controversy, interests, alliances and oppositions between all the actors.
Interviews, workshops		x	(x)	In interviews that are inductive, the goal is to identify what customers "say", "make" and "do" wherein "make" is associated with both abduction and design.
Blueprinting			x	The blueprint lets developers and researchers grasp the intangible world of interactions and make actual actions tangible

**Problem configurator.** The problem configurator tool that was developed during this research shows how the value of services can be identified and communicated in terms of the problems they address. The tool addresses the challenge of identifying valuable customer problems and matching them with appropriate service products. The web-based configurator tool is defined as deductive, as it can be seen as an engineering activity wherein certain configurations of a product or system are developed by choosing from a platform of more or less standard modules or building blocks. This tool supports the estimation of different service level needs in the sales phase based on identified investment problems. In so doing, the tool offers a means for studying the iden-

tification and communication of value. The benefit of using the configurator is that it can reduce the uncertainty caused by problems found in the customer's business (Hellström et al., 2016).

**Functional contracting techniques.** The progress towards certainty requires contractual instruments and a functional contracting process connected to the sales process. This tool is termed abductive, as it requires the seller and the customer to carefully coordinate their expectations along the value chain. The key feature of such instruments, the MoUs, is that they allow the seller company to pursue changes in their customer's organization (Liinamaa et al., 2016). The changes the MoUs initiated included the shaping of the current firm's interfaces (integration of the legal and sales departments), which caused a need for new co-creative value quantification tools and processes (i.e., information exchange practices) and decision-making structures (finding the right decision-makers). In addition, the use of MoUs allowed the seller to implement contractual sanction mechanisms (penalties for unauthorized use of Alpha's designs) which gave more freedom to both parties to look for the best total solution.

**Net present value technique.** Using this deductive technique, a seller company can affect the customer's investment cost (capital expenditure) time and operational expenditure, ultimately addressing the economic value of an offered solution. The technique works by deferring the uncertainty regarding solution and project risks, as the seller can indicate that they are aware of and can help the customer avoid delays, cost increases and quality flaws, there by affecting both operational expenditures and revenues in the NPV formula.

**Socio-technical diagram.** This tool provides an abductive way to handle the identified wicked problems as well as supporting and opposing actors during the sales process. It provides an approach for how customers' problems shape supplier offerings and actions that influence solution creation.

**Interviews and workshops.** During the different stages of the sales process, sellers conduct meetings, interviews and workshops with the customers and the needed third parties. These methods can be termed inductive as the goal is to identify what customers "say", "make", and "do" wherein "make" is associated with abduction and design (Sanders, 2005). In the interviews, sellers listen to what customers "say". Through observations and monitoring, the sellers learn what customers "do" i.e., how customers use products, services and systems, in order to identify any problems, for example, those in service operations. In meetings and workshops customers and suppliers jointly explore and articulate

these findings and “make” the best solution for the problem with the goal of identifying value for the customer.

**Service blueprinting.** This tool provides a visual and concrete mechanism to use to document and follow the value-based sales process, an important method in the designing of the solution. A blueprint is termed abductive, as it represents what happens in front of the customer already engaging with service personnel and service “evidence” behind a “line of visibility” where others support service delivery (Kimbell, 2011). This blueprint lets designers grasp the intangible world of interactions and undertake tangible actions (i.e., through prototypes, illustrations, and sketches), moving from interaction to experience (how customers value and experience the service or a solution) and then moving from experiences to commercialized solutions. A tangible blueprint of that sales process allows the seller to follow the sequence of steps when they execute a value-based sales process. In practice, it is an effective procedure to use for solving a problem.

## 5. Discussion and Conclusions

### 5.1. Theoretical Implications

On the theoretical front, this study makes three main contributions. First, it contributes to the industrial sales management literature by introducing abductive epistemology for value co-creation in value-based selling. In particular, this thesis outlines that if companies want to influence their customers' value functions and certainty, the sellers should adopt an abductive epistemology, as opposed to conventional deductive product sales or inductive, order-specific engineering. In addition, in industrial markets, there is a need for more detailed micro-foundational research (i.e., on the actor level) of value co-creation (Storbacka et al., 2016). The programmes/anti-programmes (i.e., micro-foundations) identified in this study and the four recurring themes (see Publication 3) constitute a substantial empirical extension of the value co-creation literature. Second, the concept of uncertainty that was derived from the project management literature is introduced (Loch et al., 2006; Perminova et al., 2008; Ward & Chapman, 2003) into the solutions-selling discourse. Third, this study provides a more detailed account of precisely how performance-based contract design matters in value-based selling.

#### 5.1.1. Moving Toward an Abductive Epistemology for Value-Based Selling

The findings of this research propose that solutions selling at large (including value-based selling) does not solely depart from the customer's process (as opposed to the deductive approach, wherein the value proposition departs from the supplier's product processes) as has been earlier argued by the mainstream solutions selling literature (Tuli et al., 2007). Instead, solutions to more extensive (wicked) problems require an iterative dialogue between the customer and the supplier. This study suggests that value-based selling and value co-creation not only require a different approach, but they both essentially also need a different and abductive epistemology (Luotola et al., 2017).

Therefore, an important impact to the value-based selling literature and managerial practice is the knowledge that an abductive sales approach provides empirical grounding and concrete tools for managing value co-creation during the sales process (see Tables 4 and 12). The current research suggests that the model



for value-creation requires a balance between analytical thinking that harnesses two forms of logic – deductive reasoning and inductive reasoning – as well as intuitive thinking that is centered on creativity and innovation (Martin, 2009). This particular combination is termed design thinking, and the logic of its inference is abductive. However, the goal is not to embrace abduction to the exclusion of deduction and induction. Rather, it is to strive for a proper balance.

This research contributes to the existing co-creation research by demonstrating that design thinking can be used to introduce and handle uncertainty regarding the value of the solution (Luotola et al., 2017). Moreover, design thinking provides a means for sellers to handle institutional barriers that Töytäri et al. (2015) also outlined. In particular, design thinking gives the seller a way to get closer to the customer's business situation so as to better understand and influence that customer's desired value. This focus means that the seller is able to make a concrete estimation of the investment earning potential or cost savings by exploring as yet undetermined and implicit problems and their value. This requires that the seller is able to justify value in concrete terms by using rational, solid arguments and methods like value calculations that can demonstrate the value of the seller's contribution to the customers' profitability (Pöyry & Parvinen, 2017; Terho et al., 2012). Moreover, as Pöyry and Parvinen (2017) suggest, both qualitative and quantitative business benefits should be taken into account in the calculations, even though most companies still struggle to convert their value propositions into quantified customer value (Hinterhuber, 2017). To meet this challenge, an abductive approach provides mechanisms for the seller to broaden their view of a customer's business situation and reflect on it in terms of the supplier's offering of portfolios and capabilities.

To formalize and illustrate this epistemological point, an idealized value-based sales process was created (see Fig 7) based on the data collected during the current study. The value-based sales process was influenced by the service blueprinting tool (Shostack, 1982), which shows how the seller can better grasp, specify, and calculate the value of problems and make the actions of value-creation activities tangible. Such an approach allows for approaching ill-defined research problems through design thinking and thereby systematically validating and verifying research results with practitioners to ensure the applicability of those results in actual practice (Gustafsson & Tsvetkova, 2017). Moreover, that process supports the formation of certainty and strengthens the mutual understanding of the solution.

Similar models have been presented in the management research field earlier as an example. Terho et al (2012) articulated three stages of value-based selling behaviour (understanding the customer's business model, crafting the value proposition, and communicating its value) including their consequences. Töytäri and Rajala (2015), in turn, presented value-based selling that requires three kinds of capabilities, namely, planning, implementation, and leverage. However, in contrast to the management research, design thinking offers a broad scale of process views that are grounded in the design mode. In that tradition, designers co-create solutions to problems using an iterative, reflective process, wherein both problems and solutions co-evolve (Dorst, 2007; Dorst & Cross, 2001). This research adds to the stream of research by putting forward a coherent and empirically grounded process that accounts for and also manifests the aspects of value co-creation and uncertainty.

### 5.1.2. Handling the Uncertainty of Value-Based Selling

Although scholars have recently developed the value-based selling concept, and (Töytäri, 2015), for example, deepened the current understanding of the essential capabilities and managerial practices in value-focused business strategy implementation, the concept of uncertainty does not seem to have had as broad an influence or received as much attention in the industrial marketing literature. However, this study suggests that handling and even utilizing uncertainty is a key feature of the value-based sales process presented here. (see Figure 7). This argument is in line with the project management literature, wherein the concept of uncertainty is recognized as covering both downside risks and upside opportunities (Perminova et al., 2008; Ward & Chapman, 2003). This point also became evident in this current study, and indeed it has key implications for the future literature on solutions selling.

The very reason for adopting a different approach to solution design stems from uncertainty, and that was introduced as a central facet of value-based selling (Luotola, et al., 2017). This research has shown how value-based solution selling can be understood as an uncertainty management process, wherein the seller's task is first to create and increase uncertainty based on the identification of wicked problems (Rittel & Webber, 1973), and then successively establish certainty around that particular solution.

In the classical management theory, uncertainty is seen as the fundamental source of project risks, and these risks are combated by using information pro-

cessing (Winch, 2015; Winch et al., 1998). More recently, scholars have begun to see such uncertainty as a natural element in all future undertakings and as something that works both against you (i.e. the 'wicked') and in your favour (i.e. opportunities) (Chapman & Ward, 2004; Perminova et al., 2008). In a similar vein Hellström et al. (2016) have argued that risks (uncertainty) can drive the need for more advanced services, which in turn then require novel sales arguments and functional contracting mechanisms to illustrate and prove the added value potential for the customer's business. Indeed, the greater and more complicated the problem is, the more valuable will be the solution. In essence, uncertainty about a solution offers a new point of view for developing a functional value-based selling and contracting approach.

What complicates the sales process even further is that sometimes there is uncertainty about the problem (as opposed to the solution), also referred to as undetermined problems (Dorst, 2007). These are situations wherein the underlying facts can be ambiguous and unexpected. Such problems can be interpreted in many ways that may imply different outcomes based on the seller's capabilities and creativity when solving this kind of problem. In such an uncertain and unexpected situation, the conventional information processing approach falls short, as the source of the uncertainty stems from issues that initially were not even known as unknown (Loch et al., 2006).

The earlier literature suggests that service (and solution) selling needs to build on (value) co-creation (Vargo & Lusch, 2004). Hence, value-based selling also presumably builds on co-creation between the customer and the supplier, although the corresponding literature has to date not explicitly considered co-creation as a key element (Terho et al., 2012; Töytäri & Rajala, 2015). This research suggests that establishing certainty in value-based selling undoubtedly requires further efforts to concretize any rather abstract co-creation concept. Moreover, the literature on value co-creation, has as of late also been criticized for being too much of a macro construct, for which any actual appearance and its manifestation has remained rather abstract (Storbacka et al., 2016). Thus, the value co-creation literature seems to focus on the general premises of co-creation at the expense of uncovering (micro-level) value creation mechanisms and their processes.

Storbacka et al. (2016) earlier proposed actor engagement as an operationalization of the otherwise fluid co-creation concept. Herein, this research shows how value co-creation can also be observed through the programme/

anti-programme concept, already known in the sociology of science literature (Latour, 2005) as accomplished by identifying several programmes and anti-programmes that an actor level co-creation naturally causes by applying the viewpoints and tools of design thinking and the Actor Network Theory (Luotola et al., 2017). The reliance on the actor-network theory is necessary for rooting the solution deeply within the specific context and understanding the more tacit interdependencies present for the different factors that are affecting the logic of solution (Gustafsson & Tsvetkova, 2017).

This research further shows that when the seller and the customer have reached an understanding on the micro-level problems and the opposing as well as the supporting actors in the solution network, the value of solving such problems helps handle uncertainty of the solution. To attribute the value of problems properly, sellers and contractors should look at those problems and configure solutions that are based on project-specific problem combinations (Hellström et al., 2016). To illustrate this point, an empirical example of six projects in the sales phase that were configured based on the problems and risks they contained is provided in this dissertation. This study thus contributes to the construction management literature by showing how the value of project execution services can be identified and communicated in terms of the problems they actually address. In this effort, a means for attributing this value is also provided here. Rather than a straightforward quantification of value, the functional solution must be seen as evolving from the complex problem bundles and by using a process that is aimed toward reducing the uncertainty caused by those same problems (Hellström et al., 2016). Uncertainty is, however, not exclusive to project execution; rather it is indeed a trait of complex project appraisal in the first place, and it needs to be addressed in the sales process itself rather than only in the outcome of that process.

### 5.1.3. Functional Contracting During Sales Process

This study outlines the importance of formal integration and contracting techniques during sales processes. The research suggests that when understood in a functional frame, contractual techniques may be significant, value-adding components to apply during the sales process and will work to simplify the seller's attempts to introduce value-based pricing models (Liinamaa et al., 2016).

This experience working with two case companies confirms that contract and contractual techniques are not commonly used in typical solution sales

processes. The research conducted during this study confirms that most sales personnel are not typically accustomed to handling contracts during the sales process and also want to avoid involving lawyers in that process. This dilemma suggests that sales processes are almost exclusively governed by relational integration mechanisms and methods that are based on trust and unarticulated expectations of civility and appropriate conduct (Liinamaa et al., 2016).

Previous studies have confirmed that contracts do complement relational governance mechanisms (see e.g., Poppo & Zenger, 2002). In the current research, contracts are presented as formal integration mechanisms that can add important components to sales process governance, as value-based sales processes require sellers to carefully coordinate their expectations along the value chain, indeed a co-creation of new added value allocation patterns and appropriate organizational interfaces (Liinamaa et al., 2016). Therefore, contracting allows both parties to influence each other's behaviours, affect their organizational structures and interfaces, mindsets, and even ethics in an undetermined and uncertain fashion.

This research further suggests that contractual techniques are underutilized and should be extended outside the sales processes to the solution delivery phase (Liinamaa et al., 2016). Similarly, Davies and Hobday (2006) argue that the solution business requires sellers to pay attention to organizational boundaries, as sellers are responsible for ensuring that value is created by combining processes within two organizations. Whereas the functional contracting process allows the case company to affect the behaviour of its customers, the same approach and tools may also be used to facilitate and support the solution delivery processes (see Publication 4).

## **5.2. Managerial Implications**

On the managerial front, this research has important implications for industrial companies that are striving to deploy value-based selling strategies. First, due to the abductive nature of the sales process, this research suggests that buyers should not limit the scope of a solution to their own immediate perception of a problem (i.e., the use of deductive logic). The study shows that companies that sell their offerings based on deductive push sales or use inductive pull sales methods, lack the mechanisms to form a concrete understanding of the customer's problem and its solution. They only can reflect their own determination of the problem. Abduction provides the means for seller organisations to

ground the value demonstration of their solution concept on actual empirical and operational facts that they gather from their customer's specific situations. This focus means that the sales manager actively explores and embraces all encountered facts and arguments. Likewise, the sales and contracting structure needs to be assembled in such a way that it enables all parties to agree on the facts and documentation for the final contracting, so the full knowledge of the case emerges and certainty settles in precisely and accurately (Liinamaa et al., 2016).

Second, suppliers need clear guidelines for value co-creation wherein the actual certainty of value emerges gradually during the sales process. For that purpose, the created value-based sales process, together with functional contracting techniques (see Figure 8), may have great potential to become a powerful device for value capture that can be used to improve the success of solution selling and customer perceived certainty. The design thinking approach provides a novel means for the practical and co-creative resolution of problems and solutions with the goal of creating value for the customer. An example of an industry successfully utilizing design thinking and design processes can be found in the IT-sector, which uses agile, lean, and design thinking principles in their digital product and service development. In short, when design thinking provides the appropriate mechanisms to explore and solve problems, then lean is used as a framework for testing the beliefs and learning ways to find the right outcomes; and agile illustrates how changing conditions are adapted using software (Schneider, 2017). The core idea of these different methodologies is to maximize customer value and minimize the unnecessary elements of the development, in practice creating more value for customers using fewer resources and experiencing less cost.

The companies that are designing digital services are now more involved in service design. This process examines all activities, infrastructures, communication, people, and material components involved in service to improve both the quality of the service experience and the interactions between the provider of that service and its customers. A practical example of a design thinking process can be found with Apple. In their view, the design process is not over when manufacturing begins. In fact, Apple iterates the design throughout manufacturing. The product is built, it is tested in practice and reviewed, and then the design team improves on it and it is built all over again. These cycles take 4–6 weeks at a time, and the process may be run many times over during a product's

development lifecycle (Lashinsky, 2012). Similarly, the marine company central to this dissertation recently launched its new solution concept, a forward thinking approach for ship design that aims to optimize cargo system efficiency and thus the earning potential of existing container vessels. The process was started by studying the ship's cargo system and earning potential with the customer and reviewing it against anticipated routes and cargos. Then it was tested and verified in actual operations.

Third, due to the complexity of solution sales, value propositions that sellers provide to their customers are considerably uncertain. However, suppliers should communicate that this uncertainty should not be seen in a negative light; rather, it should be seen as a source of competitive advantage when managed properly (Perminova et al., 2008). Moreover, the complexity of a solution sale increases the chances of economic benefit if both parties agree to the collaboration. This study identified four distinct themes (see Table 10) that will contribute to reaching certainty if a customer believes the following statements:

- Value potential can be created
- Risk of the solution can be managed
- The investment can be financed
- The business idea can be documented and agreed on in an official contract

For managing uncertainty successfully, this thesis has identified and created several tools (see Table 12) for that purpose. An example of a tool impacting customer-perceived certainty is the controversy mapping tool, which was adapted from actor-network theory. This tool can be used to better understand each customer's business situation on the actor level and link the identified actor-level (micro) problems that connect to the customer's business case to the end goal that is forming a solution and enhancing customer perceived certainty.

The marine case studied in this dissertation shows how the controversy mapping technique was used for handling uncertainty. The seller found during its sale efforts that one of the biggest anti-programmes (i.e., actors that oppose certainty) of sales negotiations was that the customer was not receptive to the idea of value-sharing and neither was willing to find a workable revenue-sharing mechanism (see B1.4 in Table 9). Trying to solve this challenge and achieve

a mutual confidence took several meetings, e-mail exchanges, and workshops. Moreover, the seller realized that new mechanisms for value sharing and new value propositions had to be developed. Despite these efforts, the seller company still could not fully outline all the functional pricing and revenue sharing mechanisms at this stage of the sales, nor could it gain the acceptance it sought from the relevant parties. This lack of value-based pricing and revenue sharing strategies thus remained an anti-programme, as the customer was not fully convinced of the benefit potentials (see B1.3 in Table 9). The customer did understand, however, that with the seller company's solution, in theory, the customer could achieve a higher cash flow; however, the practical issues regarding pricing and revenue sharing continued to cause uncertainty. The decisive programme that finally contributed to the progress of the solution sales was the newly founded fleet operations centre in the customer's organization, which then took on a promoting role during the sales negotiations (B.1.2 in Table 9). The fleet operations centre understood the commercial side of the operations and then could precisely verify the productivity calculations regarding the solution.

After several meetings in the spring of 2014, the parties co-created a solution offering that benefitted both parties. Certainty about proceeding with these sales negotiations was reached, as the seller company, using the customer's input and data, compared the current state of customer income to the guaranteed, increased revenues that would be provided using the seller company's solution (programme B1.7 in Table 9). Based on actual capacity calculations and platform simulations, the sales company demonstrated that the customer would increase its monthly operating revenues by 10% using their solution. This solution was thus a crucial programme, as it did indeed support the customer's readiness to invest.

This example shows what abduction in a sales situation actually means. The seller that applies design thinking in development work does not search for a solution until they can determine the real problem in the customer's business. To reach that goal, this study also introduces the service configurator tool for solution development. The key to this process is to facilitate the gradual emergence of more information and hence more certainty until a point is reached when that certainty appears regarding all the parties' ability to cope with the remaining uncertainty. These results are offered in Publication 2 (Hellström et al., 2016).



For heavy industrial firms, design thinking provides techniques to use for applying a designer's way of thinking and doing. In other words, here design is both *a verb* and *a noun*. It is something that sellers should do and not just outline the final scope of a solution. It is a sales journey and a way of thinking as much as it is an outcome - a functional solution for a customer. By choosing to focus on the contributions of design thinking and abduction in industrial solutions, the goal here is to help the heavy B2B solution industry achieve similar benefits as major IT companies have enjoyed for years.

Third, this research identifies the challenges that a seller can encounter while trying to design and introduce to the market a solution that uses performance-based contracts as value capture devices. The following five learning points that are relevant to these managers were identified and highlighted:

***PBC as a focal issue in the sales process.*** Advanced performance-based contracts are likely to pose difficult challenges during contract design that correlates with the complexity of customers' value functions (Liinamaa et al., 2016). Formalizing and moving these value functions into functional contractual expressions is difficult. However, it is obvious that in the value-based selling of solutions, the normal contracting framework is not workable, as it allows customers the possibility to backtrack from value-based pricing and negotiations at any time. In addition, to influence a customer's commitment towards PBC, it becomes necessary that for the value-based selling, companies need to consciously market their PBC model, make sure it is understandable to customers, and structure the sales process to force early commitment to that pricing model from those customers. In addition, the contracts need to be a focal issue in the sales process, also involving lawyers in the early stages of these sales negotiations.

***Functional contracting affects value creation opportunities.*** This study identified a serious managerial blind spot, namely, that companies often view and carry out formal contracting as being value adding only in the context of safeguarding their own interests. As a result, these contracts are typically deployed defensively. In that case, effective contracting may prevent profit and value slippage, but it is not thought of as in and of itself able to create value. This mindset contributes to the management missing new value creation opportunities. The created functional contracting process uses contractual techniques to coordinate the negotiation process, affect customer expectations, and

implement changes to customer attitudes and their organizational practice. The process consists of using Memorandum of Understandings (MoU's) that are sequential and customized in order to address the specific challenges these companies expect to encounter at each stage of the sales process.

**Functional contracting as a management approach.** Functional contracting during the sales phase may have great potential as a management approach, as it may open up new avenues and mechanisms that can be used to influence both market structures and customers. However, functional contracting is difficult, as it requires the deep proactive cross-functional integration of legal, sales, and product development functions as well as expertise in both seller business strategy and sales processes. Functional contracting serves its purpose best in the value-based selling of large investments and solutions that are complex and where the value functions are uncertain and difficult to map. However, if the solution is clear for all parties at the beginning of the sales situation, as it often is in traditional product and service sales situations, the use of PBC will not be beneficial.

**New co-creation process for the legal-technical contract model.** Customers often struggle to make sense of the contracts that companies are offering. Investing in the design of a legal sales process that runs parallel to the "traditional" sales process may be the key to success when a seller is trying to introduce new legal structures into the market. Managers, however, have to recognize the specificity of such legal sales processes. The pathways for creating customer confidence in legal matters are different than they are for commercial issues. On a practical level, this process entails having the legal sales process target a new set of actors in customer organizations, namely, the customer's legal department, the senior executives, and a Board of Directors, who are the decision-makers for legal matters. The legal sales process must engage these actors in a new kind of co-creation process wherein the emphasis is on the creation of a legal-technical contract model.

**Legal Design thinking as a value-capture device.** As this thesis suggests, the key for ensuring successful solution sales is having sellers adapt the design thinking principles and in particular, having an abductive sales epistemology. This view ensures that the certainty of an investment's value evolves gradually during the sales process, as any problems that may appear are handled by the seller and value is agreed upon contractually. Functional contracting, therefore, affects certainty, as sellers are responsible for ensuring that value is created

by the interlocking and interoperation of processes within the two involved organizations. This ensures that the functional contracting process will allow sellers to affect and sequence the behavior of their customers and implement functional contracting and innovative contractual governance mechanisms. As legal topics are often difficult to relate to, design thinking brings tangible entry points to bear for understanding the principles, restrictions and relations of actors within the sales and customer journey. Design thinking has a great potential impact for the practice of law, because it focuses on improving the quality of things; the law aims to determine the “guidelines for behavior” and the “punishment of misbehavior”. Moreover, in design thinking design research techniques are used to relate to people’s perceptions of individual situations. For this reason, there is a notable overlap in what the legal systems seek to accomplish and the purpose of design thinking and what it does, that is particularly focused on ensuring value capture (Beelen & Westerouen van Meeteren, 2017)

### **5.3. Recommendations for Future Research**

First, this research indicates that further conceptual and empirical research on value-based selling and value co-creation is still necessary. Empirical studies should be conducted to assess the kinds of sales processes that best facilitate the value-based selling of industrial solutions. Especially, the validity of the sales process that was designed based on the data gathered during sales negotiations and the action research settings from two industrial companies should to be tested in other companies and industries. These future studies need to gather data from a wider variety of industries, markets, organizations, and solution offerings. Future research should also focus on mapping the specific capabilities this approach requires and identify the strategies that are most effective for entrenching it in sales organizations overall.

Second, the role of design thinking and abduction in the value-based sales context must be further studied and the gathered conclusions of the current research validated in other industry venues and for different sized companies. The focus should seek to define and answer the following questions, i.e., how does certainty evolve and how can certainty be fully stabilized during the sales process?

Answering these questions requires cross-disciplinary studies that combine management, design thinking, and legal sales, as during this research it was

understood that each discipline provided valuable input, and the methods used from different disciplines contributed to the understanding of how industrial companies can design and sell value-based solutions. The literature on industrial management provides both necessary views and theories on needed solution sales capabilities, stressing the importance of micro-foundational research and concrete tools for measuring the value of a solution. Design thinking provides a typology of design problems and ways to handle them by using controversy mapping, for example. Legal sales and especially the performance-based contracting techniques are seen as a great potential for becoming an important device for value capture. That aspect should be further studied from the viewpoint of how PBC impacts customer perceived certainty during value-based selling?

As the combination of value-based sales and functional contracting process challenges many conventional sales patterns, mobilizing it in a large sales organization will likely be problematic; therefore, further studies that test and revise the legal sales concepts would be highly valuable. This effort can be accomplished by following the created sales and negotiation process and using action research methods. Although the context would be different, the ideas for handling uncertainties during value-based sales and performance-based contracting are likely to be quite applicable. In addition, future research should focus on mapping the specific capabilities this approach requires and identifying the strategies that are most effective for entrenching the tool in sales organizations.

Service design thinking is worth considering as a research approach, as in recent years its achievements as a customer-centric approach for handling business problems has generally been acknowledged. In addition, the relevance of service design for a digital service economy has been noted by both academics and practitioners. Therefore, additional research is needed to investigate the benefits of service design for the industrial solution business and sales.

#### **5.4. Limitations and Generalizability**

This research is a preliminary probe into new terrain, and thus, it has certain limitations that further research in value co-creation and value-based sales can likely indeed overcome. Many sectors are suffering from poor productivity of their investments, very often because they do not have the capability to embed new technologies and solutions into their existing business models. Value-based selling, therefore, can address this problem by outlining how customers can

make better investments if they are willing to co-create needed solutions with seller organizations.

This study sought to form better understanding of how industrial companies design and sell value based solution offerings. This thesis suggests that design thinking contributes to the concept of co-creation, by clarifying and further defining it. Co-creation is currently understood as a macro construct (Storbacka et al., 2016). Motivated by this challenge, this research suggests that the co-creation during sales should be abductive, as that line of reasoning allows sellers to orchestrate sales negotiations by investigating those uncertainties that are caused by ill-defined and wicked problems. However, several research obstacles still need to be addressed related to value co-creation and value-based selling. It is also important to closely study the role of abduction in value-based selling, especially with the goal of generalizing e.g., how certainty can be created during sales co-creation.

The solution and business model developed during this research can be transferrable to other industries and cases. These include the created value-based sales and negotiation process, solutions strategy, abductive epistemology for sales, and the design thinking principles. The concept therefore, is translatable for practice by B2B-companies.

In particular, the created theory on the integration of value-based sales and design thinking needs to be tested and verified in other industries and companies. If the proposed value-based sales process and its related design approach can be implemented and used in actual practice in several companies, then future researchers will be able to study the theory from a more practical practiced stance or, more precisely, apply a tools-in-use perspective to the theory (Jarzabkowski & Kaplan, 2015). By studying the proposed sales process in actual use, it will be possible to further the understanding of what is most important when co-creating value and handling uncertainty, as well as observe very closely in practical terms how that concept can be maintained and reinforced through the daily actions of all its users.

A clear limitation of this research is the further lack of validations from field usage regarding the value-based sales process, the problem configurator, and the methods being developed. Both industry and academia can, theoretically and practically, benefit from having these developed tools implemented and tried in actual real situations and longitudinal settings. Despite these limitations, however, this study does clearly demonstrate that important conceptual

arguments and illustrative evidence has now been put forward for designing and selling industrial solution offerings successfully.

Although the results of creating a value-based sales approach were positive from the viewpoint of sales success, because only 15 sales cases were analyzed for this study, these results and findings may not be perfectly accurate and generalizable. However, the results do clearly indicate that the findings are expected to be useful for other B2B companies and industries as guidelines for B2B sellers, especially for how design thinking supports the emergence of uncertainty, were provided clearly.

One important limitation is the entrenched industry practices that force customers to adopt a distorted understanding of the earnings potential of their installed base (Liinamaa et al., 2016). This means that the seller has significant difficulties when trying to convince the customer of the benefits of proposed value-creation and value-capture models. Typically, industrial business customers receive a value proposition of their earnings based on the theoretical technical capacity of the installed base. In contrast, this new model for value-creation is calculated based on its actual financial performance potential. Due to this difference, the customer may not find suppliers; offering credible, as there is still too much uncertainty connected to these offerings. The reason for these inadequacies can be found in how value is defined. Being able to engage the customer in joint value-creation forces all the interested parties to share solid, concrete, and verifiable business data and financial performance drivers (Terho et al., 2012).

As this research suggests, the value of a solution should rest in the problems it can solve. That means that there is a need for more concrete demonstrations of an investment's value that requires new tools at the beginning of the sales situation. In addition, any future studies should address further value quantification tools and capabilities, as well as access to customer data, to determine the certainty of value, as noted during this research, most certainly can and should impact a customer's readiness to invest in a solution.

## REFERENCES

- Adamson, B., Dixon, M., & Toman, N. (2012). The End of Solution Sales. *Harvard Business Review*, 90(7–8), 60–68.
- Adner, R., & Zemsky, P. (2006). A demand-based perspective on sustainable competitive advantage. *Strategic Management Journal*, 27, 215–239.
- Agndal, H., Axelsson, B., Lindberg, N., & Nordin, F. (2007). Trends in Service Sourcing Practices. *Journal of Business Market Management*, 1(3), 187–208.
- Amabile, T. M. (1983). The social-psychology of creativity: a componential conceptualization. *Journal of Personality and Social Psychology*, 45(2), 357–376. <https://doi.org/10.1037//0022-3514.45.2.357>
- Anderson, J. C., Narus, J. A., & Van Rossum, W. (2006). Customer value propositions in business markets. *Harvard Business Review*, 84(3), 1–8. <https://doi.org/10.4135/978145229669.n945>
- Anderson, J., & Narus, J. (1995). Capturing the value of supplementary services. *Harvard Business Review*, 73(1), 75–83.
- Argyris, C., Putnam, R., & Smith, D. . (1985). *Action science: Concepts, methods, and skills for research and intervention*. San Francisco: Jossey-Bass.
- Avlonitis, G. ., & Gounaris, S. . (1997). Marketing orientation and company performance: Industrial vs. consumer goods companies. *Industrial Marketing Management*, 26(5), 385–402.
- Beelen, L., & Westerouen van Meeteren, F. (2017). Legal Design: Collaborating with Lawyers to Improve Access to Justice. *The Journal of Service Design*, 9(2), 12–17.
- Berry, L. ., & Lampo, S. . (2000). Berry, L. L., & Lampo, S. K. (2000). Teaching an old service new tricks: The promise of service redesign. *Journal of Service Research*, 2(3), 265–275.
- Biggemann, S., Kowalkowski, C., Maley, J., & Brege, S. (2013). Development and implementation of customer solutions: A study of process dynamics and market shaping. *Industrial Marketing Management*, 42(7), 1083–1092. <https://doi.org/10.1016/j.indmarman.2013.07.026>
- Bitner, M. . (1992). Bitner, M. J. Servicescapes: The impact of physical surroundings on customers and employees. *Journal of Marketing*, 56(2), 57–71.
- Blattberg & Deighton, J. (1996). Manage marketing by the customer equity test. *Harvard Business Review*, 74(4), 136–144.
- Bowman, C., & Ambrosini, V. (2000). Value creation versus value capture: towards a coherent definition of value in strategy. *British Journal of Management*, 11, 1–15.
- Brealey, R. ., Myers, S. ., & Allen, F. (2014). *Principles of Corporate Finance*. (S. C. Myers, Ed.). New York: McGraw-Hill Education.
- Brown, T. (2008). Design Thinking. *Harvard Business Review*, 86(6), 84–94.
- Bryman, A., & Bell, E. (2003). *Business Research Methods*. New York: Oxford University Press.

- Buchanan, R. (1992). Wicked Problems in Design Thinking. *Design Issues*, 8(2), 5–21.
- Buchanan, R. (2001). Design Research and the New Learning. *Design Issues*, 17(4), 3–23.
- Callon, M. (1986). *Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St Brieuc Bay*. London: Routledge & Kegan Paul.
- Cannon, J., & Homburg, C. (2001). Buyer-Supplier Relationships and Customer Firm Costs. *Journal of Marketing*, 65(1), 29–43.
- Cantù, C., Corsaro, D., & Snehota, I. (2012). Roles of actors in combining resources into complex solutions. *Journal of Business Research*, 65(2), 139–150. <https://doi.org/http://dx.doi.org/10.1016/j.jbusres.2011.05.013>
- Caroll, J. . (2006). Dimensions of participation in Simon's design. *Design Issues*, 22(2).
- Ceci, F., & Prencipe, A. (2008). Configuring capabilities for integrated solutions: Evidence from the IT sector. *Industry and Innovation*, 15(3), 277–296.
- Chapman, C., & Ward, S. (2004). Why risk efficiency is a key aspect of best practice projects. *International Journal of Project Management*, 22(8), 619–632. <https://doi.org/10.1016/j.ijproman.2004.05.001>
- Chein, I., Cook, S. W., & Harding, J. (1948). The field of action research. *The American Psychologist*, 3(2), 43–50. <https://doi.org/10.1037/h0053515>
- Clark, A. W. (1980). Action Research: Theory, Practice, and Values. *Journal of Occupational Behaviour*, 1(2), 151–157.
- Clerand, A., & Bruno, V. (1997). Building customer and shareholder value. *Strategy & Leadership*, 25(3), 22–28.
- Coghlan, D. (2000). Interlevel dynamics in clinical inquiry. *Journal of Organizational Change Management*, 13, 190–200. <https://doi.org/10.1108/09534810010321517>
- Cova, B., & Salle, R. (2008). Marketing solutions in accordance with the S-D logic: Co-creating value with customer network actors. *Industrial Marketing Management*, 37(3), 270–277. <https://doi.org/10.1016/j.indmarman.2007.07.005>
- Cross, N. (2001). Designerly ways of knowing: design discipline versus design science. *Design Issues*, 17(3), 49–55. <https://doi.org/10.1162/074793601750357196>
- Cross, N. (2006). *Designerly Ways of Knowing* (Vol. 1). London: Springer-Verlag.
- Davies, A., & Brady, T. (2000). Organisational capabilities and learning in complex product systems: Toward repeatable solutions. *Research Policy*, 29(7–8), 931–953.
- Davies, A., Brady, T., & Hobday, M. (2006). Charting a path toward integrated solutions. *Mit Sloan Management Review* *Sloan Management Review*, 43(7), 39–48. <https://doi.org/10.1225/SMR202>



- Davies, A., Brady, T., & Hobday, M. (2007). Organizing for solutions: Systems seller vs. systems integrator. *Industrial Marketing Management*, 36(2), 183–193. <https://doi.org/10.1016/j.indmarman.2006.04.009>
- Denyer, D., Tranfield, D., & Van Aken, J. E. (2008). Developing Design Propositions through Research Synthesis. *Organization Studies*, 29(3), 393–413. <https://doi.org/10.1177/0170840607088020>
- DeVincentis, J. (1999). *Titel: Rethinking the Sales Force: Redefining Selling to Create and Capture Customer Value*. New York: McGraw Hill.
- Dorst, K. (2007). The Problem of the Design Problem. In N. G. Cross & E. Edmonds (Eds.), *Expertise in Design - Design Thinking Research Symposium 6*. Sydney: Creativity and Cognition Studios Press.
- Dorst, K. (2010). The nature of design thinking. *Proceedings of the 8th Design Thinking Research Symposium*, 19–20. <https://doi.org/10.1111/j.1948-7169.2005.tb00008.x>
- Dorst, K., & Cross, N. (2001). Creativity in the design proces: Co-evolution of problem-solution. *Design Studies*, 22(5), 425–437.
- Edman, K. . (2009). Exploring overlaps and differences in service-dominant logic and design thinking. In *1st Nordic Conference on Service Design and Service Innovation*. Oslo.
- Edvardsson, B., Tronvoll, B., & Gruber, T. (2011). Expanding understanding of service exchange and value co-creation: A social construction approach. *Journal of the Academy of Marketing Science*, 39(2), 327–339. <https://doi.org/10.1007/s11747-010-0200-y>
- Foss, N. J., & Lyngsie, J. (2014). The strategic organization of the entrepreneurial established firm. *Strategic Organization* , 12(3), 208–215. <https://doi.org/10.1177/1476127014543262>
- Fraser, H. M. . (2010). Designing business: New models for success. In In Lockwood T. (Ed.), *Design thinking: Integrating innovation, customer experience, and brand value* (pp. 35–46). New York: Allworth Press.
- Gailbright, J. R. (2002). Organizing to Deliver Solutions. *Organizational Dynamics*, 31(2), 194–207.
- Greenwood, D., & Lewin, M. (1998). *Introduction to action research: Social research for social change*. Thousand Oaks, CA: Sage.
- Grönroos, C. (2008). Service logic revisited: who creates value? And who co-creates? *European Business Review*, 20(4), 298–314. <https://doi.org/10.1108/09555340810886585>
- Gustafsson, M., & Tsvetkova, A. (2017). Transformative business studies : Technology transfer in the social sciences. *Technology and Innovation*, 19, 537–552.
- Haas, A., Snehota, I., & Corsaro, D. (2012). Creating value in business relationships: The role of sales. *Industrial Marketing Management*, 41(1), 94–105. <https://doi.org/10.1016/j.indmarman.2011.11.004>

- Hakanen, T. (2014). Co-creating integrated solutions within business networks: The KAM team as knowledge integrator. *Industrial Marketing Management*, 43(7), 1195–1203. <https://doi.org/10.1016/j.indmarman.2014.08.002>
- Hatchuel, A., & Weil, B. (2009). C-K theory: An advanced formulation. *Research in Engineering Design*, 19(4), 181–192.
- Hellström, M., Sifontes Herrera, V. ., Wikström, R., & Långstedt, J. (2017). The service configurator - how to optimally split project scopes. In J. Vesalainen, K. Valkokari, & M. Hellström (Eds.), *Practices for Network Management: in Search of Collaborative Advantage* (p. 348). Palgrave Macmillan.
- Hellström, M., Wikström, R., Gustafsson, M. &, & Luotola, H. (2016). The value of project execution services: a problem and uncertainty perspective. *Construction Management and Economics*, 6193(April), 1–14. Retrieved from <http://www.tandfonline.com/doi/full/10.1080/01446193.2016.1151062>
- Herr, C., & Anderson, G. L. (2015). *An action research dissertation: a guide for students and faculty* (Second Edi). New York: SAGE Publication, Inc.
- Hershey, D., & Walsh, D. (2000). Knowledge versus experience in financial problem solving performance. *Current Psychology*, 19(4), 261–291. <https://doi.org/10.1007/s12144-000-1020-x>
- Hinterhuber, A. (2017). Value quantification capabilities in industrial markets. *Journal of Business Research*, 76, 163–178.
- Hinterhuber, A., & Bertini, M. (2011). Profiting When Customers Choose Value Over Price. *Business Strategy Review*, 22(1), 46–49. <https://doi.org/10.1111/j.1467-8616.2011.00727.x>
- Hunter, M. (2016). *High-Profit Prospecting: Powerful Strategies to Find the Best Leads and Drive Breakthrough Sales Results*. New York: AMACOM.
- Huxham, C., & Vangen, S. (2003). Researching organizational practice through action research: Case studies and design choices. *Organizational Research Methods*, 6(3), 383. <https://doi.org/10.1177/1094428103254454>
- Jaakkola, E., & Hakanen, T. (2013). Value co-creation in solution networks. *Industrial Marketing Management*, 42(1), 47–58. <https://doi.org/10.1016/j.indmarman.2012.11.005>
- Jarzabkowski, P., & Kaplan, S. (2015). Strategy tools-in-use: A framework for understanding “technologies of rationality” in practice. *Strategic Management Journal*, 36(4), 537–558. <https://doi.org/10.1002/smj.2270>
- Kasanen, E., Lukka, K., & Siitonen, A. (1993). The constructive approach in management accounting research. *Journal of Management Accounting Research*, 5(fall), 241–264.
- Keeney, R. (1992). *Value-focused thinking: A path to creative decisionmaking*. Cambridge: Harvard University Press.
- Kimbell, L. (2011). Designing for Service as One way of Designing Services. *International Journal of Design*, 5(2), 41–52.

- Kirsilä, J., Hellström, M., & Wikström, K. (2007). Integration as a project management concept: A study of the commissioning process in industrial deliveries. *International Journal of Project Management*, 25(7), 714–721. <https://doi.org/10.1016/j.ijproman.2007.02.005>
- Kohli, A. ., & Jaworski, B. (1990). Market orientation: The construct, research propositions, and managerial implications. *The Journal of Marketing*, 54(2), 1–18.
- Kootstra, G. L. (2009). *The incorporation of design management in today 's business practices. An analysis of design management practices in Europe*. Rotterdam.
- Kowalkowski, C., Brehmer, P. O., & Kindström, D. (2009). Managing industrial service offerings: requirements on content and processes. *International Journal of Services Technology and Management*, 11(1), 42. <https://doi.org/10.1504/IJSTM.2009.022381>
- Lashinsky, A. (2012). *Inside Apple: How America's Most Admired and Secretive Company Really Works*. London: John Murray Publishers.
- Lather, P. (1986). Research as praxis. *Harvard Educational Review*, 56(3), 257–277.
- Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. New York: Oxford University Press.
- LeCompte, M., & Schensul, J. . (1999). *Designing and conducting ethnographic research*. Walnut Creek, CA: Alta Mira Press.
- Lefaix-Durand., & Kozak, R. (2010). Comparing Customer and Supplier Perceptions of Value Offerings: An Exploratory Assessment. *Journal of Business Market Management*, 4(3), 129–150.
- Lehtiranta, L., Junnonen, J.-M., Kärnä, S., & Pekuri, K. (2015). The Constructive Research Approach: Problem Solving for Complex Projects. In B. Pasian (Ed.), *Designs, Methods and Practices for Research of Project Management* (p. 477). New York: Routledge.
- Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues*, 2, 34–46.
- Liinamaa, J., Viljanen, M., Hurmerinta, A., Ivanova-Gongne, M., Luotola, H., & Gustafsson, M. (2016, May 26). Performance-based and functional contracting in value-based solution selling. *Industrial Marketing Management*. Elsevier Inc.
- Loch, C. H., DeMeyer, A., & Pich, M. T. (2006). *Managing Unknown - A New Approach to Managing High Uncertainty and Risk in Projects*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Lockwood, T. (2010). Design Thinking: Integrating Innovation, Customer Experience, and Brand Value. In T. Lockwood (Ed.), *Design Thinking: Integrating Innovation, Customer Experience, and Brand Value* (p. 285). New York: Allworth Press.
- Luotola, H., Hellström, M., Gustafsson, M., & Perminova-Harikoski, O. (2017). Embracing Uncertainty in Value-Based Selling by Means of Design Thinking. *Industrial Marketing Management*, 65, 59–75.
- Luotola, H., Ivanova-Gogne, M., & Liinamaa, J. (2017). The value-based sales approach: The design process, tools, and capabilities needed to create a solution. In J. Vesalainen, K. Valkokari, &

- M. Hellström (Eds.), *Practices for Network Management: in Search of Collaborative Advantage* (pp. 237–250). New York: Palgrave Macmillan.
- Markowski, K. (2008). Actor-Network-Theory for Project Management: use it or bin it? In *22nd IPMA World Congress "Project Management to Run" 9 - 11 November 2008, Roma, Italy*.
- Martin, R. (2009). *The Design of Business. Why Design Thinking Is the Next Competitive Advantage*. Boston: Harvard Business Press.
- Mason, J. (1994). Linking qualitative and quantitative data Analysis. In A. Bryman & R. Burgess (Eds.), *Analysing qualitative data*. London: Routledge.
- Mele, C. (2011). Conflicts and value co-creation in project networks. *Industrial Marketing Management*, 40(8), 1377–1385. <https://doi.org/10.1016/j.indmarman.2011.06.033>
- Menor, L. ., Tatikonda, M. ., & Sampson, S. . (2002). New service development: Areas for exploitation and exploration. *Journal of Operations Management*, 20(2), 135–157.
- Merriam-Webster Dictionary on-line. (2017).
- Miettinen, S. (2017). *An Introduction to Industrial Service Design*. (S. Miettinen, Ed.). New York: Routledge.
- Miller, D., Hope, Q., Eisenstat, R., Foote, N., & Galbraith, J. (2002). The problem of solutions: Balancing clients and capabilities. *Business Horizons*, 45(2), 3–12. [https://doi.org/10.1016/S0007-6813\(02\)00181-7](https://doi.org/10.1016/S0007-6813(02)00181-7)
- Moriz, S. (2005). *Service Design: Practical access to an evolving field*. Köln International School of Design.
- Möller, K., & Parvinen, P. (2015). An impact-oriented implementation approach in business marketing research: Introduction to the Special Issue on "Implementing Strategies and Theories of B2B Marketing and Sales Management." *Industrial Marketing Management*, 45, 3–11. <https://doi.org/10.1016/j.indmarman.2015.02.025>
- Ng, I. C. ., Xin, D., & Yip, N. (2013). Outcome-based contracts as new business model: The role of partnership and value-driven relational assets. *Industrial Marketing Management*, 42(5), 730–743.
- Nordin, F., Kindström, D., Kowalkowski, C., & Rehme, J. (2011). The risks of providing services. *Journal of Service Management*, 22(3), 390–408. <https://doi.org/10.1108/09564231111136881>
- Nordin, F., & Kowalkowski, C. (2010). Solutions offerings: a critical review and reconceptualisation. *Journal of Service Management*, 21(4), 441–459. <https://doi.org/10.1108/09564231011066105>
- Oliva, R., & Kallenberg, R. (2003). Managing the transition from products to services". *International Journal of Service Industry Management*, 14(2), 160–172.
- Osterwalder, A., Pigneur, Y., Bernarda, G., & Smith, A. (2015). *Value proposition design: How to create products and services customers want*. Hoboken, NJ: John Wiley.
- Peirce, C. S. (1934). *Pragmatism and Pragmaticism. Collected Papers*. Cambridge: Harvard University Press & Philadelphia.

- Pekkarinen, O. (2013). *Industrial solution business - transition from product to solution offering*. Lappeenranta: Yliopistopaino.
- Perminova, O., Gustafsson, M., & Wikström, K. (2008). Defining uncertainty in projects - a new perspective. *International Journal of Project Management*, 26(1), 73–79. <https://doi.org/10.1016/j.ijproman.2007.08.005>
- Petersen, J. (2000). *Out of The Blue – How to Anticipate Big Future Surprises*. Madison Books.
- Piller, F. (2005). Mass Customization: Reflections on the state of the concept. *International Journal of Flexible Manufacturing Systems*, 16(4), 313–334.
- Pinhanez, C. (2009). Pinhanez, C. (2009). Services as customer-intensive systems. *Design Issues*, 25(2), 3–13.
- Poppo, L., & Zenger, T. (2002). Do formal contracts and relational governance function as substitutes or complements? *Strategic Management Journal*, 23(8), 707–725.
- Public, C. I. of S. and P. (CIPS) and T. I. for, & (NIGP), P. (2012). Principles and practices of public procurement. Public procurement practice. Performance based contracting.
- Pöyry, E., & Parvinen, P. (2017). Limited Domain of Applicability of Value Calculators: Evidence from B2B Sales Work. *Global Sales Science Institute 2017*.
- Rackham, N., & DeVincentis, J. (1999). *Rethinking the Sales Force*. New York: McGraw-Hill Professional Publishing.
- Rajala, R., & Töytäri, P. (2015). Reinforcing the capability perspective of value-based selling: A response to the commentary by Jaakkola, Frösén and Tikkanen on the paper “Value-based selling: An organizational capability perspective.” *Industrial Marketing Management*, 45, 115–116. <https://doi.org/10.1016/j.indmarman.2015.02.027>
- Ramírez, R. (1999). Value co-production: Intellectual origins and implications for practice and research. *Strategic Management Journal*, 20(1), 49–65. [https://doi.org/10.1002/\(SICI\)1097-0266\(199901\)20:1<49::AID-SMJ20>3.0.CO;2-2](https://doi.org/10.1002/(SICI)1097-0266(199901)20:1<49::AID-SMJ20>3.0.CO;2-2)
- Reinartz, W. ., & Ulaga, W. (2008). How to sell services more profitably, 86(5), 90–96.
- Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a General Theory of Planning Dilemmas in a General Theory of Planning. *Policy Sciences*, 4(2), 155–169. <https://doi.org/10.1007/BF01405730>
- Romme, A. (2003). Making a Difference: Organization as Design. *Organization Science*, 14(5), 558–577.
- Roth, S. (1999). The state of design research. *Design Issues*, 15(2), 18–26.
- Sanders, E. (2005). Information, Inspiration and Co-creation. In *The 6th International Conference of the European Academy of Design* (pp. 29–31). Vremen.
- Sawhney, M. (2006). Going beyond the product: Defining, designing, and delivering customer solutions. In R. F. Lusch, & S. L. Vargo (Eds.) (Ed.), *The service dominant logic of marketing: Dialog, debate, and directions* (pp. 365–380). New York: Armonk.

- Schein, E. H. (1993). Legitimizing clinical research in the study of organizational culture. *Journal of Counseling & Development, 71*, 703–708. <https://doi.org/doi/10.1002/j1556-6676>
- Schein, E. H. (2008). From Brainwashing to Organization Therapy. *Handbook of Organization Development, 1–15*.
- Scheuing, E., & Johnson, A. (1989). A proposed model for new service development. *Journal of Services Marketing, 3*(2), 25–34.
- Schneider, J. (2017). Understanding Design Thinking, Lean, and Agile.
- Schön, D. (1983). *Reflective Practitioner: How Professionals Think in Action*. New York: BasicBooks.
- Schön, D. (1995). Knowing-in-action: The New Scholarship Requires a New Epistemology. *Change, 27*(6), 26–34.
- Shostack, G. . (1982). How to design a service. *European Journal of Marketing, 16*(1), 49–63.
- Steen, M., Manschot, N., & De Koning, N. (2011). Benefits of co-design in service design projects. *International Journal of Design, 5*(2), 53–60.
- Steinmüller, K. (2003). *The Future as Wild Card A Short Introduction to a New Concept*. Berlin.
- Stickdorn, M. (2010). *This is Service Design Thinking*. Amsterdam: BIS Publishers.
- Storbacka, K. (2011). A solution business model: Capabilities and management practices for integrated solutions. *Industrial Marketing Management, 40*(5), 699–711. <https://doi.org/10.1016/j.indmarman.2011.05.003>
- Storbacka, K., Brodie, R. J., Böhmman, T., Maglio, P. P., & Nenonen, S. (2016). Actor engagement as a microfoundation for value co-creation. *Journal of Business Research, 69*(8), 3008–3017. <https://doi.org/10.1016/j.jbusres.2016.02.034>
- Storbacka, K., Windahl, C., Nenonen, S., & Salonen, A. (2013). Solution business models: Transformation along four continua. *Industrial Marketing Management, 42*(5), 705–716. <https://doi.org/10.1016/j.indmarman.2013.05.008>
- Stremersch, S., Wuyts, S., & Frambach, R. (2001). The purchasing of full-service contracts: an exploratory study within the industrial maintenance market. *Industrial Marketing Management, 30*(1), 1–12.
- Susman, G. I. (1983). Action Research: A Sociotechnical Systems Perspective. In *Beyond Method: Strategies for Social Science Research* (pp. 95–113).
- Susman, G. I., & Evered, R. D. (1978). An assesment of the scientific merits of action research. *Administrative Science Quarterly, 23*, 582–603.
- Terho, H., Haas, A., Eggert, A., & Ulaga, W. (2012). “It”s almost like taking the sales out of selling’-Towards a conceptualization of value-based selling in business markets. *Industrial Marketing Management, 41*(1), 174–185. <https://doi.org/10.1016/j.indmarman.2011.11.011>
- Tsvetkova, A. (2014). *Designing sustainable industrial ecosystems: the case of a biogas-for-traffic solution*. Åbo Akademi University.

- Tuli, K. R., Kohli, A. K., & Bharadwaj, S. G. (2007). Rethinking Customer Solutions: From Product Bundles to Relational Processes. *Journal of Marketing*, 71(3), 1–17. <https://doi.org/10.1509/jmkg.71.3.1>
- Turkulainen, V., Kujala, J., Artto, K., & Levitt, R. E. (2013). Organizing in the context of global project-based firm-The case of sales-operations interface. *Industrial Marketing Management*, 42(2), 223–233. <https://doi.org/10.1016/j.indmarman.2012.08.004>
- Töllner, A., Blut, M., & Holzmüller, H. H. (2011). Customer solutions in the capital goods industry: Examining the impact of the buying center. *Industrial Marketing Management*, 40(5), 712–722. <https://doi.org/10.1016/j.indmarman.2011.06.001>
- Töytäri, P. (2015). *Managing value-based exchange in industrial markets: An organizational capability perspective*. School of Science, Helsinki.
- Töytäri, P., & Rajala, R. (2015). Value-based selling: An organizational capability perspective. *Industrial Marketing Management*, 45(1), 101–112. <https://doi.org/10.1016/j.indmarman.2015.02.009>
- Töytäri, P., Rajala, R., & Alejandro, T. B. (2015). Organizational and institutional barriers to value-based pricing in industrial relationships. *Industrial Marketing Management*, 47, 53–64. <https://doi.org/10.1016/j.indmarman.2015.02.005>
- Ulaça, W., & Eggert, A. (2006). Value-Based Differentiation in Business Relationships: Gaining and Sustaining Key Supplier Status. *Journal of Marketing*, 70(January), 119–136. <https://doi.org/10.1509/jmkg.2006.70.1.119>
- Ulaça, W., & Reinartz, W. J. (2011). Hybrid Offerings: How Manufacturing Firms Combine Goods and Services Successfully. *Journal of Marketing*, 75(6), 5–23. <https://doi.org/10.1509/jmkg.75.6.5>
- Ulrich, K., & Eppinger, S. (1995). *Product design and development*. New York: McGraw-Hill Professional Publishing.
- Vandermerwe, S., & Rada, J. (1988). Servitization of Business: Adding Value by Adding Services. *European Management Journal*, 6(4), 314–324.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a New Dominant Logic for Marketing. *Journal of Marketing*, 68(1), 1–17. <https://doi.org/10.1509/jmkg.68.1.1.24036>
- Viiö, P., & Grönroos, C. (2016). How buyer-seller relationship orientation affects adaptation of sales processes to the buying process. *Industrial Marketing Management*, 52, 37–46. <https://doi.org/10.1016/j.indmarman.2015.07.013>
- Ward, S., & Chapman, C. (2003). Transforming project risk management into project uncertainty management. *International Journal of Project Management*, 21(2), 97–105. [https://doi.org/10.1016/S0263-7863\(01\)00080-1](https://doi.org/10.1016/S0263-7863(01)00080-1)
- Watkins, K. (1991). Validity in action research. In *Annual meeting of the American Educational Research Association, Chicago*. Chicago.
- Weick, K. E. (1995). *Sensemaking in Organisations*. London: Sage Publication Ltd.

- Winch, G. M. (2015). Project organizing as a problem in information. *Construction Management and Economics*, 33(2), 106–116. <https://doi.org/10.1080/01446193.2015.1021703>
- Winch, G. M., Usmani, A., & Edkins, A. (1998). Towards total project quality: a gap analysis approach. *Construction Management and Economics*, 16(2), 193–207. <https://doi.org/10.1080/014461998372484>
- Windahl, C., Andersson, P., Berggren, C., & Nehler, C. (2004). Manufacturing firms and integrated solutions: characteristics and implications. *European Journal of Innovation Management*, 7(3), 218–228. <https://doi.org/10.1108/14601060410549900>
- Windahl, C., & Lakemond, N. (2006). Developing integrated solutions: The importance of relationships within the network. *Industrial Marketing Management*, 35(7), 806–818. <https://doi.org/10.1016/j.indmarman.2006.05.010>
- Wittgenstein, L. (1986). *On Certainty*. Oxford: Basil Blackwell.
- Zeithaml, V. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of Marketing*, 52(3), 2–22.



Hanna Luotola

# Designing Industrial Solutions in Value-Based Selling

## Managing Uncertainty and Solving Wicked Problems of Customer Need

Today a majority of industrial companies claim to provide solutions and produce customer value that surpasses the benefits of the traditional product-service offerings. However, providing and adding real value to the customer has seen to become more difficult for both off-the-shelf products and more complex, customized solutions with different levels of sales support. This change is creating a very different industrial business-to-business (B2B) sales environment, and business leaders need more than just the typical analytical skills to tackle these complex challenges during their sales efforts.

This study developed knowledge that can drive industrial manufacturing business toward viable solutions business and customer value orientation. In practice, this research provides a new value-based selling technique for the sales force. It lets both customers and vendors maximize their returns and minimize costs. These value-based sellers utilize problem-solving methodologies that draw on design thinking and apply them to create greater business value, innovative new products, and more valuable services and solutions.

As an outcome, the research demonstrates how value-based solution selling can be understood as an uncertainty management process. More specifically, this thesis shows that utilizing design thinking during value-based selling offers new ways to reduce the uncertainty of a solution.