Managing the complexity of service contracting in buyer-supplier collaboration

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**Abstract**

Purchasing business services have become increasingly important for companies as they strive for competitive advantages. Service contracts are an essential part of purchasing business services. The importance and complexity of service contracts increase with the complexity of the services, indicating managing service contracts can be very complicated. Yet, very little work has examined how service contracts’ structure influences supplier performance.

This dissertation focuses on managing service contracting and performance from the service complexity perspective. The present study aims to improve the current understanding of the essential dimensions of service complexity by investigating how service complexity influences service contracts and supplier performance. This study also examines how the different dimensions of service performance affect the business relationship and service contract renewal. The insights of this study draw from systematic literature review and survey research studies among the professional respondents from 25 countries.

The systematic literature review identifies four dimensions of service complexity - multiplicity, diversity, interdependence, and variability. The review provides a basis for understanding service complexity as the perspective for the study. The empirical results show the crucial role of contract structure in effective service delivery. This dissertation finds the three major contract dimensions (definition of responsibility, performance criteria, and incentives) and follow-up management practices that positively influence buyer-perceived supplier performance. It also finds that service complexity significantly increases the need to design incentives in the service contract and buyer's follow-up management towards better supplier performance. In terms of business service contracting outcomes, this dissertation finds all three dimensions of service performance – competence-based, expressive, and collaborative – drive relationship performance that increases customer repurchase intentions. The relationship performance mediates the links between expressive and collaborative service performance with customer repurchase intentions.

This dissertation contributes to the existing body on the characteristics of services by identifying the essential dimensions of service complexity. The findings contribute to advancing knowledge on performance-enhancing aspects of designing and monitoring the B2B service contracts. This dissertation is among the first few studies to incorporate the structure and the follow-up management into the services contracts in studying service delivery and performance. The results advance knowledge on the development of contractual governance for improving supplier performance by specifying the contract dimensions. This dissertation also contributes to comprehensively understanding the factors that impact business customers’ service contract renewal. It also adds the role of service complexity in successful B2B service purchasing.

**Keywords** service contracting, service complexity, service purchasing, B2B services, service performance

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List of publications

This doctoral dissertation consists of this summary and of the following publications, which are marked in the text by their numerals:


Author’s contribution

**Article 1** “Complexity in Product-Service Systems: Review and Framework”

The author of this dissertation was responsible for the initial idea, literature research, data analysis, and writing the paper. The research design was developed jointly with Brax and Rajala, who also provided support in the writing process of the article. Zou acted as the corresponding author in the publication process.

**Article 2** “The influences of contract structure, contracting process, and service complexity on supplier performance”

The author of this dissertation was responsible for designing the research model, collecting the data, conducting the statistical analyses, and producing a developed draft of the paper, including theory and discussion. The survey was designed and administered jointly with Brax and Vuori. Rajala provided support mainly in the writing of the article. Zou acted as the corresponding author in the publication process.

**Article 3** “The effects of competence-based, expressive and collaborative service performance on the B2B service relationship”

The author of this dissertation was responsible for collecting the data, conducting statistical analyses, and drafting the paper, including theory and discussion. The research model was developed jointly with Brax. Rajala provided support mainly in the writing of the article.
1 Introduction

1.1 Background

Recent business and management research has shown a global transition of industrial firms’ business models toward increasing reliance on services (Van der Valk & Wynstra, 2012; Pemer et al., 2014b). Along with this development, often labeled as service transformation or service transition (Ulaga & Loveland, 2014), service purchasing has become a more salient activity in inter-organizational exchange. This transition gives rise to the rationale that companies can improve their performance by focusing on core activities and letting specialist service providers take care of the rest (Ellram et al., 2008). On the other hand, companies are seeking more effective approaches to purchase services. Since services are essentially process-based offerings (Brax et al., 2017), their unique characteristics can complicate their purchasing (Roehrich & Lewis, 2014). From the buyer’s perspective, the intangibility of the offering, context-dependence of the value created, heterogeneity of resources and outcomes, and inseparability of the production from the consumption increase the difficulty of specifying services (Axelsson & Wynstra, 2002; Van der Valk & Rozemeijer, 2009; Datta & Roy, 2011). Also, these characteristics of services makes it more difficult to manage the risks associated with the evaluation of the performance of the service provider.

The existing literature has already recognized some challenges associated with organizational service purchasing. Many of the obstacles accentuate the increasing complexity of service offerings. Also, a fundamental issue in service purchasing is the asymmetry of information between buyers and service providers. Although service providers depend on buying organizations to define their needs, requirements, and the context of use, buying organizations may lack the ability and knowledge to define these elements clearly (Stauss et al., 2010; Aarikka-Stenroos & Jaakkola, 2012). Customers’ failure to specify a service gives service providers the room to engage in opportunistic behavior, increasing the difficulty of predicting the supplier’s behavior (Williamson, 1985; Susarla et al., 2009). It is
generally challenging to fully specify services in contracts due to the uncertainties in service deliveries (Anderson & Dekker, 2005). Since the details of the service specifications often remain unclear, buying companies cannot conclusively determine the performance details and relevant costs with service providers (Ellram et al., 2008). Furthermore, Möller & Törrönen (2003) have identified that the greater the information asymmetry between buyer and suppliers, the more dependent the buyer and its service providers are on each other in the value chain. Services often have the interdependent and interactive character of co-production between buyers and suppliers (Brax et al., 2017). Service providers are autonomous actors whose goals may deviate from those of the service purchasers. This interdependence can induce opportunism in the buy-supplier relationship and thus may result in poor delivery of the service (Stouthuysen et al., 2012). Due to these challenges, understanding the effects of the complexity of service contracts seems to be an increasingly important factor in service purchasing. At the outset of this study, service contract design and management are expected to influence supplier performance, which has become an essential element for buying organizations to ensure successful service-based value creation in B2B contexts.

Good service performance creates benefits for both service buyers and their service providers (Bolton et al., 2006; Briggs & Grisaffa, 2010). These benefits focus on the core service or on the relationship that refers to relational benefits. Existing studies have found that positive customer perceptions of service performance are a primary goal for most companies, as retaining customers can promote sustained growth of profits (Yee et al., 2008; Koklic et al., 2017). However, the process-based nature, complexity, and continued duration of many B2B services (Brax & Jonsson, 2009) indicate that managing service performance can be very complicated.

The governance practices for service contracts are considered essential in ensuring the expected service performance (Ferguson et al., 2005; Enquist et al., 2011; Roehrich & Lewis, 2014). The importance and interplay of contractual and relational governance have received
considerable attention in service contract arrangements (Zheng et al., 2008; Cao & Lumineau, 2015). Contractual governance supports organizations to manage service delivery based on the contractual arrangements (Enquist et al., 2005). Relational governance, such as trust, encourages cooperation between the parties to overcome the adaptive limits of contracts (Poppo & Zenger, 2002). Existing empirical studies demonstrate that companies must have appropriate contractual and relational capabilities to write, interpret and manage complex service contracts (Zheng et al., 2008; Kreye et al., 2015). Companies need these capabilities to design service contracts to ensure the expected service performance (Van der Valk & Wynstra, 2014). However, few empirical studies have investigated which dimensions or agreements designed in the service contracts that can directly lead to service performance improvement, which would eventually influence business relationship improvement and continuity (Van der Valk & Wynstra, 2014; Van der Valk et al., 2016).

Since contractual arrangements differentiate the main business model types for different product-service-systems (PSS) offerings (Tukker, 2004; Ng et al., 2013; Reim et al., 2015), the importance and complexity of service contracts increase with the complexity of the service (Van der Valk & Wynstra, 2014). The complexity in PSS increases due to the large number of elements (e.g., stakeholders and activities) involved in the service process (Rondini et al., 2017; Johnson et al., 2021). In addition, co-creating value with customers (Kuhlenkötter et al., 2017; Steinbach et al., 2018); and difficulties in defining the outcome of a service in advance (Kreye et al., 2015) further increase complexity in PSS. Existing studies have found that re-arranging service processes and resources to respond to the evolving customer needs during the lifecycle of the offering also increases complexity in the service business (Angelis et al., 2012; Eloranta & Turunen, 2016). Therefore, the complexity of service contracts includes the need to define the situational factors and the features of the service. Although service complexity is not a new construct in service literature, it is still an emerging field with limited investigation focusing on defining and conceptualizing the construct (Benedettini & Neely, 2012; Kreye, 2019). This relative immaturity of theory in this area
shows that research that connects service complexity to service contracts and service performance is still relatively scarce.

To address this gap in the current knowledge, this dissertation builds a framework that characterizes the dimensions of service complexity. It aims to thoroughly understand how service complexity influences service contracting and service providers’ performance. Moreover, the dissertation investigates the effects of service performance on business relationship performance and customer repurchase intentions.

1.2 Research objective and research questions

In this dissertation, the focus is on managing service contracting and performance from the service complexity perspective. This dissertation investigates the dimensions of service complexity and how service complexity influences service contracting and supplier performance. More specifically, the dissertation examines the effects of different dimensions of service complexity and their influence on supplier performance and customer repurchase intentions. Given the research objective, the following research questions are formulated.

**RQ1: What constitute the dimensions of service complexity?**

This research question is based on the observation that complexity is a fundamental characteristic of a service offering in B2B contexts (Benedettini & Neely, 2012). Complexity in services may arise from many factors, including the heterogeneity of contextual factors, interrelated elements, use of sophisticated technologies, and need for interactions between the buyer and the service provider. Therefore, a more in-depth understanding of what forms and characteristics service complexity may have and how these could be classified is needed. The purpose is to provide an overview of factors that constitute different dimensions of service complexity. A better understanding of the characteristics of service complexity can facilitate firms to manage service contracts and service performance successfully. A systematic literature review on complexity in product-service systems (PSSs) is conducted to address the
first research question. The reason to choose PSSs as the context but not B2B service purchasing is that PSSs literature captures a broad scope of service delivery and combines technical complexity of tangible systems, which provides a comprehensive understanding of complexity manifestations. Article 1 “Complexity in Product-Service Systems: Review and Framework” provides the answers to RQ1.

**RQ2:** How does service complexity influence service contracting and supplier performance?

In service contracting, the key elements for buying organizations reflect how firms design contract structure and manage the contracting processing. The existing studies have concentrated on the interplay of contractual and relational governance in service procurement arrangements (Zheng et al., 2008; Cao & Lumineau, 2015), but few empirical work has provided guidance on which dimensions or agreements are supposed to be incorporated into the service contracts to enhance service performance. Furthermore, since contracts differentiate the types of business model that are implemented in different B2B service offerings (Tukker, 2004; Ng et al., 2013; Reim et al., 2015), the complexity of service contracts increases with the complexity of services. Buying firms, especially those that are shifting from buying goods to buying services, face challenges with a lack of knowledge on designing contract structure and managing contracting process for B2B services (Oliva & Kallenberg, 2003; Datta & Roy, 2011). While research interest in this area has recently burgeoned, the existing studies on contracting in complex B2B service contexts tend to be grounded in case studies representing the supplier side (Kleemann & Essig, 2013; Kreye et al., 2014; Grubic & Jennions, 2017). Therefore, further empirical research is needed to examine the influence of design of service contracting on the supplier performance perceived by the buyer. It is needed to understand how the service complexity that connects with service contracting influences supplier performance. This is important for buying companies to better understand of the influences of contract design and management of a contracting process for the expected supplier performance. Article 2 “The influences of contract structure, contracting
process, and service complexity on supplier performance” focuses on RQ2.

**RQ3:** *How do service performance and business relationship performance affect service contract renewal?*

Service contract renewal is a primary goal for most companies, as retaining business customers can create sustained growth of profits (Yee et al., 2008; Koklic et al., 2017). Unlike the initial purchase decision, the firm’s assessment of the service contract renewal is likely on the prior service performance perceived by the buying firm (Bolton et al., 2006). Positive customer perception of service performance is vital for service providers to continue the business with their customer. Understanding the factors influencing business customers’ service contract renewal decisions is critical for achieving long-term buyer-supplier collaboration (Bolton et al., 2006).

Prior studies that examine B2B relationship continuity focus on buyer-supplier relationship stages at the firm level (Dwyer et al., 1987; Bolton et al., 2006). The empirical work that has investigated the effects of service performance on service contract renewal in B2B contexts remains scarce. Due to the complex characteristics of B2B services that are difficult to be evaluated, managing service performance is a complex issue. Service performance can be evaluated from different perspectives, including competence-based, expressive, and collaborative service performance. The ways how these three dimensions influence business relationship performance and the renewal of service contracts warrant in-depth investigation. Article 3 “The effects of competence-based, expressive and collaborative service performance on the B2B service relationship” focuses on RQ3.

By addressing these questions, this dissertation aims to contribute to the literature of business services purchasing by advancing knowledge on service contracting from the perspectives of design, performance evaluation, and outcomes, as well as on the conceptualization of service complexity.
1.3 Scope and structure of the dissertation

This dissertation explores service contracting in a global B2B service setting. The research takes the perspective of the buying organizations and focuses on the design and renewal of service contracts. Therefore, empirical studies concentrate on the perspective of the buyer, and the empirical data excludes the perspective of the supplier. For a more robust dataset, a broad set of companies from various industries that have purchased business services are covered in the empirical inquiry (see Chapter 3.2.2 for details).

The dissertation is structured into five chapters. Chapter 1 introduces the background, research objectives, and research questions. It also briefly summarizes the appended research articles and how they link to the research questions. Chapter 2 starts by exploring the theoretical foundation contract theory, and then describes the three selected theoretical lenses for the original articles. This chapter also provides a review of relevant literature. Chapter 3 presents the methodological choices of the dissertation, data collection and analysis, research process, as well as critical evaluation of the methods and data. Chapter 4 outlines the findings based on the original articles. Chapter 5 consists of conclusions and discussion. In the discussion, the contributions of the theoretical part is presented, together with managerial implications, limitations, and future research opportunities.
2 Theoretical and conceptual background

2.1 Theoretical positioning and selected theoretical perspectives

Since the present study is linked to the service contracting on supplier performance and service relationships, it builds on the foundation of the contract theory. Contract theory provides us with the explanations how organizations construct and develop contractual agreements upon the principles of economic factors in the presence of information asymmetry (Hart & Holmström, 1987). The asymmetry of information between buyers and suppliers is the fundamental issue in service purchasing, since buyers may lack of knowledge and skills to articulate their needs, requirements, and the context of use to suppliers (Aarikka-Stenroos & Jaakkola, 2012). Against this background, this dissertation adopts the three theoretical lenses - systems theory, transaction cost economics (TCE), and information processing theory (IPT) to study the complexity of contracts and its influences on supplier performance and service relationships.

First, the complexity of contracts used in inter-organizational exchange increases with the complexity of the services (Van der Valk & Wynstra, 2014). The present study adopts the systems theory to investigate the dimensions of service complexity. Second, the transaction cost economics perspective is adopted because this study is interested in the influence of contracts on supplier performance. Third, all service contracts are incomplete since it would be impossible for the parties to develop agreements to cover all the details of the matter to be agreed (Hart & Moore, 1988). These contracts involve challenges related to information incompleteness and information asymmetry, as suggested by the contract theory, thus the information processing theory is adopted.

2.1.1 Systems theory

Systems theory suggests that a system should be perceived as a whole, which is made up of interrelated and interdependent elements that
continually influence each other over time and operate towards a common goal (Senge, 2014; Braun & Hadwich, 2016). Changing one component of the system usually influences other elements and the whole system. Within service research, systems theory has received increasing attention due to its contributions to the understanding of a service as a systemic phenomenon (Barile & Polese, 2010; Briscoe et al., 2012). A service system is shaped by continuous interactions among actors and reticular relationships (Barile & Polese, 2010). Therefore, systems theory provides the support to conceptualize and analyze the network of interactions that can be applied to describe service complexity (Braun & Hadwich, 2016).

Systems theory is used as the basis to investigate complexity of product-service systems (PSSs). According to systems theory, complexity is considered an essential characteristic of a system, determined by system parameters, such as the number of elements and the relationship between these elements (Manson, 2001; Braun & Hadwich, 2016). Systems theory, as the theoretical basis, is applied to define and conceptualize the dimensions of complexity is PSSs.

2.1.2 Transaction cost economics (TCE)

To analyze service contracting and supplier performance in B2B services, the study draws on transaction cost economics (TCE). TCE has emerged as a common framework for understanding how organizations identify comparatively better governance arrangements (Poppo & Zenger, 2002). Coase (1937) was the first to emphasize the importance of understanding the transaction costs, and TCE was developed further as a formal theory by Williamson (1985). TCE provides insights into the costs of the contractual exchange, which determines the type of contractual governance arrangements to minimize the costs of transacting (Williamson, 1985; Donato, 2010).

TCE addresses to align the governance features of inter-organizational relationships to minimize transaction costs. According to the TCE perspectives, three transaction characteristics determine transaction
costs: asset specificity, measurement difficulty, and uncertainty (Williamson, 1985; Poppo & Zenger, 2002). Asset specificity relates to the relationship-specific investments in resources. These investments can generate hazards of hold-up behavior because one party in the relationship may seek to appropriate gains, such as reducing service quality or increasing prices, from the other party’s specific investments (Donato, 2010). Difficulty in measuring the service performance also generate hazards. When the service performance is difficult to measure, suppliers may limit their efforts to fulfill the agreement (Poppo & Zenger, 2002). For example, the supplier may cut corners since the buyer is not able to measure it. Uncertainty challenges an exchange by addressing the unforeseeable contingencies through the adaptation of two parties (Susarla et al., 2009). Since services cannot be fully specified in the contracts before services are delivered (Roehrich & Lewis, 2010; Kreye et al., 2015), inter-organizational relationships are characterized by a degree of uncertainty that makes these contracts unenforceable in their entirety (Kreye et al., 2015).

The first two categories of transaction costs provide us with the support to identify and describe three dimensions of the contract structure, while the third resource of transaction costs underpins to design a contracting process that monitors and evaluates suppliers once the transaction is underway. Furthermore, TCE, as a theoretical lens, explains how contract structure and contracting process may influence supplier performance.

2.1.3 Information processing theory (IPT)

Information processing theory (IPT) suggests that organizations should increase their ability to share and process information to cope with the complexity of the environment (Galbraith, 1973; Wiengarten et al., 2017). From the IPT perspective, the greater complexity is associated with the need for more expansive information flow through inter-organizations (Handley & Benton, 2013). The existing studies show that effective application of information sharing along the interactions among involved
parties can reduce the degree of task complexity and improve performance (Power, 2005; Handley & Benton, 2013).

Previous studies have identified the problems arising from incomplete information and asymmetric information between contracting parties (Williamson, 1975; Hart & Moore, 1988). In case of contractual incompleteness, the involved parties may have the same information (Hart & Moore, 1988). This incompleteness in service contracts stems from uncertainty, since services cannot be fully specified in the contracts before service are delivered (Roehrich & Lewis, 2010; Kreye et al., 2015).

The complexity of services increases the degree of uncertainty during service deliveries. According to IPT, uncertainty amplifies the need for information processing and coordination (Handley & Benton, 2013; Larsen et al., 2013). This increases difficulty and the likelihood of problems during service delivery. In the case of information asymmetry, certain contingent statements are infeasible, since it is not observed by all parties to the service contract (Hart & Moore, 1988). This asymmetry of information possessed by the partners demands a high level of integration and coordination of actions (Whang, 1992; Anderson & Dekker, 2005). The post-contract management practices can maintain regular and customary interactions and structural information flows between buyers and suppliers, thereby mitigating the problems associated with late adjustments (Faems et al., 2008). Furthermore, a buyer’s follow-up management practices put forth rules for information exchanges, which reduces the risk of information asymmetry. This promotes open communication between the two parties and fosters relationship bonding, thereby enhancing perceived supplier performance (Schmoltzi & Wallenburg, 2012).

IPT, as a theoretical lens, is applied to identify the problems arising from incomplete information and asymmetric information, and to underpin how the service contracting process connects with service complexity, which is expected to affect supplier performance.
2.2 The underpinnings of complexity in business services

Reflecting the growing and increasing importance of services in all industries, organizations have shifted from product-driven business logic to service-oriented logic towards better facilitation of value creation (Vargo & Lusch, 2004; Holmlund et al., 2016). The purchasing of business services has become a substantial element in inter-organizational exchanges (Axelsson & Wynstra, 2002; Van der Valk & Rozemeijer, 2009; Pemer et al., 2014a). A recent study by Wirtz et al. (2015) shows that business services explain a large share of the growth of the global service economy.

Business services refer to services that are implemented between organizations, rather than with consumers. In the literature, the broad concept of business services consist of a variety of specific services in both manufacturing and service industries, such as industrial services, logistics and distribution services, information and communications technology (ICT) services, R&D and design services, support services, integrated solutions, consulting services and other knowledge-intensive business services (Van der Valk & Rozemeijer, 2009; Wirtz et al., 2015). The purchase of these services has become an essential element in a firm’s strategy towards external resources (Axelsson & Wynstra, 2002; Van der Valk & Rozemeijer, 2009).

There are several drivers for organizations to promote the development of service purchasing such as globalization, intensified competition, and technology fusions (Stouthuysen et al., 2012). Despite this growing trend, the business services context has received comparatively less attention than the consumer services context. From the purchasing perspectives, the literature shows that academic knowledge about service purchasing is limited compared with knowledge about product purchasing (Van der Valk & Rozemeijer, 2009). There are few studies to demonstrate that buying services would be substantially different from buying goods. Compared to the purchase of goods, the purchase of services, especially in the B2B setting, is much more complicated. This is mainly due to the characteristics of services, including the intangibility of service offerings, the heterogeneity of resources and outcomes, the inseparability of the
production from the consumption of a service, as well as the perishability of the offerings (Lovelock, 1983; Van der Valk & Rozemeijer, 2009). Therefore, the purchasing process for business services is more complicated. This also indicates increased risks for buying firms associated with the evaluation of the service provider, specification of service content, governance of service contracts, and evaluation of service outcomes (Fitzsimmons et al., 1998; Van der Valk & Rozemeijer, 2009).

Concerning the growing interest and practical need for service purchasing, purchasing processes for business services have been developed (Axelsson & Wynstra, 2002; Van der Valk & Rozemeijer, 2009; Selviaridis & Spring, 2010). These processes have been developed based on purchasing processes for goods, which has been adapted to the characteristics of services (Pemer et al., 2014a). The following Figure 1 shows the purchasing process for business services developed by Selviaridis & Spring (2010), which consists of five steps and three main phases – pre-contract phase, contract phase, and post-contract phase.

![Figure 1. Purchasing process of business services (Selviaridis & Spring, 2010)](image.png)

This purchasing process seems to be the dominant issue in the extant literature, with studies focusing on the description of stages, procedures and activities involved in purchasing business services (Mahnke et al., 2005). Researchers and practitioners have paid much more attention to the pre-contract stages of requirements specification and service supplier selection (e.g. Stremersch et al., 2001; Smeltzer & Ogden, 2002; Day & Barksdale, 2003). For example, the study conducted by Lindberg & Nordin (2008) demonstrates that the buying company has put much effort into the first stage of the purchasing process, in which service specification is developed and in most cases with supplier involvement.
(Selviaridis et al., 2013). Furthermore, their study (Lindberg & Nordin, 2008) also shows the importance of soft factors for selecting business service providers, including creativity, flexibility, and ability to cooperate. However, existing studies appear to pay much less attention to contract design and post-contract adaptations and interactions between buyers and their service providers (Kern & Willcocks, 2000; Wynstra et al., 2006). In recognition of this gap, recent studies have emphasized the importance of contracting and evaluating for business services (Ferguson et al., 2005; Cao & Lumineau, 2015) and there have been calls in-depth understanding of managing service contracting in B2B contexts (Van der Valk & Wynstra, 2014; Broekhuis & Scholten, 2018). In the following sections 2.2.2 and 2.2.3, the contracting of business services and its outcomes are investigated in detail.

### 2.2.1 Complexity of business services

Existing research agrees that complexity is a common feature in business services (Benedettini & Neely, 2012; Kreye et al., 2015; Braun & Hadwich, 2016). There is no universally accepted definition of complexity due to a wide range of discipline within which the phenomenon has been investigated (Robertson, 2004). In the organizational domain, the concept of complexity is often linked with the concept of a system (Benedettini & Neely, 2012). A system is considered to be complex when there are many elements that interact each other, which heavily influence the probabilities of many of later events (Robertson, 2004; Sargut & McGrath, 2011). The concept of complexity is generally understood as the increase of uncertainty (Davis, 1993; Van Der Vorst & Beulens, 2002). This connection between complexity and uncertainty has been noted specifically in services (Argyres & Mayer, 2007; Selviaridis, 2016; Kreye, 2019). This is because predicting effects of decisions and attaining complete understanding are difficult (Kreye et al., 2015).

Business service offerings are much more complicated than individual service purchases. This is not only due to the complexity of the interfaces that have to be designed in service contracts but also arises from its far
and broad-reaching consequences on service implementation and
general managerial activities (Stremersch et al., 2001). In this
dissertation, service complexity is investigated to get the overall view of
factors that constitute different dimensions of service complexity because
an in-depth understanding of the characteristics of service complexity in
B2B contexts can help service purchasers to better manage service
contracts and service performance.

The extant research on the complexity of business services is an emerging
field, in which recent research has focused on conceptualizing the
concept (Benedettini & Neely, 2012; Zou et al., 2018; Kreye, 2019). The
discussion considering complexity remains highly fragmented in B2B
services, and complexity is attributed to many factors. For instance, some
researchers have demonstrated that the complexity of business services
arises from value being co-created between buying firms and their
providers, implying relational in nature (Badinelli et al., 2012; Van der
Valk & Wynstra, 2012). Other previous service research has found that
multiple actors, stakeholders, and interactions involved in service
processes increase complexity in business services (Brax et al., 2017;
Rondini et al., 2017). Furthermore, some studies have shown that re-
arranging service processes and resources to respond to the evolving
buying firm’s needs during the lifecycle of the offerings further intensifies
complexity in service deliveries (Angelis et al., 2012; Eloranta & Turunen,
2016).

These descriptions that focus on the aspects of complexity stem from the
notion that a business service is increasingly considered as a service
system consisting of heterogeneous entities interacting with a common
objective (Spohrer & Maglio, 2008; Badinelli et al., 2012). This
dissertation adopts the systems theoretical perspective as a theoretical
lens. When systems theory has been applied to increase understanding of
the service phenomena (Barile & Polese, 2010; Briscoe et al., 2012), a
system is considered as a whole where its elements influence each other
each time and operate towards a shared goal (Senge, 2014; Braun &
Hadwich, 2016). Complexity is perceived as an attribute of a system that
is driven by system factors such as the number of elements and the
relationships between them (Manson, 2001; Braun & Hadwich, 2016). Therefore, systems theory provides the foundation to analyze and classify the manifestations of the complexity of business services.

2.2.2 Contracting of business services

While there is an increasing body of scientific knowledge on business services, including the vast body of literature on the service-dominant logic of business, and value creation through services, much less attention has been paid on contractual agreements between economic actors that form a service system.

**B2B service contracts**

A contract is a mutual agreement between exchange parties to ensure predictability and security of economic transaction (Nahapiet & Nahapiet, 1985; Gao et al., 2018). TCE provides the foundation into the cost of contractual exchange, which determines the type of contractual governance arrangements to minimize the costs of transacting (Williamson, 1985; Donato, 2010). Contracts are explicit (usually written, often detailed) and formal artefacts that specify the legally binding obligations and roles of both parties in a relationship (Lyons & Mehta, 1997). In this sense, contracts are essential transaction mechanisms in service operations. The literature explores how formal contracts are used for effective governance of inter-firm business exchanges, which also help to maintain relationship between involved parties (Luo, 2002; Lui & Ngo, 2004; Roehrich & Lewis, 2010). Formal contracts between buyers and suppliers reduce transaction ambiguity by clear contractual specifications of what is and is not allowed within a relationship (Lui & Ngo, 2004). A contract provides a safeguard against ex-post performance problems by increasing the cost of self-interest activities (Luo, 2002). Formal agreements can reduce the risks stemming from opportunism by legal rules, standards, and remedies implied in the law (Achrol & Gundlach, 1999).

Contracts are critical for B2B services that have a significant impact on a core business (Van der Valk & van Iwaarden, 2011; Zou et al., 2019). Contractual arrangements can shape the service provider’s operations
and support effective service delivery (Datta & Roy, 2011). Furthermore, contracts can constitute a foundation for the measurement and control of service performance, because they explicitly specify the obligations and roles of both parties in a relationship (Enquist et al., 2011). Well-specified service contracts are able to limit the domain and severity of risk where an exchange is exposed, and encourage cooperation between exchange parties (Poppo & Zenger, 2002). As discussed in TCE, contracts provide customized approaches and mutually agreed procedures for addressing necessary adaptations during an exchange (Williamson, 1991). This continuity and cooperation may create contractual refinements that further support greater cooperation (Poppo & Zenger, 2002).

The existing literature also shows the importance of contractual and relational governance for service contracts (Ferguson et al., 2005; Enquist et al., 2011; Roehrich & Lewis, 2014). The interplay of contractual and relational governance has received considerable attention in service procurement arrangements (Zheng et al., 2008; Cao & Lumineau, 2015). To ensure effective service delivery, empirical studies demonstrate that organizations should have appropriate contractual and relational capabilities to write, interpret and manage complex service contracts (Ferguson et al., 2005; Kreye et al., 2015). Organizations that purchase complex services need these capabilities to design contracts to ensure effective service deliveries (Van der Valk & Wynstra, 2014). However, there is very little work to guide which dimensions or agreements should be incorporated into the service contracts that improve service performance.

The complexity of the service amplifies the importance and complexity of contracts (Van der Valk & Wynstra, 2014), as contracts distinguish the main business model types that are implemented in different PSSs offerings (Azarenko et al., 2009; Ng et al., 2013; Reim et al., 2015). Buying companies, especially those that are shifting from buying goods to buying services, struggle with the lack of knowledge on designing service contracts and managing performance for B2B services (Oliva & Kallenberg, 2003; Datta & Roy, 2011). For example, buyers have to anticipate the usual risks of poor service performance (Stouthuysen et al.,
The earlier research on contracting in B2B service contexts tends to be grounded in case studies representing in supplier side; there is also a noticeable emphasis on the defense industry in case selection (Ng & Nudurupati, 2010; Kleemann & Essig, 2013; Grubic & Jennions, 2017). This implies that the design of service contracts and management of service performance warrants additional empirical investigation in B2B contexts. In addition, the lack of variety in research methodology and industry representation points to the need for balance.

**Service contract design**

Extant literature has widely acknowledged the significance of service contract design for purchasing organizations (Ng & Nudurupati, 2010; Enquist et al., 2011; Ng et al., 2013). According to the TCE perspectives, a detailed contract reduces opportunistic behavior by stimulating mutual expectations because it provides a formal governance structure for the interactions between buyers and service providers (Huo et al., 2016; Wacker et al., 2016; Chang et al., 2017). In service procurement, the contextual characteristics of services increase complexity and uncertainty. From the buyer's perspectives, the intangibility of the offering, context-dependence of the valued created, heterogeneity of resources and outcomes, and inseparability of production and consumption increase difficulty and risks associated with the specification of service content and the design of contract with the supplier (Van der Valk & Rozemeijer, 2009; Datta & Roy, 2011). In addition, services are typically characterized by uncertainty in specifying the expected outcome or the steps to achieve it and by information asymmetry between the buyers and service providers (Anderson & Dekker, 2005). Therefore, neither buyers nor service providers have complete information to specify all the necessary safeguards and contingencies due (Zheng et al., 2008; Roehrich & Lewis, 2014).

This contractual incompleteness may allow opportunistic service providers to exploit contracts to their own advantage at the expense of service performance (Brown et al., 2006). This demands service contract design processes in order to ensure good service performance with the minimal transaction costs (Brown et al., 2006; Susarla et al., 2009). One
of the tenets of TCE is that transaction characteristics determine transaction costs and the optimal buyer-supplier governance structure (Wynstra et al., 2018). Therefore, service-buying organizations are supposed to design governance arrangements to align the exchange conditions with the specific type of the service acquired (Poppo & Zenger, 2002; Enquist et al., 2011; Mills et al., 2013).

Macneil (1978) identifies three basic types of contracts: 1) classical; 2) neoclassical; 3) relational. The first two types of contracts are categorized as “transactional” in nature, which are general short duration and deal with issues that can be easily measured. These two types are also referred to “static” contracts by Enquist et al. (2011). The third type - relational contracts are difficult to describe and specify governance arrangements, where the exchange variables are not restricted to measurable quantities (Macneil, 1978). Relational contracts are also referred to “dynamic” contracts by Enquist et al. (2011). Due to the characteristics of services - the intangibility of the offering, context-dependence of the value created, heterogeneity of resources and outcomes, and inseparability of the production from the consumption, service contracts are generally relational contracts that allow room for interpretation and discussion.

**The structure for contractual governance**

In the research literature, contractual governance is generally defined as formal contracts, demonstrating legal agreements that specify the binding obligations and roles of both parties in a relationship (Lyons & Mehta, 1997; Enquist et al., 2011; Roehrich & Lewis, 2014). Contractual safeguards are established to minimize costs and performance losses from exchange hazards (Joskow, 1988; Roehrich & Lewis, 2014). Different types of contracts should be designed for different types of services, for example, spare parts sales contract, time and material contract, availability contract, development contract, outsourcing contract, and performance-based contract (Colen & Lambrecht, 2013). The performance-based contracting has received increasing attention in purchasing of business services, especially for advanced business services (Robinson & Scott, 2009; Datta & Roy, 2011; Kleemann & Essig, 2013).
The performance-based contracting tends to focus on achieving required outcomes rather than performing to a set of prescribing specifications (Gruneberg et al., 2007; Ng & Nudurupati, 2010). Under performance-based contracts, suppliers have full responsibilities for performance (Glas & Essig, 2008; Datta & Roy, 2011). Performance-based contracts also equitably align risks and incentives between buyers and service providers (Kim et al., 2007). In service contracts, a supplier’s performance measurement needs to be designed in the contract in order to induce optimal effort or increase productivity consistent with efficient risk-sharing (Robinson & Scott, 2009). The performance measurement designed in the contracts makes it easier for the two parties to understand the process, competencies, and assets required to deliver the performance level as required by the customer. Besides, the incentives and responsibilities described in the contracts can motivate suppliers to improve their performance over the contract period. By examining the contracts of industrial product service systems (PSSs) in the two companies, Datta & Roy (2011) have identified that the contract that includes three dimensions -- incentives, performance measures, and responsibilities of both parties can ensure effective service delivery.

In the management control literature, the two frameworks presented by Jensen & Meckling (1995) and Whang (1992) widely used to provide guidance for interpreting the structure of contract design (Anderson & Dekker, 2005). Jensen & Meckling (1995) demonstrate that control systems comprise three main contract practices: performance measurement, rewards and sanctions, and the assignment of rights and responsibilities. Through the analysis of five contracts for IT products and services in a case study, Whang (1992) identified three clusters of contract practices -- product definition, payment terms, and intellectual property protection. Based on the two transaction characteristics of asset specificity and measurement difficulty (Williamson, 1985; Poppo & Zenger, 2002) (details in Chapter 2.2), and combined with these two frameworks for contract design guidance, this dissertation identifies three dimensions of the contract structure: definition of responsibilities, performance criteria and incentives. The details of these three dimensions are elaborated in the Article 2.
The structure for relational governance

Relational governance refers to the strength of the social norms presented in the inter-organizational exchanges (Paulin et al., 1997; Poppo & Zenger, 2002; Ferguson et al., 2005). Inter-organizational exchanges are generally embedded in social relationships, which develops values and agreed-upon processes (Heide & John, 1992; Poppo & Zenger, 2002). According to Poppo & Zenger (2002), social relationships develop norms of flexibility, solidarity, and information exchange, which improves adaptation and problem solving among parties. Therefore, relational governance could encourage the continuity and cooperation by establishing trust, which will safeguard against hazards poorly protected by the contractual governance (Poppo & Zenger, 2002; Zheng et al., 2008).

The service purchasing literature has demonstrated that post-contract interactions and adaptations between buyers and service providers are crucial for achieving desired service outcomes in B2B contexts (Mouzas & Ford, 2006; Ellram et al., 2007; Selviaridis & Spring, 2010). Since there is no prospect of writing complete contracts for business services, inter-organizational relationships are characterized by a degree of uncertainty that makes these contracts unenforceable in their entirety (Kreye et al., 2015). The uncertainty that arises from incomplete service specifications challenges an exchange by addressing the unforeseeable contingencies through two parties’ adaptations during the service contract period (Susarla et al., 2009). This necessitates designing post-contract management that monitors the performance of service providers once the transaction is underway. It emphasizes management practices to monitor and assess service performance based on pre-specified arrangements made during the contracting period (Selviaridis & Spring, 2010; Hou & Neely, 2017).

Follow-up contract management practices (e.g. frequent review meetings) allow buyers and suppliers to exchange information, renegotiate in cases of changing circumstances, modify the service specifications defined in the contracts, and even revise the contracts. This is because the
interactions through review meetings help two parties adopt a joint approach to problem solving that facilitates mutual adaptations (Zheng et al., 2008; Roehrich & Lewis, 2014). This allows the service provider to implement continuous improvement practices throughout the contracting process (Mills et al., 2013). Therefore, establishing management practices in the contracting process can compensate for ambiguities in the contracts, which means it may encourage continuity and cooperation between the contracting parties as well as assist with the mutual adaptations between buyers and service providers (Poppo & Zenger, 2002).

Although follow-up management practices are considered as essential elements for successful B2B service delivery (Selviaridis & Spring, 2010; Hou & Neely, 2017), the literature tends to underplay the linkage between them. Huo et al. (2016) identify that the management practices, as a form of process control, focus on how the outcomes are reached. The case studies by Roehrich & Lewis (2014) show that post-contract management practices are crucial to establishing feedback channels and increasing the team familiarity that can lead to improved service performance outcomes. These management practices are assumed to be present, but their function in terms of service control and support has remained unexplored (Selviaridis & Spring, 2010). Therefore, it is necessary to understand the actual impact of post-contract management on service performance and how this impact could be influenced in terms of purchasing different services. This could help the buying organizations to design appropriate management practices to monitor and manage service contracts to secure good performance from their service providers.

**Evaluation of service performance**

The literature has illustrated that evaluation of service performance is crucial for effective service delivery and is the key element for service contracting (Axelsson & Wynstra, 2002; Lindberg & Nordin, 2008; Van der Valk & Rozemeijer, 2009). The evaluation includes activities such as comparing the achieved service outcomes with what was described in the specification, organizing service supplier, settling penalty clauses and
performing project evaluations (Van Weele, 2009; Pemer et al., 2014b). In case of purchasing business service, evaluating service performance is usually perceived as difficult by the buying organizations, due to the intangibility and process-based nature of services (Smeltzer & Ogden, 2002). Therefore, because of lack of formalized evaluations, buying organizations’ subjective perceptions of service performance are very important (Pemer & Werr, 2013; Pemer et al., 2014b).

Buyer-perceived service is closely connected with the value-creating practices between business customers and service providers (Marcos-Cuevas et al., 2016). Since the value of a service is subjectively determined by buying organizations based on their experience, buyer-perception is the key to understanding and measuring the value realized through the service (Vargo & Lusch, 2011; Kohtamäki & Rajala, 2016). In the service marketing literature, service performance is usually evaluated by service quality (Parasuraman et al., 1985; Chiou et al., 2002; Gounaris & Venetis, 2002). In supply chain management literature, service performance is commonly assessed instead of service quality and narrowly focuses on the technical outcomes of a service (Stank et al., 2003; Briggs & Grisaffe, 2010). In recent years, based on the foundational arguments on the ‘service-dominant’ theory proposed by Vargo & Lusch (2004), an increasing number of studies on service performance focus on the co-production and co-creation of service offerings (Dong & Sivakumar, 2015; Oertzen et al., 2018).

**Service quality and service-dominant (S-D) logic**

A comprehensive understanding of service quality facilitates the detailed analysis of how value is created for customers (Macdonald et al., 2011), since service quality is a core component of value (Lapierre et al., 1999; Leek & Christodoulides, 2012). Service quality has received ample attention in the service marketing literature. There have been two eras of knowledge development. From the early 80s until the end of the 90s, the first era focused on the conceptual development of the service quality construct and analyses of its different aspects. In this era, researchers and
practitioners have a shared understanding that service quality involves a comparison of expected with realized performance (Lewis & Booms, 1983; Grönroos, 1984; Parasuraman et al., 1985). Furthermore, service quality is often considered in terms of processes and outcomes (Grönroos, 1984; Parasuraman et al., 1985; Parasuraman et al., 1988). The perceived service quality framework (Grönroos, 1984) builds on technical and functional quality. Technical (or “hard”) quality is the quality of service outputs that can be objectively measured, conformance to technical criteria; functional (or “soft”) quality refers to process-related aspects such as the service supplier’s accessibility or the service surrounding the deliverable, for example, promptness, respect, courtesy and flexibility (Moorman et al., 1992; Arnott et al., 2007). The SERVQUAL model (Parasuraman et al., 1985), one of the most widely used operationalization of service quality, can be seen as an extension of Grönroos (1984) model; its first two dimensions represent technical quality and the remaining three represent functional quality. Parasuraman et al. (1985) used qualitative and quantitative research strategies to develop the SERVQUAL model that captures the service experience with five dimensions: tangibility, reliability, responsiveness, empathy, and assurance.

The second era, from the beginning of the 21st century, was initiated by the service-dominant (S-D) logic theory, which gained popularity after the initial article by Vargo & Lusch (2004). Here researchers moved beyond the quality constructs, and investigated value co-production and co-creation of service offerings, also in B2B service exchanges (e.g. Kohtamäki & Rajala, 2016). According to the service-dominant (S-D) logic literature, value is co-created through interaction between two parties participating in the service performance, encompassing service design, development, and delivery (Vargo & Lusch, 2004, 2008). Furthermore, recent literature by Oertzen et al. (2018) even shows that the ways of the intensity of co-creation vary between different types of service offerings, and across the life-cycle of services in a business context. B2B services are considered to be more complex than B2C services, which requests the assessment and management of multiple parameters to ensure adequate service provision and outcome (Gounaris, 2005; Pemer
& Skjølsvik, 2019). Therefore, acknowledging both research perspectives is crucial, because they help organizations to understand what value is and how it is created for customers (Macdonald et al., 2011).

**Service performance**

In this dissertation, the dimensions of service performance are grounded on the alignment of service quality and S-D logic literature. Three dimensions of service performance are identified in a B2B context: *competence-based service performance, expressive service performance, and collaborative service performance*. Competence-based service performance is defined as the outcome-achievement of a service, which is grounded on Grönroos’ (1984) widely used concept – technical service quality. Essentially, it describes “what” the customer gains from the interactions with the service provider (e.g. service-need fit, conformance to specifications, and reliability of operations) (Arnott et al., 2007). The substantial variation in service systems introduces further complexity. This variation arises from the heterogeneity of the internal and external situations in which services take place – including different service offerings and customers, as well as the life-cycle stages of the associated business activities and systems. Many industrial and B2B services are advanced services in the sense that they typically require specialized competence from the providers who may also invest on customer-specific resources. Therefore, competence-based service performance should be evaluated from service providers.

Expressive service performance refers to the customer’s affective reaction to a service. This dimension illustrates that the provisioning process of a service offering has expressive characteristics, which convey something to the customer on a psychological or emotional level and evoke affective reactions (Beltagui & Candi, 2018). Although these reactions include a subjective component, they reflect the customers’ experiences of interactions with the provider and the service system (Moorman et al., 1992; Arnott et al., 2007). The positive experiences of mutual interactions through the course of the service activities in the
psychological and emotional level can develop trust and commitment that is crucial in business relationships. Trust and commitment facilitate firms in reconciling difficult situations that go beyond those while preparing service contracts (De Ruyter et al., 2001). Existing research on B2B service purchasing has not explored the more detailed level of this service performance dimension; expressive service performance warrants further investigation and assessment in B2B services.

Collaborative service performance refers to the customer-perceived performance of collaboration with the supplier during service exchanges, which involves activities as well as exchange of information in order to achieve the targeted performance level and output. Co-creation is an important source of variation in any service process (Vargo & Lusch, 2008). In B2B contexts, services are generally co-created through interactions between buyers and service providers, which requires close collaboration among involved parties to design, develop, and deliver services (Vargo & Lusch, 2008). Previous empirical studies emphasize information sharing (particularly the transparency and quality of information flow) as the foundation of collaboration between two parties to work jointly towards a shared goal (Stank et al., 1999; Barratt, 2004). In service, where the co-creation element is salient, buying organizations are major contributors to the service process and the consequent service performance (Dong & Sivakumar, 2015; Oertzen et al., 2018). In a B2B context, collaborative service performance has a crucial role in B2B category of services and can have a significant impact on relationship performance, thereby should be evaluated by service providers.

2.2.3 The outcomes of business service contracting

Service performance and related business performance are multi-faceted phenomena, and difficult to measure (Franco-Santos et al., 2007). However, effective service contracting can be considered to improve service performance through well-designed service contracts and managing the activities of service providers. Accordingly, a well-performing service and subsequent customer-perceived business
performance enhances buyer-supplier relationships towards a long-term collaboration by mutual understanding and adaptations during service processes (Roehrich & Lewis, 2014). Furthermore, effective service deliveries are suggested to lead to stronger customer repurchase intentions either directly (Dagger & Sweeney, 2007; Roy & Butaney, 2014) or through buyer-perceived value (Aitken & Paton, 2016). Some empirical studies also identify that effectiveness of service contracts in a business context is beneficial for financial outcomes (Palmatier et al., 2007b; Hou & Neely, 2018). However, financial performance is excluded, since it exceeds the scope of this dissertation. In this study, I focus on business relationships and customer repurchase intentions as the outcomes of service contracting.

**Business relationship performance**

Relationships between buyer and service providers describe “valuable bridges, as they give one actor access to the resources of another” (Harland, 1996p. 68). The business marketing literature emphasizes well-performing business relationships as important sources of the competitive advantage for organizations (Chang & Gotcher, 2007; Palmatier et al., 2007a; Kohtamäki et al., 2012). Well-performing and long-term oriented relationships with service providers enable companies to be more efficient in service procurement and more effective in service delivery (Sheth & Sharma, 1997; Walter et al., 2003).

The issue of relationship performance in business interactions is particularly critical in times of increasing business service purchasing due to globalization, competition, and technology infusion (Van der Vaart & van Donk, 2008; Stouthuysen et al., 2012). In B2B services, the uncertainties from unfamiliarity with the service, the complexity of the service, and long time horizon of delivery require good inter-organizational relationships, and demand for long-term orientation between buyers and service providers (Hou & Neely, 2017). Business services, especially advanced business services, call for better coordination, adaptation, and increased learning capabilities in business interactions (Möller & Törrönen, 2003; Kohtamäki et al., 2012).
Typically, business relationships can be classified as transitional or relational (Cannon & Perreault Jr, 1999; Bastl et al., 2012). From a buying organization’s perspective, the services tend to be implemented through a relational exchange rather than transactional exchange (Bastl et al., 2012). From the service provider’s perspective, the provision of services requests relational interactions with customers (Mathieu, 2001; Oliva & Kallenberg, 2003). In B2B services, the interactions that facilitate joint learning and adaptations during the services process are essential in long-term business relationships (Bensaou, 1999; Roehrich & Lewis, 2014). Existing literature emphasizes that the primary safeguard with relational exchange is trust (Morgan & Hunt, 1994), while contracts as the main safeguarding mechanism is mainly for transactional relationships to prevent opportunistic behaviors (Williamson, 1985, 2005). However, trust in B2B is built through information exchange and open interactions between two parties, which should be considered and designed in the service contracts. Therefore, in terms of purchasing business services, understanding the business relationships and their development through service contract design demand more attention.

Relationship performance reflects the overall nature of relationships between buyers and service providers; these relationships consist of several key dimensions (Homburg & Garbe, 1999; Hennig-Thurau et al., 2002; Kim et al., 2012). Its definition stems from studies in marketing (e.g. Dwyer et al., 1987; Crosby et al., 1990; Hennig-Thurau, 2000). Relationship performance is mostly describe as the overall depth and climate of the inter-firm relationship (Zeithaml et al., 1996). Cannon & Homburg (2001) define relationship performance as the extent to which the relationship meets the customer’s expectations based on their interactions. Although there are minor differences in the definitions of relationship performance, most researchers agree that relationship performance represents the customer’s evaluation of transactions and relationships (Kim & Cha, 2002). Due to the factors such as intangibility, complexity, lack of service familiarity, and long time horizon of delivery in B2B services, buying organizations have to face the uncertainty that implies the potential for service failure (Huo et al., 2016). From a buying organization’s perspective, relationship performance can be achieved...
through information exchange, cooperation, and adaptations during a service process, which then reduces the buying company’s perceived uncertainty (Crosby et al., 1990; Roehrich & Lewis, 2014).

Prior studies on relationship marketing have found the factors that explain the various outcomes of relationships between buyers and suppliers. Crosby et al. (1990) studies the factors of trust and satisfaction that facilitate relational outcomes, indicating relationship performance as higher-order construct including trust and satisfaction. Morgan & Hunt (1994) analyzed both antecedents and effects of trust and commitment, demonstrating these two constructs as central dimensions in business relationships. In their meta-analysis study, Palmatier et al. (2006) investigated several factors that lead to relational outcomes, such as customer loyalty, business continuity, cooperation and supplier objective performance. Their study highlights the essential roles of trust, commitment, and relationship satisfaction in business relationships.

In this dissertation, customer trust in the service provider, customer satisfaction with the service provider, and commitment to the relationship with the service provider are considered the essential dimensions to describe what business relationships are perceived from the buying organization’s point of view. This is consistent with previous studies of relationship performance in B2B contexts in the literature (e.g. Morgan & Hunt, 1994; Homburg & Garbe, 1999; Walter et al., 2003).

In the Article 3, these three dimensions have been elaborated. In this dissertation, trust refers to “the belief of the buying organization that needs can be fulfilled by another organization’s action” in organizational settings. Satisfaction is defined as “the buyer’s positive affective state in a business relationship with the supplier”. Furthermore, commitment represents “the buyer’s perception of the provider’s willingness to maintain a stable relationship on a long-term basis”.

**Service repurchase intentions**

Service repurchase intentions reflect the buying organization’s intention to maintain the relationship in the future and captures the likelihood of
continued purchases (Palmatier et al., 2006), which is considered as the eventually positive outcome of the business relationships. In this dissertation, service repurchase intentions represent a buying organization’s intent to buy the same or additional or even other services from the same service providing company and thus maintain the business relationship. In B2B services, understanding service repurchase intentions is critical in today’s markets because a long-term relationship between firms and their suppliers are necessary for collaborative innovation, total quality management, and other activities coordinated across the entire value chain (Calantone et al., 2002; Bolton et al., 2006; Ploetner & Ehret, 2006).

Unlike the initial service purchase decision that depends on contract specifications and marketing communication (Kalwani & Narayandas, 1995; Ganesh et al., 2000), service contract renewal decision is likely to depend on its previous experiences under the old service contract (Bolton et al., 2006). The prior studies show that business customers’ assessment of service performance at the contract level is likely to be a key determinant of their decision to continue to conduct business with the service provider (Zeithaml et al., 1996; Bolton et al., 2008). The buying firm has many opportunities to evaluate service performance through ongoing interactions and coordination with the service suppliers, thereby learning to make better purchase decisions. Therefore, when a firm perceives a poor delivery of the service from the provider, the firm may conclude that the service performance on the contract level is inadequate for their needs, and it is less likely to renew the contract (Bolton & Myers, 2003; Bolton et al., 2008).

Research in services and industrial marketing has focused on the influence of business relationships between firms and their suppliers on firms’ repurchase intentions (Barry & Terry, 2008; Briggs & Grisaffe, 2010). These studies show that the buying firm’s overall evaluation of the business relationship is likely to be an essential driver of repurchase intentions in service exchanges. Relational aspects are fundamental in long-term service collaboration. While business relationships may be influenced by service performance (Gounaris & Venetis, 2002;
Chumpitaz Caceres & Paparoidamis, 2007), the relational outcomes are also partly determined by other factors. For instance, an exchange partner’s beliefs affect the business relationship between the firm and its supplier (Morgan & Hunt, 1994), and relationship-specific investments influence business relationship performance (Van der Vaart & van Donk, 2008). This reality creates additional challenges for service providers in B2B exchanges because they need to allocate resources for both service performance and relationship performance improvements in order to retain business customers.

2.3 Application of the selected theoretical lenses in the study

This section summarizes the linkage of the literature reviewed in this part combining with different theoretical lenses applied in each article of this dissertation. While this dissertation focuses on managing service contracting in business services, its core lies in understanding how service complexity affects service contracting and influences service performance. Further, informed by the review of the existing literature and the selected theoretical perspectives, the study focuses on the effects of different dimensions of service performance on customer repurchase intentions.

In the Article 1, systems theory is adopted as the basis to investigate complexity of product-service systems (PSSs). According to systems theory, complexity is considered an essential characteristic of a system, determined by system parameters, such as the number of elements and the relationship between these elements (Manson, 2001; Braun & Hadwich, 2016). As one of the theoretical perspectives of the present study, systems theory is applied to define and conceptualize the dimensions of service complexity.

In the Article 2, TCE is applied to understand a firm’s transaction costs during business exchanges. The three transaction characteristics - asset specificity, measurement difficulty and uncertainty - provide us with the support to identify and describe three dimensions of the contract
structure, as well as to design a contracting process that monitors and evaluates suppliers once the transaction is underway. TCE, as a theoretical lens, connects to the literature on contractual and relational governance to build theoretical arguments how contract structure and contracting process may influence supplier performance. Furthermore, this article connects IPT and the literature on service contracting, underpins how the contracting process that connects with service complexity could affect supplier performance.

In Article 3, the investigation into the dimensions of service performance is ground on the literature of service quality alignment. The alignment includes service quality defined by Parasuraman et al. (1985) and Grönroos (1984), as well as the service-dominant (S-D) logic. This alignment, as the theoretical foundation, provides a basis to investigate how different dimensions of service performance influence the business relationship and service contract renewal. This perspective is applied in Article 3 by looking at the effects of service performance on customer repurchase intentions, and by analyzing the mediating role of relationship performance between service quality alignment and business continuity. In the article, service quality alignment is studied in terms of competence-based service performance, expressive service performance and collaborative service performance, whereas business continuity is operationalized as customer repurchase intention.
3 Research design and methodology

3.1 The methodological choices of the research

The two distinctive clusters of research strategy in the field of management are quantitative and qualitative research (Bryman, 2012). Qualitative research predominately entails an inductive approach to the relationship between theory and research, where the focus is placed on the generation of theories. In this research strategy, researchers put the emphasis on the ways how they interpret the studied phenomenon (Bryman, 2012). Quantitative research utilizes a deductive approach to the relationship between theory and research, in which the aim is to develop and employ models, theories, and hypotheses pertaining to a phenomenon (Singleton & Straits, 2018). It emphasizes quantification in the data collection and analysis and the testing of theories (Bryman & Bell, 2015). This approach reifies a view of social reality as an objective reality.

This dissertation aims to identify the dimensions of service complexity, and then investigates the effects of service complexity connecting with service contracting on service performance in a global context. Moreover, the dissertation aims to examine the effects of different dimensions of service performance on customer repurchase intentions. Given the objectives of this dissertation, systematic literature review and quantitative research approach are justified as the main methodological choices of this dissertation, which are elaborated next. For the empirical approach, this dissertation chose to conduct a broader research in a global context across different industries. This can build a comprehensive understanding spanning across countries and industries by synthesizing this stream of research. Research based on this approach is scarce and provides opportunities for unique insights and contributions. This approach allows the present study to complement service contracting from a global context. This can balance the lack of variety in research methodology and industry representation.
3.1.1 Systematic literature review

The non-empirical study (Article 1) included in this dissertation is a systematic literature review that was conducted to gain an overview of factors that constitute different dimensions of complexity in PSS, and then help to understand service contracting management from the characteristics of service complexity. The systematic literature review method is a good way of identifying all empirical evidence that fits the pre-specified inclusion criteria, and synthesizing research findings to answer the research question (Snyder, 2019). This method is an effective research strategy since service complexity is an emerging field, its knowledge remains fragmented and interdisciplinary. This method can addresses the dimensions of service complexity with a power through integrating findings and perspectives from many empirical findings (Snyder, 2019).

In the present dissertation, the systematic literature review served the purpose of identifying the dimensions characterizing complexity in PSS. The review was provided for identifying the research gap in the current knowledge, developing the construct of service complexity and its operational indicators for the empirical studies conducted as part of this dissertation. These dimensions also helped to develop the research models of the empirical studies.

However, the limitations of a systematic literature review should be noted. A complete reliance on previously published studies is risky because of the appropriateness of the found studies with the inclusion and exclusion criteria, as well as the potential unavailability of the most relevant studies using the search methodology.

3.1.2 Quantitative research and survey research approach

The two empirical articles (Article 2 and 3) in this dissertation follow a quantitative research approach, which aims to examine the relationships between the observed variables (Singleton & Straits, 2018). Singleton & Straits (2018) demonstrate that there are four principal research
strategies for conducting social research: experiments, field research, surveys, and the use of archival data. Experiments are difficult to arrange, appropriate archival data on service purchasing could not find, and conducting enough case studies to allow quantitative analysis requires immense data. Therefore, the survey research design is most justified for the empirical studies of this dissertation.

Survey-based research is one of the most widely used methods of collecting data in the social sciences. This method is applied to collect information from individuals (through mailed questionnaires, online questionnaires, telephone calls, personal interviews, etc.) about themselves or about the social unites to which they belong (Rossi et al., 1983; Forza, 2002). The sampling process of survey determines information about representative population with a known level of accuracy (Rea & Parker, 2014). Survey research can be classified into three main categories – exploratory survey research, confirmatory (or theory testing or explanatory) survey research, and descriptive survey research, which contribute to the advance of scientific knowledge in different ways (Filippini, 1997; Malhotra & Grover, 1998; Forza, 2002).

As expressed by Forza (2002), exploratory survey research is adopted during the early stages of research into a phenomenon, which aims to gain preliminary insight on a topic. Confirmatory survey research is carried out when the knowledge of a phenomenon is well described in the literature, which aims to examine the adequacy of the concepts developed in relationship to the phenomenon and hypothesized linkages among the concepts. The aim of descriptive is to accurately describe a population, situation or phenomenon (Malhotra & Grover, 1998; Wacker, 1998). The empirical studies in this dissertation adopt confirmatory survey research using Web in-depth questionnaires. This approach is an effective research strategy since the phenomenon of service contracting has already been studied in the case study literature (Forza, 2002; Singleton & Straits, 2018). In Article 2, the constructs (perceived supplier performance and three control variables) that are not specific to the B2B service context applied in the study are well-established in the literature; while other constructs (definition of responsibilities, performance
criteria, incentives, and follow-up management) and the linkages between contracting and performance are well-developed in previous case studies. In Article 3, the constructs (relationship performance and repurchase intentions) are well-defined in the extant literature, while other constructs regarding three dimensions of service performance developed in this study and the relationships between service performance and business relationships and their impacts on service contract renewal intentions are well-documented in previous case studies.

3.2 Data collection and analysis

In this dissertation, the main approaches to data collection are systematic literature review and quantitative research approaches. The literature review followed the principles of systematic search of the existing body of knowledge relevant to the study. The survey data were collected in two phases, from August to October 2015, and from August to October 2016.

3.2.1 Selection of articles for the systematic literature review

The non-empirical analyses of this dissertation are based on the data collected from the systematic literature review. The systematic literature method allows the charting of the extant knowledge as a whole (Tranfield et al., 2003; Brax & Visintin, 2017). This method applies systematic search protocols that ensure breadth in coverage and prevent bias in selection of the literature included in the analysis, and then follows documented screening and analysis protocols that enable transparency and replicability of the study (Zou et al., 2018). The search was conducted in the journal titles, abstracts, and keywords. The abstracts from the retrieved articles were read to ensure the presence of the research terms, and the relevance of the academic discipline. For instance, the articles in chemistry were excluded, since “integrated solution” was used in chemistry without a link to PSS. Followed by the full-text screening, core set of the sample comprised of 18 articles that fulfilled the inclusion criteria, expressing different manifestations of complexity either explicitly or implicitly. Those articles that only mentioned “complex” in
the texts without the expression of the manifestations to service complexity were excluded. After that, implementing the so-called snowballing tactic during the thematic analysis, five other relevant articles indicated by the studied core articles were added to the final data set, resulting in the final sample of 23 articles.

Scopus was chosen as the database for the literature search due to its coverage; according to Scopus website (Elsevier 2017), in August 2017 the database consisted of 1.4 billion references from over 5000 publishers, published since 1970, with about 5500 new items added daily. The identified 23 articles were from 16 different journals, representing a wide range of journals (See Article 1). These journals represent good quality based on the CABS ranking system (Chartered Association of Business Schools). Based on the number and coverage of the journals, there is no clustering in a particular outlet or sub-discipline. Although there is a possible bias in all literature searches, it is reasonable to think that these selected articles represent the essential body of knowledge for the empirical study due to the coverage and quality of the journals.

The analysis of the sample articles follows the typical process of qualitative content analysis (Brax & Visintin, 2017). The articles were first read through to get an overview, summarizing the descriptive information of the identified articles, such as year of publication, the journal in which the article was published, and the research methods applied. Then, the articles were uploaded to the Atlas.ti 7 software to enable the coding practices and analysis. The ultimately aim of the literature review is to describe the nature of complexity in PSS and identify the constitutive factors that generate this complexity. The text sections that express different manifestations of service complexity either explicitly or implicitly were coded. These codes were thematically analyzed to develop the dimensions of service complexity.
3.2.2 Collection of empirical data

The empirical analyses of this dissertation are based on the data collected from an online survey. The survey was developed through the following four steps: Initially, the two interviews with a senior purchasing consultant who specialized in service contracting in a global consulting firm provided a background regarding the challenges and successful factors of contracting and evaluating service outcomes in organizations. The interviewed informant provided constructive feedback after reviewing the initial questions of the survey during the face-to-face interview. Second, the questionnaire was reviewed by a marketing researcher specialized in questionnaire design, when some questions and items were rephrased to enhance clarity and eliminate misunderstanding, as well as the logic of the questionnaire. Third, the questionnaire was tested through a face-to-face semi-structure interview with a global sourcing category manager from a large international corporate who was responsible for purchasing travel services and professional services such as finance services and accounting services. The manager has worked for the purchasing department for eight years. Interestingly, she emphasized that many purchasing service decisions were made in collaboration with other functions. Accordingly, some questions were designed to reflect that respondents should answer them based on their most recent service-purchasing contract. Finally, the revised paper-based questionnaire and the online version were tested with 17 professionals representing purchasing and business functions in private, public, and non-profit organizations. These organizations cover several industries, consisting of manufacturing, information, educational services, and utilities.

The sampling frame of the empirical studies in this dissertation consisted of service purchasing professionals whose jobs involving in purchasing business services. In both two empirical articles in this dissertation, the source of sample were three private focus groups on LinkedIn. LinkedIn, described as the world’s largest professional network (Bonsón & Bednárová, 2013; Hutchins, 2016), focuses on professional information that can be applied to identify professionals in producing research data (Maramwidze-Merrison, 2016). The memberships of private focus
groups require applications and are managed by the group owners. The selected three largest international purchasing private groups (see Table 1) were the contact database for the empirical studies. Based on the members of these three private groups, the sampling frame for the empirical studies in this dissertation consisted of 1500 individuals from 46 countries.

**Table 1.** The sampling database for this dissertation

<table>
<thead>
<tr>
<th>Forums</th>
<th>Web link</th>
<th>Member count</th>
<th>View date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing &amp; Supply Chain Manager Professionals (ISM)</td>
<td><a href="https://www.linkedin.com/groups/50589/">https://www.linkedin.com/groups/50589/</a></td>
<td>74178</td>
<td>30.6.2015</td>
</tr>
<tr>
<td>Purchasing &amp; Materials Management (PMM)</td>
<td><a href="https://www.linkedin.com/groups/156598/">https://www.linkedin.com/groups/156598/</a></td>
<td>28323</td>
<td>30.6.2015</td>
</tr>
</tbody>
</table>

Of the 1500 prospective informants, 62 individuals were not able to receive surveys due to incorrect or outdated contact information. 88 individuals requested to be removed from the sample (either because they were no longer responsible for service purchasing or because they declined to participate), leaving an effective sample of 1350 individuals. The data were collected through two periods: 1) August to October 2015; 2) August to October 2016. After the first collection phase (August to October 2015), 144 usable responses were received, for an effective response rate of 15.7 percent. After the second period data collection, 33 usable responses were received, for an effective response rate of 8.3 percent. In total, 177 usable responses from 25 countries were received, for an effective response rate of 13.1 percent. This result falls within the range from 6 to 16 percent that Dillman (2000) considers acceptable for international internet surveys. While the results from the initial set of data were significant, the data set was extended with the same survey by the second period data collection. It has been found that the results in
period 1 with the initial data set (n=144 respondents) were almost identical with the larger data set including period 1 and 2 (n=177 respondents). The biggest difference in the coefficients of all confirmed relationships is less than 0.01. Therefore, using the larger set of data was chosen. Most of respondents had approximately ten years of purchasing experience in companies.

Article 2 investigates the influences of contract structure and contracting process on the buyer-perceived supplier performance, and how these relationships are moderated by service complexity. The examined relationships were tested by the ordinary least squares (OLS) regression model technique. The OLS regression model was chosen because the examined relationships within the underlying system that are considered to be linear. Furthermore, the OLS regression model enables researchers to examine the relationships between multiple independent constructs and the dependent construct simultaneously (Ozment & Morash, 1994; Stouthuysen et al., 2012). Besides, OLS allows analyzing the moderating influences of service complexity on these relationships in a single research model.

Article 3 predicts the effects of three service performance dimensions on customer repurchase intentions in B2B contexts, and how these relationships are mediated by business relationship performance. The investigated relationships were tested by structural equation modeling (SEM), which is the combination of factor analysis and multiple regression analysis. This modeling allows researchers to estimate the multiple and interrelated dependence in a single analysis.

### 3.3 Research process

At the outset of this study, there was a need to establish a basis for understanding service complexity as the perspective for the study. For this purpose, the systematic literature review was to investigate manifestations of complexity through the thematic content analysis, which identified four dimensions of service complexity - multiplicity,
diversity, interdependence, and variability. These four dimensions helped to explore the role of service complexity in purchasing B2B services, and also helped to develop the research model – how service complexity influences the effects of contract structure on supplier performance. Furthermore, these four dimensions were the foundation to develop the operational indicators of service complexity in the empirical analyses. The analysis of the existing body of knowledge on service complexity, conducted in the literature review, provided a basis for focusing on the essential aspects of the phenomenon, and establishing the hypotheses for the empirical study.
Table 2. The research process

<table>
<thead>
<tr>
<th>Phase</th>
<th>Literature review</th>
<th>Service and contract complexity and supplier performance</th>
<th>Service performance and the B2B service relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>08/2016-01/2018</td>
<td>10/2016-10/2019</td>
<td>03/2019-05/2021</td>
</tr>
<tr>
<td>Methods</td>
<td>Systematic literature review</td>
<td>Ordinary least squares (OLS) regression model</td>
<td>Structural equation modeling (SEM)</td>
</tr>
<tr>
<td>Data</td>
<td>23 articles in scientific journals</td>
<td>177 usable responses from a sample of 1350 individuals.</td>
<td>141 usable responses from an effective sample of 897 individuals.</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Article 1: conceptual foundations for the study and identification of research gaps.</td>
<td>Article 2: definition of responsibility, performance criteria, and incentives as well as follow-up management practices were found to positively influence buyer-perceived supplier performance. It also found that service complexity amplifies the effects of incentives designed in the contract and follow-up management practices on buyer-perceived supplier performance.</td>
<td>Article 3: competence-based, expressive, and collaborative service performance drive relationship performance and increase customer repurchase intentions of the services. Relationship performance is found to fully mediate the links between expressive and collaborative service performance with customer repurchase intentions.</td>
</tr>
</tbody>
</table>

The empirical inquiry focused on analyzing the role of contract structure in effective service delivery, and the effects of service performance on the service provide-customer relationship. First, the analysis of the data revealed three major service contract dimensions (definition of
responsibility, performance criteria, and incentives) and follow-up management practices that were found to positively influence buyer-perceived supplier performance. Also, it was found that service complexity significantly increases the need for designing incentives in the service contract and buyer’s follow-up management towards better supplier performance. Moreover, it was found that that service complexity weakens the effects of the criteria defined for the supplier’s performance in the contract, which was contradictory to the original hypothesis. This is interesting especially when the complexity of the purchased service is high. Performance criteria defined in the contracts failed to improve supplier performance when uncertainty is extremely high.

Second, the empirical analysis concerning the influences of service complexity on supplier performance (Article 2), and the effects of service performance on the B2B service relationship (Article 3). The empirical inquiry covered the different aspects of service complexity as identified in the literature review. Especially, the analysis conducted in the latter paper project revealed that three dimensions of service performance – competence-based, expressive, and collaborative – drive relationship performance and increase customer repurchase intentions of the service in the B2B setting. Also, the analysis underscores that relationship performance mediates the effects of expressive and collaborative service performance on customer repurchase intentions. These findings imply that service providers can ensure business continuity with their customers by investing in expressive and collaborative service performance.

### 3.4 Critical evaluation of the methods and data

When establishing the research design for this study, the fundamental ontological questions included determining whether the expected complexity of B2B services exists and whether it affects service relationships. Considering these questions, the research included an extensive literature search to find evidence of the complexity of business
services and service contracts and their effects on service and business relationships and customers’ repurchase intentions. Also, the critical epistemological question – the ability of the study to make the empirical observations needed to capture the real-life phenomenon in its true form – was considered when selecting the methods for the empirical inquiry. For this epistemological concern, the selection of informants for the surveys was considered carefully. While business service purchasing professionals represent just one party of a business relationship – the customer – they were selected as the key informants on the grounds that, they still are the best available sources of information for analyzing the influences of the service complexity, and the performance of the service provider on the service provider-client relationship, on the customers’ intentions to continue the service relationship.

The known shortcomings of the selected methods were noted in the study. For the literature review, a critical concern was the appropriateness of the found studies with the inclusion and exclusion criteria and the potential unavailability of the most relevant studies using the search methodology. For the quantitative approach of the empirical studies of this dissertation, a critical concern was the reliability and validity of the results.

### 3.4.1 Reliability and validity of the empirical measurement

Developing appropriate measures to ensure reliability and validity during the research process is essential for the quantitative study because they are the concepts used to evaluate the quality of the research (e.g. Drost, 2011; Bryman, 2012; Lameck, 2013). Reliability is related to the questions of whether the study results are stable and consistent (Traub, 1994; Lameck, 2013; Singleton & Straits, 2018). In quantitative research, this concerns the consistency of a measure. Validity is concerned with “the integrity of the conclusions that are generated from a piece of research” (Bryman, 2012). It is about the accuracy of a measure (Brinberg & McGrath, 1982; Singleton & Straits, 2018). In quantitative research, construct validity is considered a fundamental criterion (Bryman, 2012).
Construct validity evaluates whether the measures truly measure the concept (Bryman, 2012; Singleton & Straits, 2018). In other words, it means that the constructs measure what they intend to measure.

In the empirical studies of this dissertation, the measurement scales of the constructs were developed from a literature review and then refined through a series of pretests. The survey was reviewed by a marketing researcher specialized in survey design and then tested by 18 professionals from purchasing and business functions in private, public, and non-profit organizations across several industries. In Article 2, service complexity was captured with the formative measurement, while all other constructs were captured with the typical reflective view of construct specification. In Article 3, reflective measurement specifications were used to capture all the constructs.

Indicator collinearity and external validity are the two potential issues concerning the reliability and validity of the measurement with formative scales (Diamantopoulos & Winklhofer, 2001; Diamantopoulos et al., 2008). In the present study, these issues were carefully checked for the construct of service complexity. Also, the variance inflation factor (VIF) and the correlations between each indicator and with the overall item have been inspected (Diamantopoulos et al., 2008; Briggs & Grisaffe, 2010), supporting the reliability and validity of the construct (details see Article 2, Table II and III). For the reflective constructs in the empirical studies, Cronbach’s α was used to check the reliability of the constructs (Bagozzi & Yi, 1988; Drost, 2011). Moreover, average variance extracted (AVE), as well as the comparison between AVE and the squared correlation (between all pairs involving the construct), were applied to check convergent and discriminant validity (Fornell & Larcker, 1981; Barry & Terry, 2008; Briggs & Grisaffe, 2010). For details of these checks, see Article 2, Table III and IV; Article 3, Table 2 and 3. All of the conducted tests show that the constructs met the reliability and validity criteria. Therefore, based on the development of the measurement and the reliability and validity of the measurement, it is reasonable to believe that the empirical data sufficiently cover the phenomenon under the study and provide a solid ground to believe that the findings are valid.
3.4.2 Triangulation

Triangulation is considered as a way of improving the reliability and validity in social research (Turner et al., 2017). In this research, triangulation was used to address the known shortcomings of the chosen methods, and to improve the reliability and validity of the findings. Triangulation includes different ways to generate better understanding of a phenomenon and ensure the validity of the findings (Singleton & Straits, 2018). It is often described in terms of methodological triangulation, investigator triangulation, data triangulation and theoretical triangulation (Denzin, 2017). Methodological triangulation entails the use of different research methods to avoid the methodological bias in achieving the results. Data triangulation is based on using different datasets and different subsets of the data to ensure that the findings represent the investigated population. The premise of investigator triangulation is that several independent researchers participate in an investigation, discuss the analysis, and agree on the findings. Theoretical triangulation is the use of more than one theoretical perspectives are used to investigate a phenomenon (Turner & Turner, 2009).

In this dissertation, different methods were applied to study the phenomenon. First, the literature review built on the existing body of the subject. The review was conducted systematically, and all the critical aspects of the analysis and the findings of the review were evaluated by the multiple researchers. Hence, the review process demonstrates theoretical triangulation and investigator triangulation. Furthermore, in the empirical studies, the research models were developed based on different theories including TEC and IPT. The quantitative analysis employed different methods and data, and the findings were also analyzed by the multiple researchers in the team. Therefore, theoretical triangulation, methodological triangulation, and investigator triangulation were applied.
4 Key findings

4.1 The conceptual dimensions of service complexity

Focusing on the extant literature on PSSs to analyze the nature and characteristics of service complexity, Article 1 conceptualized the four dimensions of complexity in the PSS context. As mentioned in the introduction (Chapter 1.2), the reason to focus on the PSSs context instead of B2B service purchasing, is that PSSs literature entails a broad scope of service delivery with technical complexity of tangible systems. This provides a comprehensive understanding of complexity manifestations during the service process.

The findings indicate that service complexity is still an emerging field, only 23 articles in the data set, ranging from 2006 to 2017 (See Figure 2). The analysis on research methods shows that 20 articles utilized case study approaches, followed by qualitative research (2) and conceptual work (1). Besides the obvious low number of identified articles, the absence of survey-based studies also indicates the immaturity of this research area.

![Figure 2. Annual publication of complexity in PSSs articles](image)

Responding to RQ1, the four dimensions of service complexity have been identified in Article 1, which are summarized in the following Table 1.
Table 3. Summary of the dimensions of service complexity in Article 1

<table>
<thead>
<tr>
<th>Dimensions of service complexity</th>
<th>Outcomes of manifestations of complexity identified in the literature source</th>
<th>The definition of each dimension in Article 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplicity</td>
<td>13 articles out of 23 associate multiplicity with service complexity, for example:</td>
<td>“Multiplicity refers to the number of stakeholders, service components and interactions involved in the process of PSS adoption”.</td>
</tr>
<tr>
<td></td>
<td>Angelis et al. (2012): multiple stakeholders involvement, the two-way interactions between involved parties;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Braun &amp; Hadwich (2016): multiple internal service components, internal suppliers, and interactions in the service process.</td>
<td></td>
</tr>
<tr>
<td>Diversity</td>
<td>19 articles address complexity emerging from diversity, for instance:</td>
<td>“Diversity is defined as heterogeneity of elements in a PSS, consisting of different stakeholders, service components and interactions involved in the service process.”</td>
</tr>
<tr>
<td></td>
<td>Hou &amp; Neely (2017): involvement of different stakeholders; diversified and unclear customer needs;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smith et al. (2014): variety of knowledge and skills required, as well as contextual use.</td>
<td></td>
</tr>
<tr>
<td>Interdependence</td>
<td>13 articles describe interdependence with complexity in PSSs, for example:</td>
<td>“Independence arises from interrelationships between different service components, and between different stakeholders during the PSS implementation.”</td>
</tr>
<tr>
<td></td>
<td>Rondini et al. (2017): high level of interaction between business customer and company;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Song &amp; Sakao, 2017): high interdependencies; amount of interactions between components in PSS.</td>
<td></td>
</tr>
<tr>
<td>Variability</td>
<td>While 15 articles mention that changes in customers’ needs increase complexity in PSS organizations, only 2 articles explicitly address complexity emerging from variability, for instance:</td>
<td>“Variability is defined as the number of changes in stakeholders, service components and/or interrelationships during the lifecycle of the PSS.”</td>
</tr>
<tr>
<td></td>
<td>Geng et al. (2012): dynamicity of updating technology;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Braun &amp; Hadwich (2016): changes occurring in service elements and internal relationships.</td>
<td></td>
</tr>
</tbody>
</table>

4.2 The influences of contract structure, contracting process, and service complexity on supplier performance

Focusing on the factors affecting the success of service contracting, Article 2 develops a research model that connects service contracting with service complexity to impact on supplier performance. Article 2
finds that three major contract dimensions and follow-up management practices positively influence buyer-perceived supplier performance. In terms of moderating effects of service complexity, Article 2 finds that service complexity significantly increases the need for designing incentives in the service contract and buyer’s follow-up management towards better supplier performance. Interestingly, service complexity reduces the effects for performance criteria defined in the contract on perceived supplier performance. These findings provide answers to RQ2, explicating how service contracts can be designed to improve supplier performance, and how complexity of services influences contract structure and contracting process on supplier performance. When firms purchase complex services, they should pay more attention on designing incentives in the contract and developing follow-up management to secure good performance from their supplier. Figure 3 summarizes the hypotheses and the findings in Article 2.

Figure 3. Summary of hypotheses and findings in Article 2
4.3 The effects of service performance on sustaining B2B service relationships

Moving from studying the design of contract structure and management of the contracting processing in the Article 2 towards the outcomes of business service contracting, Article 3 finds that all three dimensions of service performance – competence-based, expressive, and collaborative – drive relationship performance that directly increases customer repurchase intention. While three dimensions of service performance positively influence business relationship, the expressive and the collaborative service performance have greater effects. Moreover, Article 3 finds the relationship performance mediates the links between expressive and collaborative service performance with customer repurchase intentions. Interestingly, Article 3 identifies that competence-based service performance does not have significant influences on repurchase intentions in B2B contexts. These findings in Article 3 provide answers to RQ3, explicating the effects of service performance dimensions and business relationship on service contract renewal intentions. The hypotheses and findings from Article III are presented in Figure 4 below.

![Figure 4. Summary of hypotheses and findings in Article 3](image-url)
5 Discussion and conclusions

The objective of this dissertation is to improve the current knowledge of service complexity and its influences on service purchasing. In particular, the aim is to add to the literature of business service purchasing by investigating the effects of service contract design, performance evaluation on the outcomes of a service contract. This dissertation addresses three research questions: 1) What are the dimensions of service complexity? 2) How does service complexity influence service contracting and supplier performance? 3) How do service performance and business relationship performance affect service contract renewal? Article 1 reviews the characteristics of complexity in the PSS context that covers a broad scope of service delivery and the complexity of tangible systems and identifies four dimensions of service complexity. The review provides a comprehensive understanding of complexity manifestations as the background for this dissertation. Also, it adds to the literature by developing the conceptualization of service complexity. Article 2 focuses on the influences of contract structure, contracting processing, and service complexity on the buyer-perceived supplier performance. It finds the crucial role of contract structure in effective service delivery and demonstrates theory’s relevance in designing the B2B service contract, which advances knowledge on the development of contractual governance for improving the supplier performance. Article 3 focuses on the interplay between service performance and business relationship performance to effectively encourage service contract renewal. The study identifies the all three dimensions competence-based, expressive, and collaborative service performance have direct positive effects on business relationship, as well as the importance of the buyer-supplier relationship on the service contract renewal. This advances knowledge on understanding the factors that have impacts on business customers’ service contract renewal.

The theoretical and managerial contributions are elaborated based on these three articles, followed by the consideration of limitations of this dissertation and future research opportunities.
5.1 Theoretical contributions

Previous literature focusing on the purchasing business services has paid much more attention to the pre-contract stages of requirement specification and service supplier selection (Smeltzer & Ogden, 2002; Day & Barksdale, 2003) than to the supplier’s performance in the post-contract stages of the service process. While there is an increasing interest in performance-based contracting and an emerging stream of research covering the topic (e.g. Schepker et al., 2014; Selviaridis & van der Valk, 2019), there is a need to investigate the complexity it involves for the service contract design and the buyer-supplier relationship. By addressing this gap in the current knowledge, this dissertation makes several theoretical contributions to the service contract management and performance evaluation research. The present study took the service complexity perspective to investigate how complexity influences service contracts and supplier performance. Also, the study was motivated by the need to increase the current understanding of how the different dimensions of service performance affect the business relationship and service contract renewal. In the subsequent sections, the four principal contributions of this dissertation are discussed.

Contributions to the conceptualization of service complexity

First, this dissertation establishes a conceptual framework that presents the four dimensions of service complexity in the PSS context. These four dimensions of service complexity are multiplicity, diversity, interdependence, and variability, which are consistent with basic tenets of systems theory (Senge, 2014). This delineation of the essential dimensions of service complexity adds to the existing body on the characteristics of services (Zeithaml et al., 1985; Moeller, 2010), which informs future research on the important determinants of service supplier performance. In the extant literature, the discussion considering service complexity is fragmented and remains a relative immature area (Benedettini & Neely, 2012; Kreye, 2019). By defining and illustrating these four dimensions, this dissertation contributes to advancing knowledge about the constitutive features of complexity associated with
adopter a service strategy. The conceptualization of service complexity consisting of these four dimensions provides a basis for manufacturing companies to understand the detailed characteristics of complexity and analyze the main source of complexity in their PSS context. This observation can help firms to devise effective ways to cope with service complexity while adopting a service strategy.

This conceptualization of service complexity in the PSS context also contributes to understanding the effects of service complexity on purchasing business services. Understanding the ways how complexity affects service performance can be considered essential for the success of the purchasing function because the complexity of services in the PSS context involves a broad scope of factors affecting service delivery and the performance of the service. In the study, a business service is studied in the context of a service system that includes heterogeneous entities interacting with a common objective (Spohrer & Maglio, 2008; Badinelli et al., 2012). The conceptualization based on the systems perspectives can be considered an essential premise to understand the manifestations of the complexity of business services.

**Contributions to the service contract design**

This dissertation contributes to advancing knowledge on performance-enhancing aspects of designing and monitoring the service contract between buyers and their service providers. By developing and applying a research model that investigates the influences of designing a contract structure and managing a contracting process on perceived supplier performance across a wide range of industries and countries, the dissertation finds that three major contract dimensions (definition of responsibilities, performance criteria and incentives) and follow-up management practices positively impact perceived performance.

Although the existing literature emphasizes the importance of contract design for successful B2B service deliveries (Selviaridis & Spring, 2010; Van der Valk & van Iwaarden, 2011; Van der Valk & Wynstra, 2014), very little empirical work has examined the structure of service contracts that
influence the supplier performance. This dissertation is among the first few studies to start incorporating the contract design and follow-up management into the service contracts in studying service delivery and performance. Building upon prior case studies on service delivery and contracting (Robinson & Scott, 2009; Datta & Roy, 2011, 2013) and TCE theory (Williamson, 1985), this dissertation provides statistical results regarding the crucial role of contract structure in effective service delivery. It demonstrates the theory’s relevance in designing the B2B service contract. These results illustrate that service contracting should include a specification of the responsibilities, performance indicators, and incentives in the contract to ensure effective service delivery. This observation also advances knowledge on the development of contractual governance for improving the supplier performance, while a large body of service literature highlights the crucial role of contractual governance in effective service delivery (Enquist et al., 2011; Roehrich & Lewis, 2014; Van der Valk et al., 2016).

Furthermore, this dissertation advances knowledge about monitoring the incomplete service contract through a contracting process to improve supplier performance (Zheng et al., 2008; Roehrich & Lewis, 2010; Selviaridis & Spring, 2010). Essentially, the findings in this dissertation suggest that the buyer’s follow-up management practices in a contracting process are effective ways to respond to unexpected contingencies that may arise during the course of the service delivery. These practices include establishing frequent review meetings between buyers and service providers, revisiting service specifications throughout the contracting period, and revising the contract if necessary, to facilitate adaptations during service delivery. These also contribute to TCE theory by translating what effective contractual governance practices can be for business services.

More importantly, by investigating the moderating role service complexity, this dissertation is the first study to assess how the characteristics of purchased services could influence the importance of contract design on supplier performance, which contributes to the existing literature on contracting in complex B2B service contexts.
The findings in this dissertation indicate that the more complex the service is, the greater the roles of incentives and follow-up management in achieving good supplier performance. The complexity of services increases the difficulty of defining the services, which then increases the risks for buyers to purchase the services. Incentives entailing risk sharing are considered to elicit productive supplier behavior, leading to supplier performance improvement (Maestrini et al., 2018; Selviaridis & van der Valk, 2019). These results provide statistical evidence on the existing finding from the case studies (e.g. Datta & Roy, 2013; Selviaridis & van der Valk, 2019), demonstrating that incentives framing in the contracts could promote supplier performance improvement in terms of purchasing complex services. Moreover, this dissertation finds that service complexity moderates the relationship between the buyer’s follow-up management in the contracting process and perceived supplier performance. Service complexity adds the difficulty in specifying the features of services, which then increases the need to define contingencies. In the contracting process, the buyer’s follow-up management enables the buyers and their suppliers to mitigate problems with timely adjustments due to regular interaction and information exchange, thereby enhancing supplier performance.

The dissertation also finds that service complexity decreases the influence of performance criteria defined in the contract on supplier performance. This finding suggests that the initially specified performance criteria might be inefficient during the contracting process and cannot function as an adequate safeguard mechanism as suggested in TCE (Williamson, 1985). Also, this finding underscores the importance of mutual understanding and alignment of performance objectives and incentives during a contracting process (Selviaridis & Spring, 2018), providing new evidence that service complexity increases the effects of buyer’s follow-up management on the desired service performance.

**Contributions to the service business relationship and continuity**
By considering three dimensions of service performance and relationship performance in B2B contexts, this dissertation contributes to advancing knowledge on comprehensively understanding the factors that impact business customers’ service contract renewal. Previous empirical studies examining B2B relationship performance have often considered service performance an aggregate construct (Arnott et al., 2007; Briggs & Grisaffe, 2010). Based on the alignment discourse drawing upon service quality (Grönroos, 1984; Parasuraman et al., 1985) and S-D logic (Vargo & Lusch, 2004, 2008), this dissertation identifies and separately examines the three dimensions of service performance. The findings suggest that all three dimensions – competence-based, expressive, and collaborative service performance - directly affect business relationships. More importantly, the findings demonstrate that the expressive and collaborative dimensions of service performance contribute more to the business relationships than the competence-based performance. The potential explanation of this observation includes the complexity of the services in the current study as the growing trend of purchasing business services has become more complex in the markets (Selviaridis et al., 2013; Pemer et al., 2018). The complexity of services arises from the diversity of interaction between parties in the service delivery, the uncertainties of the service situation, and the difficulties in evaluating service outcomes (Selviaridis et al., 2013; Braun & Hadwich, 2016; Pemer et al., 2018). These findings are consistent with prior studies that emphasize the value of investing in “soft” services (Eisingerich & Bell, 2008; Deleon & Chatterjee, 2017). Moreover, these findings provide empirical explanation for supplier selection and the continuance rationale of purchasing business services (Lindberg & Nordin, 2008; Gelderman et al., 2015). Their studies have suggested that selecting a service supplier in purchasing complex services should be based on “soft factors” such as supplier’s continuous interaction, flexibility, creativity, and ability to cooperate. These views are in line with the observations concerning expressive and collaborative service performance in this dissertation, highlighting the importance of “soft” criteria into supplier selection criteria to enhance service business relationships.
By establishing a mediating role of business relationship performance, this dissertation demonstrates how a buying company tends to renew the service contract in purchasing business services. The dissertation finds relationship performance mediates the relationship between expressive service performance and customer repurchase intentions and the relationship between collaborative performance and customer repurchase intentions in B2B contexts. These observations underscore that buyer’s decision-making concerning contract renewal directly depends on the relationship with service providers, rather than emanating from the customer’s affective reactions evoked by the service process and the collaboration between the customer and their provider during service exchanges. This observation highlights the interdependence between buyers and service providers. Also, it provides empirical evidence for the prior study by Gadde & Hulthéen (2009) that emphasized the importance of the buyer-supplier relationship on the outcome of outsourcing services.

Interestingly, this dissertation finds that even without considering the mediating effect of relationship performance, competence-based service performance does not significantly influence customer repurchase intentions in B2B contexts. This finding suggests that service outcome is not a determinant for the buyer’s decision to make repeated purchases of business services, which contradicts the prior findings by Brady & Cronin (2001) and Briggs & Grisaffe (2010). A possible explanation may be that customers are sometimes uncertain about or cannot fully articulate their service needs, so they might not be capable of evaluating the service outcomes (e.g. Aarikka-Stenroos & Jaakkola, 2012; Powers et al., 2016). Another possible explanation could be that when customers are highly capable of explicating their service needs in detail, technical specifications for providers are ‘given’ for example in clearly defined calls for tenders. Considering repeat purchasing and sustained relationships, such situation makes the outcome aspect an ‘order qualifier’, and expressive and collaborative aspects an ‘order winner’ (Drew Rosen & Karwan, 1994; Wouters, 2004). Because expressive and collaborative service performance are proven as the dominant determinants for successful buyer-supplier relationships. These performance dimensions
ultimately translate into customer repurchase intentions through the mediating role of relationship performance. Hence, despite the quite mature discussion on service performance in the literature, this study increases understanding about the determinants of service purchasing decisions in B2B context.

Moreover, the data in this dissertation covers a wide range of industries, thereby supplementing the extant studies that have focused on specific industries and phases in buyer decision making (Bolton et al., 2006; Bolton et al., 2008). In addition, this dissertation provides a methodological contribution. This dissertation demonstrates that LinkedIn contact databases can be applied to identify suitable respondents across different countries, which has not yet been shown in the literature. The process of data collection in the dissertation demonstrates that LinkedIn focus groups can be used to build a sample list, suggesting that social scientists should pay more attention to the new databases of business professionals, such as LinkedIn.

5.2 Managerial contributions

This dissertation investigates contract design and service performance in the context of global B2B services. In this section, I discuss the managerial implications of the findings of this dissertation for buying companies and for service providers in purchasing business services.

Managerial implications for buying firms

To address the question of which dimensions or agreements should be designed in the service contracts to enhance service performance, this dissertation provides a better understanding of the factors that affect the success of service contracting. This helps buying organizations to improve the design and management of service contracts to secure good service performance from their provider.

First, the findings concerning the essential contract dimensions and follow-up management practices on buyer-perceived supplier
performance suggest that purchasing managers in the buying organizations should specify the service content, set the necessary performance indicators, define responsibilities and shared risks in the contract, and monitor the contract throughout the entire service delivery process. These practices are beneficial for companies that have just been shifting from buying goods to buying services, since conventional supply contracts are not suitable for purchasing business services. The framework from this dissertation can help these buying firms to build a better understanding of contract design and management of the contracting process for the expected service performance. Service managers should consider and discuss these three contract dimensions and follow-up management practices with the provider to ensure good supplier performance.

Second, the findings underline that service complexity amplifies the importance of incentives and follow-up management designed in the contracts to enhance service deliveries. This implies that when companies purchase complex services, they are supposed to pay more attention to designing incentives in the contract and developing comprehensive review process for contract management. Service managers that purchase complex services (e.g. maintenance services, performance-based services) should carefully develop incentives and review management process with the service providers.

**Managerial implications for service providers**

The findings regarding different dimensions of service performance on relationship performance and customer repurchase intentions suggest that investing particularly in expressive and collaborative service performance is likely to pay off for the service suppliers. Expressive and collaborative service performance are found as the more important determinants in successful buyer-supplier relationships, in comparison with competence-based service performance. These findings suggest that service providers should invest in the training of their service employees on how to deliver services (Pomirleanu et al., 2016), as well as developing ways of interacting with customers to better understand the customers’
needs rather than taking independent actions (Powers et al., 2016). Accordingly, it may be beneficial for service providers to apply some tools focusing on customers’ emotions during service deliveries (Johnston & Kong, 2011; Beltagui & Candi, 2018), as well as the tools improving information flow between involved parities (Barratt, 2004). These practices help service providers to prevent problems with service delivery and adapt to changes during entire service process.

Furthermore, the observation regarding the mediating role of relationship performance demonstrate that business relationship performance is an indispensable element to remain the business continuity. This finding suggests that service providers need to consider how their service offerings contribute to their business relationship with the customers. They also need to establish good relationships with their customers, consisting of building trust, making customer satisfied and show their commitment to the customers. Therefore, service managers need to consider allocating their resources to both service improvement and relationship management. Since the business relationship has the direct effect on business continuity, service managers should develop an effective communication process with their customers to better understand their needs, and then develop and maintain a long-term relationship with them.

5.3 Limitations and further research directions

This dissertation has several limitations that can be addressed in future studies. With regard to Article 1, the study identifies articles addressing service complexity by searching in the title, abstract and keywords in the context of PSS. This approach is useful and efficient for developing the framework of service complexity, but it is not comprehensive in the coverage of purchasing business services literature. Future studies need to extend to look at all servitization and purchasing business services literature to comprehensively address the issue. The results of the literature review show that service complexity remain highly fragmented both thematically and across the publication outlets and academic sub-disciplines, indicating a promising field for researchers to explore further.
The conceptualization of complexity identified by this dissertation provides a basis for future studies to develop the operationalization of complexity in purchasing business services.

Regarding empirical studies in the dissertation, one limitation pertains to the wording and contextual fit of the survey scale items. Whereas the questionnaire was tested through the interviews and the workshop, all testers except one were Finnish. Some purchasing professionals from outside of Finland might have interpreted the behavioral-related questions differently. In further research in a global context, researchers would be encouraged to invite people from different countries to further test the questionnaire. Second, given the nature of the data, a generalization of the findings from this dissertation requires consideration. Whereas the contact list including the 1500 professionals was built by randomly selecting from three LinkedIn focus groups, memberships in these groups were not random. Also, whereas the collected data covered 18 industries from 25 countries, the distribution of industries and countries was not equally represented, which makes generalizability across all industries and countries uncertain. Further studies could well address the limitation of the data by examining the research model in a large and more comprehensive sample including equal distribution of industries and counties, exploring the generalizability of the findings in this dissertation. In this way, a sample with equal distribution of industries and counties could further compare the findings with different industries, which improves the understanding of managing service contracting in different types of organizations. Third, other variables beyond the scope of the investigation may be of importance in B2B services. For instance, in analyzing the effects of contract design and follow-up management on buyer-perceived supplier performance, buyer behavior might be influenced by cultural differences (Ramsay et al., 2013), since services especially complex services are created by intangible qualities and dependent on interaction (Axelsson & Wynstra, 2002; Van der Valk & Rozemeijer, 2009). Cultures may have meaningful relationships with perceived supplier performance. Future studies could add a set of determinants in supplier performance. In addition, variables such as company size and age of relationship could
help to explain other possible effect on intentions of service contract renewal.

Finally, Article 2 studied perceived service performance from contract design perspectives, Article 3 looked at the customer repurchasing intentions from service performance and relationship performance. Extending the studies in service contracting, further research could incorporate both views in one study to deeply understand how contract design influence different dimensions of service performance, which in turn have impacts on business relationships and relationship continuity.


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