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Preface

Dear reader,

The personal interest in this topic growth during a previous educational experience. Before I started this Master Course in Strategic Management, I firstly completed a higher professional education. During the final thesis of that course, I was an intern at an SME active in printing packaging materials. In this internship, I was challenged with the question of how the organisation could increase their customer value. After completing a design thinking research, I came up with a plan that was more or less a product-service innovation. Both the internal and external stakeholders were positive about the strategic plan. However, the organisation was unable to implement the new service strategy. The question arose for me: what did I miss? Further reflective thinking brought me to the insight that certain SMEs can implement product-service innovation; meanwhile, others are still struggling or even not begun thinking about services. Why are certain SMEs able to implement product-service innovations meanwhile others cannot? In this thesis, I searched for answers to fulfil my quest and better understand what I missed during my internship in Sneek. Secondly, I hope this thesis will help other struggling SMEs in implementing product-service innovation. I want to thank dr. ir. J. W. M. Schaffers for supervising me during this thesis. I also would like to thank the companies that participated. Finally, I would like to wish you good luck reading this thesis, and hopefully, it answers some questions your organisation has.

Reading advises: the end product of this thesis consist of two parts: I) The thesis itself including six chapters and crucial tables & figures in the appendix and II) The appendix book 'case-description' including the case-descriptions, interview-transcripts and documents. Chapter 1, 2 and 3 are based upon the research proposal and improved based on the given feedback. Chapter 4 consist of the results and in chapter 5, the discussion takes place. Finally, in chapter 6, a conclusive answer will be given on the formulated research questions.

With kind regards,



Bas Visser

Management Summary

Product-service innovation is a concept where firms innovate by complementing their products with value-added services. Offering these value-added services can be interesting both from a competitive and sustainability perspective. However, manufacturing SMEs are often experiencing a bottleneck in transforming their production-oriented organisation towards a service-orientated organisation. SMEs are hindered by specific barriers that result in an inability to implement product-service innovation. In scientific literature network capabilities of SMEs are described as critical for overcoming these barriers.

Prominent in the development of these network capabilities by SMEs is the interplay between the strategy, structure and environment. In order to acquire a better insight, the following research question was formulated: "how does the interplay between strategy, structure and environment within SMEs affect the development of network capabilities in order to implement product-service innovations?" Through qualitative case study research, eleven cases are constructed based on the combination of in depth-interviews and strategical documents. These eleven SMEs recently implemented product-service innovations. The main theoretical contribution of this thesis is providing new insights based on empirical evidence on how SMEs create an alignment between strategy, structure and environment, resulting in a set of normative principles to guide SMEs in their network capabilities development process when implementing product-service innovation. Secondly, this thesis offers several alignments created by SMEs that challenge the overly simplistic direct effects proposed within the current product-service innovation literature on the development of network capabilities. Besides these theoretical contributions, this thesis also provides recommendations which are summarised in the picture below, showing a strategic roadmap of actions SMEs should execute to better develop and manage network capabilities within their organisation.

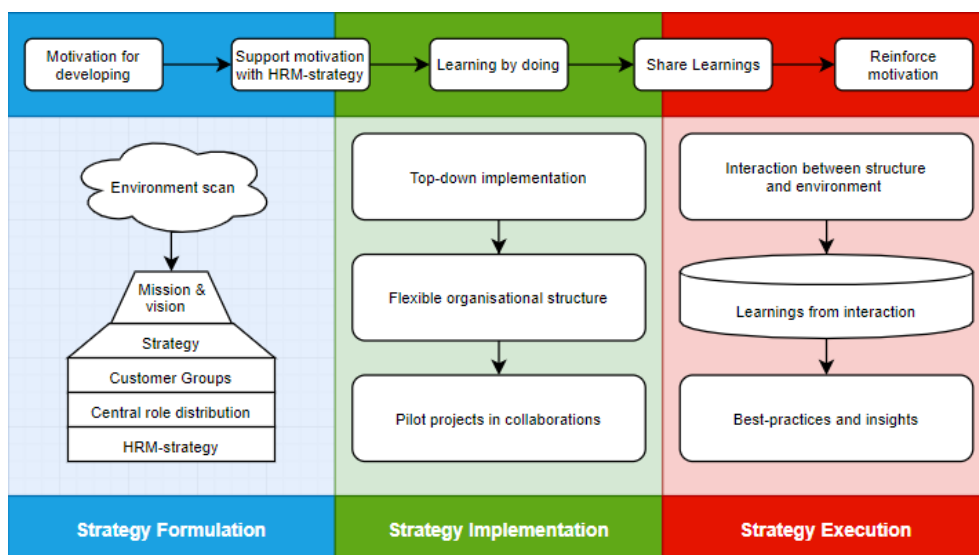


Figure 0.1 Strategic Roadmap

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Chapter 1 Introduction

In this chapter, at first, the topic product-service innovation and the role of network capabilities will be introduced combined with the theoretical and practical relevance of this innovation. Secondly, a concise positioning of the research topic in academic literature will be presented, and the research gap. Hereafter, the research gap will be translated into the research objective of this thesis, followed by the central research question. Finally, a brief introduction of the research approach will be given with the thesis outline.

1.1 Network capabilities and product-service innovation: relevance

Product-service innovation is a concept where firms innovate by complementing their products with value-added services (Kohtamäki et al., 2013). In a report of the consulting group (2017) it was stated that 75% out of the 60 top managers within industrial manufacturers expect that their industry will change profoundly because of the introduction of product-service innovations. A report of ABN AMRO (2016) describes product-service innovation as the future for the manufacturing industry. According to a European Union report (2017), SMEs are currently increasing their efforts to integrate product-service innovation into the business model. This increased integration of value-added services in the business model is driven commercially because it enables organisations to create higher margins (Visnjic et al., 2013). Secondly, successful product-service innovations can create a superior competitive advantage (Breitbach & Maglio, 2016). This competitive advantage is created because product-service innovation provides companies with a way to strengthen their relationship with critical clients, thereby increasing their loyalty, collaboration and knowledge exchange (Ulaga & Reinartz, 2008). Therefore, product-service innovation is generally used as a way to pursue and strengthen the competitive advantage of an organisation (Baines et al., 2017). Several authors propose that product-service innovation goes beyond this view stating that it is also a way to seek a balance between environmental, economic and social concerns (Maxwell et al., 2006; Baines et al., 2007). For example, by shifting from the traditional way of selling products towards an integrated solution, it was assumed that product-service innovation could take the first steps towards a circular economy (De Jesus Pacheco et al., 2019). Because sustainability is described as one of the critical factors for long term business success, this additional element of product-service innovation can make this type of innovation highly relevant (Yang et al., 2018). Together, the above findings state the increasing importance of product-service innovation for manufacturing firms both from a competitive point of view as from a sustainability perspective. Although, the proven relevance of product-service innovation,

several authors address the difficulties and often failing attempts within SMEs to transform their organisation towards a more service orientated organisation and thereby missing out the competitive and sustainable enhancing effect of product-service innovations (Jovanovic et al., 2019; Saul & Gebauer, 2018). De Jesus Pacheco et al. (2019) explain these failing attempts by the financial- and knowledge gap SMEs are experiencing during the integration of product-service innovations. Fliess and Lexutt (2019) propose that cooperating with partners and building networks can offset the lack of competences. The ability to integrate and learn from this external network for overcoming the financial- and knowledge gap is described as network capabilities (Walter, Auer & Ritter, 2006). According to Jovanovic et al. (2019) organisation can foster the development of network capabilities by implementing the right strategy and structure in their environmental context. However, within the current scientific literature, less emphasis is placed on this interplay between strategy, structure and environment in the development of network capabilities within the specific context of an SME when implementing product-service innovations (Kohtamäki et al., 2019). Therefore, this thesis will focus on how SMEs can develop network capabilities by creating a ‘fit’ between strategy, structure and environment in order to overcome the barriers when implementing product-service innovations.

1.2 Theoretical Positioning

In this part of the chapter, the essential knowledge themes will be discussed based on the explained focus of the thesis in the previous section. At the end of this section, based on the theoretical positioning of the essential concepts, the research gap will be described.

1.2.1 Product-Service innovation transformation

According to Kowalkowski et al. (2015) implementing successful service, innovations requires a reconfiguration of the fundamental elements of an organisation, altering the set of activities and their linkages between them (Visnija et al., 2016). Martinez et al. (2017) describe this service transformation as a continuous change where the organisation experiments and learns to create customer-oriented services. Based on this notion of gradual change, several authors have developed evolutionary models where organisations evolve towards providing more sophisticated product-service innovations (Coreynen et al., 2017; Kowalkowski et al., 2015). However, Brax and Visintin (2017) note that the service transformation process of SMEs does not follow these evolutionary models and that it differs from larger organisations in the sense that for an SME ‘any way goes’. Therefore, it is unclear how SMEs overcome barriers they face providing more complex product-service solutions (Brax & Visintin, 2017). In addition to this ambiguity within SMEs, Kohtamäki et al. (2019) propose that there does not exist a ‘one-size-

fits-all' for product-service innovation. Instead, organisations should find the appropriate alignment between strategy, structure and environment.

1.2.2 Barriers for product-Service innovation within SMEs

In the report from the European Union (2018) on product-service innovation, several specific barriers for SMEs are described: skills of current staff, inability to recruit the right people, market and product regulation, access to financial resources, availability of partners, and uncertainty of demand from clients. More generally, De Jesus Pacheco et al. (2019) states two types of gaps SMEs need to overcome when implementing product-service innovations. Firstly, SMEs consist of a financial gap, where they do not have enough financial resources to create and sustain the development towards a service-orientated organisation. Secondly, SMEs consist of a knowledge gap where they do not have the right capabilities and knowhow to provide their customers with the right services. De Jesus Pacheco et al. (2019) states that SMEs consisting of the capability to foster engagement in their networks and the ability to learn from their environment can overcome these specific barriers. More specific, Walter et al. (2006) describes this capability of creating engagement with the network and learning from the external environment as network capabilities.

1.2.3 The importance of aligning strategy, structure and environment

The success of a product-service innovation depends on the interplay between strategy, structure and environment (Kohtamäki et al., 2019). According to the configuration theory, the effectiveness of a strategy depends on the 'fit' (or alignment) with the organisational context (Venkatraman, 1989). However, finding and creating the right 'fit' is often very challenging for SMEs (Kohtamäki et al., 2019). Where large organisations can more easily obtain and internalise competencies and resources to create and establish the right 'fit', SMEs are found vulnerable because of their general lack of resources available and lack of internal competencies (De Jesus Pacheco et al., 2019; Coreynen et al., 2017).

1.2.4 The role of network capabilities in overcoming transformation barriers

Network capabilities are the ability to manage, integrate, and learn from customer relationships (Walter et al., 2006). Several authors note these network capabilities as the critical capability because it enables value creation in service interactions (Nam & Lee, 2010; Walter et al., 2006; Spring & Araujo, 2014). Secondly, Fliess and Lexutt (2019) state that cooperating with partners and building networks can offset the lack of financial resources and knowledge. Therefore, network capabilities consist of a double role where it firstly enables value creation in the service

interaction. Secondly, it helps to overcome specific barriers that SMEs face. As described earlier, an organisation can foster the development of network capabilities by implementing the right strategy and structure in its environmental context (Kohtamäki et al., 2019). However, in current literature it is still unknown how SMEs can create the right alignment, considering their specific limitations, for the development of these network capabilities in order to overcome the barriers they are facing (De Jesus Pacheco et al., 2019).

1.2.5 Research gap

Based on the above notions, several authors propose that further research should focus itself on how SMEs can develop network capabilities by creating a ‘fit’ between strategy, structure and environment in order to overcome the specific barriers when implementing product-service innovations (Kohtamäki et al., 2019; De Jesus Pacheco et al., 2019). By analysing successful cases from a configuration perspective, this research tried to gather empirical evidence instead of the numerous conceptual research papers in the literature to-date. These insights are needed to get an improved understanding of how SMEs develop their network capabilities. Empirical evidence of successful SMEs can lead to managerial insights to avoid further failing attempts of SMEs when adopting product-service innovations. Following this unique approach of combining a configuration perspective and the gathering of empirical evidence, can lead to new theoretical insights that can challenge and elaborate on the current literature.

1.3 Research Objectives and Research Questions

Based on the above research gap, this research will focus itself on the interplay between strategy, structure and environment of SMEs for the development of network capabilities in order to implement product-service innovation. The theoretical goal of this thesis is providing evidence-based insights on how SMEs create a ‘fit’ between strategy, structure and environment to develop network capabilities for the successful implementation of product-service innovations. Based on this description of successful product-service organisations managerial applications are suggested to help SMEs in their product-service transformation. Therefore, the practical objective of this research is to develop managerial implications that can guide SMEs on how to create alignment for the development of network capabilities that can help overcome the specific barriers SMEs are facing when implementing product-service innovation. Thus, leading to the following research question: “how does the interplay between strategy, structure and environment within SMEs affect the development of network capabilities in order to implement product-service innovations?” This central question can be structured into several sub-questions that are going to be answered in this thesis:

- 1) How do network capabilities help overcome the product-service innovation barriers of SMEs?
- 2) How does the implemented strategy of an SME influence the development of network capabilities?
- 3) How does the organisational structure of an SME influence the development of network capabilities?
- 4) How does the environment of an SME influence the development of network capabilities?
- 5) How do SMEs create an alignment between strategy, structure and environment in order to develop network capabilities?

The above sub-question will be further explained in chapter 2 of this research, where the aim is to describe and explain the existence and need for each sub-question related to a knowledge gap within the literature.

1.4 Research Approach

In order to answer the central question, insight is gathered within successful SMEs on their made and executed strategic decisions, strategic actions and environmental aspects when developing network capabilities. To gather the required data, this thesis dived deeper into these SMEs to understand how these organisations aligned their approach for the successful development of network capabilities when implementing product-service innovations. Therefore, a qualitative case study is executed consisting of eleven cases. By combining and comparing these cases, this thesis aimed to discover similarities and differences between these cases that formed the foundation for managerial implications on how SMEs can develop network capabilities successfully.

1.5 Thesis outline

In chapter 2 of this thesis, a literature review will take place to define and explain the essential theoretical concepts and their research gaps. In chapter 3, the methodology will be outlined and explained why specific techniques are being used to enhance research validity and reliability. In chapter 4, the general findings of the data collection will be presented. In chapter 5, these findings will be set in a broader theoretical discussion. After that, thesis findings are discussed in their broader theoretical context combined with managerial implications and further research questions as also the limitations of the executed research. In chapter 6, a conclusive answer will be given on the formulated sub-research questions and the formulated central research question. Finally, these findings are translated into a new conceptual model.

Chapter 2 Theoretical Background

In this chapter, theoretical concepts will be critically discussed to shape a theoretical framework in order to define a research gap regarding the research questions. This part will provide an outline of the relevant theories and perspectives concerning the research question described in chapter 1. The essential concepts are based on the central research question and described sub-questions. This chapter aims to elaborate on the essential concepts discussed in chapter 1. Secondly, this chapter tries to explain the motivation and focus of each sub-question for answering a specific knowledge gap in the current literature.

2.1 Product-Service Innovation

The label 'servitization' was first addressed by Vandermerwe and Rada (1988) to define the tendency of manufacturing firms to offer fuller market packages also described as 'bundles' of customer-focused combinations of products, services, self-support and knowledge (Visnjic et al., 2013). This innovation by services tends to enrich the product marketing strategy and customer satisfaction, making product-service innovation an opportunity for organisations to distinguish themselves from their competitors (Neely, 2008). A classic example from practice addressed in several research papers is the transition within Rolls-Royce from selling engines towards performance-based contracts where customers pay in the form of price per kWh (Visnjic et al., 2016; Kohtamäki et al., 2013; Martinez et al., 2017). Product-service innovation in literature is commonly discussed on several levels of intensity. To understand the concept product-service innovation, it is necessary to understand the different degrees of service innovation as discussed by several authors (Tukker, 2004; Beuren et al., 2013; Parida et al., 2014). The degree of product-service innovation determines the complexity and needed skills for an organisation to implement the product-service innovation (Brax & Visintin, 2017).

2.1.1 Degrees of Product-service innovation

Tukker (2004) is the most cited paper to represent the different degrees of product-service innovations (Beuren et al., 2013). In this paper Tukker (2004) describes three perspectives: I) Product-orientated (i.e. product supported services), II) Use-orientated (i.e. no shift of ownership) and III) Results-orientated (i.e. no pre-determined product). However, Parida et al. (2014) states that the categories described by Tukker (2004) are highly generalised. Therefore Parida et al. (2014) proposes a different categorisation of perspectives: I) Add-on customer service (i.e. product dominant services), II) Maintenance and product support services (i.e. product maintenance services), III) R&D-oriented services (i.e. product improvement services)

and IV) Functional and operational services (i.e. outsourcing service). In comparison with Tukker (2004) this more differentiated categories still serve as a continuum from product-driven towards services-driven solutions. However, the categorisation of Parida et al. (2014) provides further distinguish between categories based on empirical research of product-service business models. Secondly, Parida et al. (2014) note the interdependence of the degrees of product-service innovation in stating that a higher degree of product-service innovation needs to be supported by a lower degree of product-service innovation. Also, Kindström, Kowa and Kowalkowski (2014) propose further distinction on six perspectives based on two dimensions. The first dimension addresses the service focus, where it can be either on the product or customer process. The second dimension is the revenue model that distinguishes between input-based, output-based on availability and output based on performance. These two dimensions extract six typologies of service offerings that show high similarity with the categories of Tukker (2004) and the categories of Parida et al. (2014), but it adds further discrimination between categories. Lastly, a conducted meta-analysis of 154 articles resulted in eight different degrees of product-service innovation (Brax & Visintin, 2017). The meta-analyse separated categories on four elements: I) Structural coverage of the product-service system life cycle, II) who responsible for the stage, III) Ownership and IV) The payment model (input, output or outcome-based). The model created accommodates the pre-existing models in one model that presents product-service solutions that are product-dominant towards solutions that are service-dominant (Brax & Visintin, 2017) The meta-analysis supports the assumption of hierarchy stepwise complexity of product-service innovations and their impact on the organisation and its supply chain. This stepwise hierarchy complexity is of importance because of the moderation relationship between degrees of product-service innovation and the importance of network capabilities as will be later described in chapter 2.3.4 (Kohtamäki et al., 2013).

To sum up, the findings of the different degrees of product-service innovation a table is constructed in appendix 1. In essence, different categorisations are quite similar, and they all show, although with less or more steps, the continuum between product-dominant and service-dominant solutions. Secondly, it presents the interdependence between categories, where lower levels support higher-level services. Because several authors note that only a high degree of product-service innovation creates more significant value potential and a higher level of services rest on more integrated capabilities, which are especially harder for SMEs to obtain, this research will focus itself on higher degrees of service innovation where solutions are

service-dominant. This higher-order product-service innovation focus is needed to get a better insight into the role of network capabilities when implementing product-service innovations.

2.2 Description of Product-service innovation transformation

“Servitization of manufacturing is conceptualised as a change process whereby a manufacturing company deliberately or in an emergent fashion introduces service elements in its business model“ (Brax & Visintin, 2017, p.18). Alternatively, in other words, the transformation of the organisation its business model from product-orientated towards service-orientated. According to Kowalkowski et al. (2015) organisation change in this transformation includes: I) From product-orientated towards process-orientated services, II) From standardised products towards customised services and III) From transactional towards relation services. When firms can achieve change on these three elements, they are regarded as offering service solutions rather than providing some essential services that are product dominant (Kowalkowski et al., 2015). The impact and challenge are strongly influenced by the complexity of product-service innovation (Martinez et al., 2017). More sophisticated services require an integrative organisational approach, involving several stakeholders (Visnjic & Val Looy, 2013). This system-wide change demands a new mindset driven by cognitive reframing that pervades the entire firm, its network and ecosystem in which it operates (Visnjic & Val Looy, 2013). The notion for reframing cognitive frames is early addressed in the development of product-service innovation as the ‘Service Paradox’ (Brax, 2005; Gebauer et al., 2005). This paradox indicates that a service transformation exists of various challenges and pitfalls, which can lead to investments not earning the expected returns (Brax, 2005; Gebauer et al., 2005). A reason for the underperformance is the absence of a service-culture (Kowalkowski et al., 2017). This absence results in a cognitive phenomenon limiting the managerial motivation to continue fully with the service transformation, which leads to a self-fulfilling result of underperformance (Gebauer et al., 2005). The presence of this ‘Service Paradox’ is related to the complexity of the product-service innovation that is tried to achieve, because the complexity determines the needed investments and capabilities for the transformation (Kowalkowski et al., 2017). The creation of complex service solutions is often linked as a process of gradual change because this transformation requires increasingly pro-active, flexible, customised and long-term relationships with customers and partners in order to reduce the risk of investment and improve the development of capabilities (Matthyssens & Vandenbempt, 2010). Based on this notion of the preference for gradual change, Martinez et al. (2017) compared from a broad theoretical perspective the two theories of change that are most relevant to product-service transformation.

2.2.1 Service transformation as a continuous change process

The first theory originated in the research of Tushman and Anderson (1986) states the punctuated equilibrium, which assumes that long periods of small change are interrupted by a short period of radical change. The second theory that stems from the research of Brown and Eisenhart (1997) states the continuous change, where organisations operate with the ability to engage in rapid and relentless organisational change. Based on their case study of service innovation journeys Martinez et al. (2017) concluded that service innovation is often a more continuous character because in order to provide the correct services the organisation undergoes a process of experimenting and learning. The showed a continuous process that was neither logical nor structured (Martinez et al., 2017). The researchers found a back-and-forward process between steps of the transformation where an organisation evolves towards a service organisation. In the first three years, the organisation adopted basic towards intermediate product-service solutions. In the following years, organisations followed two concurrent streams of service developments: the continuous evolution of the basic and intermediate service solutions and the emerge of complex services (Martinez et al., 2017). Based on this evolutionary approach of service transformation, several authors proposed pathways where companies evolve towards more complex product-service innovations (Coreynen et al., 2017; Kowalkowski et al., 2015). However, according to Brax and Visintin (2017), service transformation within SMEs does not follow a transition line. Instead, it is rather a process where ‘any-way-goes’ and therefore, it is unclear which specific steps SMEs undertake in their service transformation. Secondly, several authors propose that SMEs are hindered by specific barriers in their servitization process making them unable to transform their organisation towards product-service solutions (De Jesus Pacheco et al., 2019; EU, 2018).

2.2.2 Barriers for SMEs in Service transformation

According to the European Union (EU) report (2018), SMEs are hindered in their service transformation because compared to larger organisations, these SMEs are unable to utilise resources and develop the internal competences. In the EU report (2018) several specific barriers are mentioned that hinder SMEs: the skills of current staff, inability to recruit the right people, market and product regulation, access to financial resources, availability of partners, and uncertainty of demand from clients. More broadly, De Jesus Pacheco et al. (2019) describes two categories of barriers for product-service innovation within SMEs. First, they describe the financial gap where the SME consist of insufficient financial resources to create and sustain the development towards a service-orientated organisation. This absence of slack resources creates

the inability for these SMEs to transform because the continuous investments combined with often longer return on investment increase the likelihood that an SME gets trapped in the 'service paradox' as mentioned earlier (Gebauer et al., 2005; Fang et al., 2008). The second barrier is the knowledge gap where the SME does not consist of the required knowhow in order to develop and transform the organisation towards service solutions (De Jesus Pacheco et al., 2019). Fliess and Lexutt (2019) state that SMEs can overcome these barriers by cooperating with partners and building networks that can offset the lack of financial resources and knowledge. This finding stresses the importance of possessing network capabilities from a different perspective than mentioned earlier (chapter 2.1.1). Besides that network capabilities offers the opportunity to learn from the customer relationships (De Jesus Pacheco et al., 2019), these network capabilities are also essential to create partnerships with companies that have service-related capabilities that contribute to product-service innovation success by overcoming the barriers SMEs face, as will be further explained in chapter 2.3.4 (Fliess & Lexutt, 2019).

To conclude, the service transformation process in the literature is treated as a process where organisations gradually develop from a product-orientated state towards a service-orientated state. In this process, organisations are facing several challenges, and the right strategic design must be offered that can complement and leverage the several levels of product-service innovation. SMEs are hindered in this service transformation because of their insufficient financial resources and the absence of specific knowledge. Partnerships can help overcome these specific barriers, thereby stressing the need within SMEs for developing network capabilities as will be explained in the next section.

2.3 Defining Network capabilities and their role in product-service innovations

The foundation of network capabilities is based on the resource-based view proposed by Barney (1976), which centres that an organisation exists of bundles of resources that form the basis of the competitive advantage of an organisation. Teece, Pisano and Shuen (1997) extended this view with the dynamic capabilities approach to address the changes in the environment of an organisation. Teece et al. (1997) defined dynamic capabilities as the ability of an organisation to address rapidly changing environments. In a further research of Teece (2007) on dynamic capabilities, three categories were distinguished: I) Sensing, the capacity to sense and shape opportunities; II) Seize, the capacity to seize those opportunities; and III) Reconfigure, the capacity to remain competitive by reconfiguring intangible and tangible assets of the organisation. Dynamic capabilities are seen as the critical ability of an organisation to innovate and thereby critical for the implantation of product-service innovations (Teece, 2007; Parida et

al., 2014). Dynamic capabilities include the ability of organisations to leverage external networks and ecosystems to adapt to change in the business environment (Eisenhardt & Martin, 2000). Ritter, Wilkinson and Johnston (2004) found out that this ability to leverage from external networks was especially critical for creating product-service innovations. Walter et al. (2006) elaborated further on the need for collaborating with external partners where they defined this capability more specific as network capabilities. Network capabilities are the ability of an organisation to manage, integrate, and learn from customer relationships (Walter et al., 2006). Several authors support the importance of network capabilities as the critical one because it enables value creation in service interactions (Nam & Lee, 2010; Spring & Araujo, 2014). Kohtamäki et al. (2013) defined three dimensions of inter-related network capabilities: I) Network management capability: the skills to coordinate between organisations; II) Network Integration capability: the relational skills in bonding and linking organisations; and III) Network learning capability: the skill to learn from these processes. Organisations could improve their product-service value creation by investing in these network capabilities as described further below (Kohtamäk et al., 2013).

2.3.1 Network Management Capability

The network management capability is the ability of an organisation to manage the external network by coordinating interactions between organisations (Kohtamäk et al., 2013). Schreiner, Kale and Corsten (2009) researched this ability in the context of alliance management, where they defined two essential activities in order to manage the alliance. Firstly, it is important to coordinate, which implies the knowledge and skills to understand the interdependence between entities and the ability to manage them (Schreiner et al., 2009). Organisations with strong coordination skills can dynamically review and adapt as the relationship evolves and thereby understand how joint activities need to be managed (Schreiner et al., 2009). The second important aspect Schreiner et al. (2009) describe is communication, which refers to the formal as well informal sharing of meaningful information between firms. Through this information sharing organisations can understand the needs of other organisations in order to adapt (Schreiner et al., 2009). Parida et al. (2014) described in their research in the context of service innovation the need for network management where they defined three critical aspects: I) Involve new and existing partners, II) Develop partner understanding and III) Align partner incentives. Parida et al. (2014) stress the importance of the network management capability that by involving existing value chain partners and actively explore the involvement of new partners these partnerships can decrease the lack of internal competencies (knowledge gap) and allow organisations to share risks and responsibilities when introducing product-service innovation.

Lütjen et al. (2019) from an ecosystem perspective within service innovation saw this network management capability as part of the ‘sensing’ category of Teece (2007). Lütjen et al. (2019) defined several key activities within network management: creating an open mindset for a diverse set of partners, evaluating opportunities with different partners, screening distant markets and technologies and gathering information of institutions, regulators and influencers. To summary, network management capability consists of two general aspects where coordination is needed to involve existing and new partners. Secondly, communication is needed to gather information to understand partners goals and evaluate opportunities. The network management capability can be seen as the ‘sensing’ of opportunities for the start and exploration for further collaboration.

2.3.2 Network Integration Capability

The network integration capability is the relational skills required for bonding and linking organisations (Kohtamäk et al., 2013). Although the linking of organisations is quite similar to the alignment of organisations discussed in the network management ability, however, this integration capability is more aimed at the relational part (Schreiner et al., 2009). The bonding of organisations involves extensive and repeated contacts between concerned entities, and it is seen as the capability of an organisation to develop strong bonds and create a mutual trust (Schreiner et al., 2009). According to Schreiner et al. (2009), this requires an organisation to provide reliable and timely responses, being proactive, spend time to connect and attending seriously on partners views and ideas. However, these requirements can still be seen as quite abstract (Parida et al., 2014). Therefore, Parida et al. (2014) defined several elements considering network integration capabilities with an emphasis on the relational skills: linking disconnected development processes, adopt a value-based pricing strategy, increase focus on flexibility and customisation and establish relationship management unit. From an ecosystem perspective, Lütjen et al. (2019) define elements that according to their estimation are part of the ‘seizing’ category of Teece (2007): integration of value-adding and non-value-adding partners in the decision-making process, pursuing a keystone position in the ecosystem, controlling the bottleneck of the ecosystem and management competence for open innovation. Managing this open innovation requires the willingness to take care of the relationships with other ecosystem actors and manage these collaborations (Lütjen et al., 2019). To summary, the network integration capability focuses itself on the relationship aspects of network capabilities and the ability to ‘seize’ the set opportunities that were ‘sensed’ with an adequate network management capability.

2.3.3 Network Learning Capability

The network learning capability is the ability of organisations to continually learn of the interaction with the external network (Kohtamäk et al., 2013). Kale and Singh (2007) found out the importance of organisational learning processes in order to be successful in a strategic alliance. Within this research Kale and Singh (2007) defined four activities: I) Codification the creation of guidelines, checklist, or manuals to assist action in future alliance situations; II) Sharing exchanging and dismantling individual or organisational knowledge that is both tacit and codified through interpersonal interactions; III) Internalization individual's absorption of alliance management know-how, and IV) Articulation the efforts of accessing and externalising individual tacit knowledge into explicit knowledge. From an ecosystem perspective, Lütjen et al. (2019) categorised these learning process as the 'reconfigure' category of Teece (2007). Lütjen et al. (2019) defined several activities to enable organisation learning process when striving for service innovation: I) Organisational ability to continually adjust the partners; II) Realignment of knowledge-transfer to adopt cross-industry innovation; III) Establishing a useful governance structure for ecosystem learning and IV) Maintaining relationships to value-adding and non-value-adding partners as the ability to manage these specific service-related relationships consistently. Lütjen et al. (2019) propose that dedicated relational organisational units allows continuous learning concerning service ecosystem capabilities but are at the same time able to find solutions with inconsistencies within the current operations. To summary, the network learning capability focuses itself on the learning process in creating service solutions and especially improve these solutions during the offering of product-service innovation. It is the ability of an organisation to 'reconfigure' their solution based on new developments in their environment.

2.3.4 The role of network capabilities in Product-service innovation

According to several authors, network capabilities are the essential capabilities when providing service solutions because it enables value creation in the service interactions (Nam & Lee, 2010; Walter et al., 2006; Spring & Araujo, 2014). These service interactions between manufacture and customer are crucial because often value within product-service solutions is co-created (Lockett, Johnson, Evans, & Bastl, 2011). An organisation that consists of sufficient network capabilities can, therefore, extract more value from these service interactions to improve their product-service solutions. Additionally, Kohtamäki et al. (2013) describes the moderating relationship between the degree of product-service innovations and the need for network capabilities. The higher the degree of service innovation, as described in 2.1, the further these offerings rely on integrated solutions creating an intensification of service interactions between

organisations thereby increasing the demand for network capabilities (Kohtamäki et al., 2013). Secondly, Fliess and Lexutt (2019) propose that cooperating with partners and building networks can offset lack of competences SMEs are facing during their service transformation. Therefore, these network capabilities offer the possibility for SMEs to overcome their specific barriers in service transformation by requiring and developing network capabilities in their organisation. To summary, network capabilities consist of a double function. Firstly, it enables the organisation to extract the value of the service interaction needed for providing higher degrees of product-service innovation and secondly, it provides the ability to cooperate and build a network of partners that can be used to overcome specific barriers SMEs face in the product-service transformation process. However, in the current literature, it is not clear which specific network capabilities within an SME context can help overcome the product-service transition barriers and how then these network capabilities help overcome SME related product-service transformation barriers. Thereby leading to the following sub-question: how do network capabilities help overcome the product-service transformation barriers SMEs face?

To conclude, a table is constructed in appendix 2 to give an overview of the dimensions within network capabilities. However, there is quite some overlap within those dimensions. Secondly, the proposed distinction between these dimensions, as described above, is not that clear in the literature. Kandemir, Attila, and Cavusgil (2006) note that network capabilities as a combination of dimensions provide the benefits of network capabilities and not one single dimension on its own. Therefore, this thesis will not treat the dimensions of network capabilities as strict, but instead, find answers on how to develop the combination of dimensions within network capabilities. Finally, most of the described literature above is aimed at what to achieve, but less specific on how this capability can be created. Therefore, the next section will further elaborate on how organisations by creating an alignment between strategy, structure and environment can develop network capabilities for overcoming the barriers during a service transformation.

2.4 Strategy, structure and environment in developing network capabilities

According to the resource-based view (RBV), an organisation has access to bundles of resources that form the basis for a competitive advantage (Barney, 1986). This view, extended by Teece, Pisano and Shuen (1997) provided the dynamic capability approach which expresses the ability of firms to develop integrate, build and reconfigure internal and external competences to address rapidly changing environments (Teece et al., 1997). Following this approach, organisations can develop the required network capabilities by executing the right

strategy (Kohtamäki et al., 2013). However, in comparison to larger organisations, these SMEs are often restricted by their resources and secondly less resistant to environmental changes which can hamper their capability development (De Jesus Pacheco et al., 2019). Therefore, based on Porter's (1980) view, Bierly and Daly (2007) state that specific strategies are more effective in certain environments. More specifically, it is understood that aligning the organisational structure, type of strategy based on the environmental conditions will increase the organisation capability development (Evanschitzky et al., 2011). This notion for alignment originates from the configuration theory, which shows that the appropriateness of a strategy depends on its 'fit' with the organisational context (Venkatraman, 1989). In the research of Kohtamäki et al. (2019) on product-service innovation from a configurational approach, the framework of strategy-structure-environment is used as domains to assess the alignment of the service strategy. This thesis will follow this framework of the three domains strategy, structure and environment focusing on how the three domains can develop network capabilities as will be described further below.

2.4.1 The role of strategy in the development of network capabilities

The business strategy can be described as a company's behaviour in the market, including policies, plans and procedures to attain the set objectives (Ritter & Gemünden, 2004). The development of network capabilities requires a clearly formulated strategy consisting of the importance of competence development and making sure that the contributing components are in order (Ritter & Gemünden, 2004). Ritter and Gemünden (2004) found out that a business strategy that is more technological related enhances the network capabilities of an organisation because these organisations consist of a higher degree of technological interweavement. Therefore, these organisations need to facilitate the flow of information across organisational borders. Additionally, Ritter and Gemünden (2004) noted that to support network capabilities development, a strategy should consist of network-oriented human resource management. More specific Fliess and Lexutt (2019) state that this network related human resource management should consist of improving service-related skills by focusing on these capabilities when recruiting personal and providing them with service-related training, incentives and rewards-systems, these organisations are found to be more successful in developing the right capabilities. To conclude, the strategy of an organisation can play an essential role in the development of network capabilities by defining a clear strategy and enabling the development of network capabilities by training and requiring of employees. However, these findings are not based on the interplay with structure and environment (Kohtamäki et al., 2019). Therefore,

research is needed, and especially within an SME context, on how the implemented SME strategy concerning structure and environment can enable network capabilities development. Thereby leading to the following sub-question: how does the implemented strategy of an organisation influence the development of network capabilities?

2.4.2 The role of structure in the development of network capabilities

The structure of an organisation is related to issues about the decisions concerning a chosen strategy (Kohtamäki et al., 2019). Decisions in regard organisational structure consist of, for example, the organisational form, organisational processes, routines, practices, activities and resources (Danneels, 2010). In the servitization context, the structure is related to how services are offered by the supplier (Josephson et al., 2016). According to Ritter and Gemünden (2004), integrative communication and open culture are required for the development of network capabilities, because they give the employees the flexibility and so opportunity to learn from their environment. Secondly, the structure decision is also about the relationships with external partners. Therefore, the structure of an organisation plays an essential role in both the development and execution of network capabilities (Kohtamäki et al., 2013). The transition towards service solutions and related development of capabilities requires an adequate investment of resources (Fliess & Lexutt, 2019). Therefore, organisations should allocate sufficient resources for the development of these capabilities (Fliess & Lexutt, 2019). Related to this need for resources Fang et al., 2008 found out that organisation consisting of slack-resources were more successful in developing service-related capabilities because there were able to maintain the needed investments for the gradual development of these capabilities (Fang et al., 2008). To conclude, the structure of an organisation plays an essential role in the development of network possibilities because it sets the boundaries where under the development of network capabilities takes place. It enables or disables the possibilities for employees to learn and develop the needed skills in order to fulfil the set strategy of an organisation. However, besides the notion for creating an open culture, enough resources and integrative communication further research is needed to understand better how this structure can enable the development of network capabilities concerning the strategy of an organisation and its environment. Therefore, further research is needed to understand how successful SMEs have enabled the development of network capabilities by creating an organisational structure fitting their context. Thereby leading to the following sub-question: how does the organisational structure of an organisation influence the development of network capabilities?

2.4.4 The role of environment in the development of network capabilities

The environment of an organisation provides the context in which strategic and structure decisions are made (Kohtamäki et al., 2019). The strategy research provided plenty of evidence that these external factors affect the performance of an organisation (Porter, 1980). Therefore, the business environment is seen as crucial for creating the optimal configuration for network capabilities development (Kohtamäki & Helo, 2015). Flies and Luxett (2019) defined several relevant factors. Firstly, the competitive environment has an impact on the success of the development of service-related capabilities (Flies & Luxett, 2019). The market size and its complexity positively moderate the success of service-related capabilities development (Flies & Luxett, 2019). Secondly, technological innovations like big-data or remote monitoring can enable the development of service-related capabilities (Flies & Luxett, 2019). A third factor is a legislation that supports the development of servitization-solutions and thereby increasing the viability of these business models (Flies & Luxett, 2019). To conclude, the environment plays a vital role in moderating the success of strategic and structure decision an organisation makes. Several factors can positively moderate the successful development of service-related capabilities. However, Kohtamäki et al. (2019), in their literature review, found out that only a few (7 out of the 52 articles) of the service-related papers included environmental factors. Therefore, more research is needed on which environmental factors both negatively and positively affect the development of network capabilities. Thereby leading to the following sub-question: how does the environment of an organisation influence the development of network capabilities?

2.4.3 The role of alignment in the development of network capabilities

This notion for alignment originates from the configuration theory, which shows that the appropriateness of a strategy depends on its 'fit' with the organisational context (Venkatraman, 1989). To implement this configuration logic within product-service innovation, different domains and their interplay have to be understood to determine the success of servitization strategies (Kohtamäki et al., 2019). Considering the specific limitations of SMEs, this configurational approach seems the appropriate lens to understand better the role of strategy in the development of network capabilities to implement product-service innovation because it takes into account the specific context SMEs are operating in and the conditions for success. Even though this view adds complexity because it denies the existence of a 'one-size-fits-all' approach, improved insights from a configurational perspective can help organisations find the right configuration for product-service innovation (Kohtamäki et al., 2019). Although this is a promising approach to better understand decision and actions made by the organisation, only a

limited amount of research papers adopted this view in the specific context of network capabilities development. Let alone the development within an SME to overcome their specific barriers towards product-service solutions as this thesis is trying to examine. Therefore, research is needed to understand better how SMEs create the optimal configuration for network capabilities development consisting of the interplay between strategy, structure and environment. Thereby leading to the following sub-question: how do SMEs create an alignment between strategy, structure and environment in order to develop network capabilities?

2.5 Conceptual Model

In the conclusion of this chapter, the conceptual model (figure 2.5) is constructed. This conceptual model explains the essential findings out of the current literature and their connections. In the conceptual model, the interplay between strategy, structure and environment is depicted for the development of network capabilities in order to overcome the specific barriers when implementing product-service innovations. Within those concepts, the essential elements are described. However, the goal of this thesis is to find out additional elements or practices to extend the current insights within the specific SME context and secondly control if the items of the literature also are of importance in the specific SME context. Therefore, question marks are placed in the strategy, structure and environment concepts which should be answered by the outcome of the thesis. Secondly, an answer should be given on how SMEs create an alignment in order to develop network capabilities which is not evident in the current literature. In the current conceptual model, network capabilities are treated as a way to overcome SME barriers. Thereby, stating that a higher level of network capabilities results in a lesser effect of barriers preventing the adoption of product-service innovations within SMEs.

To conclude, this current conceptual model should be extended by the findings of the thesis to broaden our insights on network capabilities development by creating an alignment between strategy, structure and environment. By elaborating on these domains, this thesis helps to generate managerial implications on the aspect of strategic decisions on the set strategy and structure in reaction the environment for network capabilities development in order to achieve higher degrees of product-service innovation successfully. Therefore, to gather these insights, the central question of these thesis remains: “How does the interplay between strategy, structure and environment within SMEs affect the development of network capabilities in order to implement product-service innovation?”

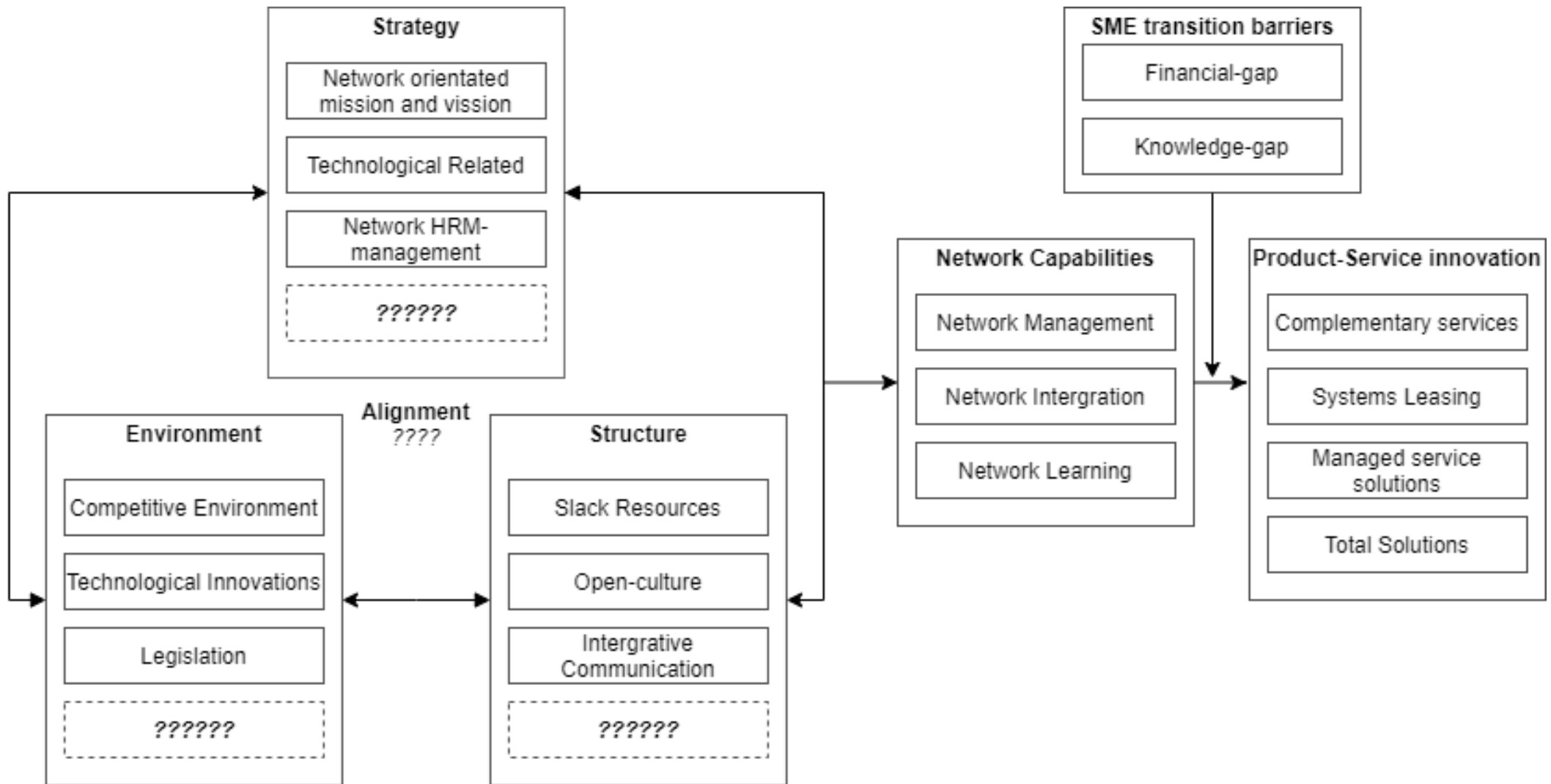


Figure 2.5 Conceptual model based on the literature review

Chapter 3 Methodology

In this chapter, the methodology will be explained and how the research is executed. Firstly, an overview will be given of the overall research approach and the executed research activities. Secondly, the used research design will be described and explained why this design was the most appropriated method to use. Thirdly, the data-collection, data-sample, data-analysis procedure will be described and motivated. Fourthly, the actions to ensure research quality will be discussed. Finally, it will be explained how research ethics are taken into account.

3.1 Introduction of the research approach

To give an overview of the overall research approach, a table is constructed, which can be found in appendix 3. In order to answer the research question, it was crucial to get insights in the strategic decisions and actions made by SMEs in relation with their context for developing network capabilities to overcome the barriers when implementing product-service organisation. By examination of strategic decisions and actions within SMEs that have completed their service transformation, insights are gathered on how these organisations have overcome their specific barriers. In order to gather this data, several research activities are executed. The first research activity was a pre-assessment on which SMEs in the manufacturing sector recently have successfully undergo a product-service transformation. Criteria within this assessment where the degrees of product-service innovation achieved that is or exceeds level 'C' of Brax and Visintin, (2017) their categorisation. A second criterion used was the revenue product/service ratio, where more than 50% is achieved by service solutions (Kohtamäki et al., 2013). Furthermore, the third criteria were that the SME undergo significant service revenue growth in the past three years (Kohtamäki et al., 2013). Based on the pre-assessment, a short-list was created of SMEs that were invited in to participate in the research. In the second research activity, thirteen interviews were conducted. The data gathered within those interviews was elaborated with relevant documents provided by the SME that resulted in eleven case descriptions. These cases descriptions were then analysed in the third research activity by executing an inductive coding technique. This resulted in an overview of requiring elements across cases that helped answer the formulated sub-questions. Together, the sub-questions answered the central question which laid the foundation for the theoretical contributions and managerial implications to fulfil the research objective of this thesis by providing insights on how SMEs create an alignment in their service transformation process to overcome their specific product-service innovation-related barriers. In the following sub-chapters, each research activity will be discussed more in detail.

3.2 Research Design

Considering the central research question on how SMEs create an alignment between strategy, structure and environment to develop network capabilities, an explorative research approach was followed. In order to answer 'how' this alignment is created by SMEs, deep insights were needed to get insights on the strategic decisions and actions followed by SMEs in their specific context. These insights required rich data and context-specific information. Therefore, a qualitative research method was executed. This qualitative research design was seen as the most appropriated method to follow because this qualitative data helps to understand the context within decisions and actions take place (Myers, 2009). Secondly, qualitative methods are especially useful when multiple causalities have to be explained as is the case in this research where the interplay of several concepts had to be examined (Myers, 2009). This qualitative research design followed a multiple case study design by combining in-depth interview(s) with relevant documents to construct eleven cases. This triangulation of data prevents relying only on the gathered information within the organisation in order to construct a 'fuller' picture of the situation (Myers, 2009). Below the executed data-collection, data-sample and data-analysis of this research design will be explained in detail with a motivation why this method was followed.

3.2.1 Data-collection

The qualitative data collection method used in this thesis is a multiple case study. According to Bleijenbergh (2015), a case study combines interview(s), observations and relevant documents of an organisation in order to increase the understanding of the situation. By using several kinds of data, it enables the researcher to get an in-depth view of the situation (Bleijenbergh, 2015). In order to create this in-depth view, this research has constructed cases by combining interview(s) with relevant documents. However, an often-cited limitation of case studies is the weaker generalising of the results because in a single case study, it only examines one specific situation (Myers, 2009). Therefore, this research conducted a multiple case study of eleven cases based on the principle of 'conformity' (George & Bennett, 2004). According to this principle, organisations are selected that only confirm in their success on the service transformation (see criteria chapter 3.1) but differ on the sectors and context in which these SMEs operate, thereby trying to filter the bias of the specific sectors that are more beneficiary for service solutions. Secondly, this method of 'confirmatory' can lead to general aspects that lead to managerial implications because aspects that are present in all cases, although, the cases are operating in different sectors, can be seen as essential elements. A case is constructed out of in-depth interview(s) with the CEO, CCO, CFO or Service Manager of

the SME combined with relevant documents. The decision to interview these select group of employees is based on their influential role in strategic decisions and actions of the organisation combined with their relationship with external partners. According to the definition of Swanborn (2013), observation is part of a case study as well. However, because the organisations mostly completed their product-service transformation and secondly the gradual change nature of product-service transformation, it was not doable, considering research deadline, to include observations in this case study. The in-depth interviews were semi-structured to remain open enough for appropriated answering by the respondent but still have enough structuring to review the several concepts that need to be addressed (Bleijenbergh, 2015). Secondly, this format ensures that all the respondents are questioned on all relevant domains to ensure the reliability of the data-collection as further explained in chapter 3.3. This semi-structured format can be found in appendix 4. Documents were selected on the bases of content relevance with the service transformation, the specific period during the change process and the specific domain. Used documents are annual reports, strategic plans, website information and news articles. However, the availability of certain documents was based on the willingness of an organisation to share this information. Within some cases, the unwillingness to share documents have led to validity related limitations as will be discussed in 5.3 research limitations. An overview of the number of interviews, interview lengths, used documents and respondents per case can be found in table 3.1.

Organisation:	Interviews:	Documents:
Printing solutions	CEO (1h and 15 minutes)	Website, Strategic vision document, articles.
Air Extraction Systems	CEO (1h and 5 minutes)	Website, strategic documents news articles.
Building constructor	CEO (58 minutes) and Service Manager (1h and 8 minutes)	Strategic presentations, website, articles.
Compressed air installations	CEO (1h and 2 minutes) and service manager (1h and 20 minutes)	Website and news articles.
Buss door systems	Service manager (58 minutes)	Website and news articles.
Energy Systems	CFO (1h and 3 minutes)	Website, strategic documents and news articles.
Coating machines	CEO (1h and 10 minutes)	Website and strategic presentation.
Lifting machines	CCO (57 minutes)	Website and news articles.
Servitization Consulting	CEO (1h and 20 minutes)	Website, strategic documents and cases.
Water cleaning machines	CEO (59 minutes)	Website and videos.
Sprinklers & Sweepers Vehicles	Service manager (55 minutes)	Website, articles and strategic documents.

Table 3.1 overview data-collection within each case

3.2.2 Data-sample & Measurement

In line with the constructed research question of this thesis, the research population of this research was: manufacturing SMEs within the Netherlands that are providing their solution to other businesses (B2B). These small to medium enterprises are in several research papers defined as organisations that consist of a maximum of 250 employees and a maximum yearly turnover of 50 million euros (Valtakoski & Wittel, 2018). In order to ensure that the sample consists of a formulated strategy and intrafirm development of network capabilities, the minimal size of the organisation is set on 50 employees. The reasoning behind organisations located in the Netherlands is driven from practicability, because organisations have to be contacted to execute the interviews. Secondly, it is important for the interpretation of relevant documents because these documents within SMEs are often written in their native language. Based on the concepts and research questions, questions are constructed and translated into a semi-structured questionnaire (appendix 4). As described earlier, this research, in total, consists of eleven cases of SMEs that recently undergo the implementation of product-service innovations. To construct these cases in total, thirteen digital interviews with an average length of one hour are conducted across the eleven SMEs on management level. The complete case-descriptions can be found in appendix book 'case description' including the transcripts and used anonymised documents. Nine out of the eleven cases meet all the set selection criteria formulated in chapter 3.1. For two cases an exception is made based on the following argumentation. The first exception was made for Organisation #7 that did not meet the criteria of the type of service offering. However, Organisation #7 is currently extending its product-service offerings. In order to develop these new service solutions, Organisation #7 introduced an innovate concept to enable co-creation with the customer, which resulted in relevant insights considering the research questions. The second exception was made for Organisation #9 that is a consulting organisation implementing servitization solutions within SMEs. Because this organisation has guided several transitions, this case gave a general overview of several cases at once to better understand changes SMEs made to develop network capabilities. Secondly, in the early interviews, it was regularly described that SMEs used consultants when implementing product-service solutions. Therefore, this case gave a better insight into the role of this consultant and his perspective in these transitions.

3.2.3 Data-analysis

As described earlier, this research applied a qualitative research method consisting of two types of data-collection methods that combined formed wordy descriptions of each participating

organisation. This qualitative data have been interpreted based on the research question by coding fragments within the text and labelling these fragments. In this qualitative content analysis, this thesis followed the inductive coding method of Boeije (2005), where the aim is to stay close to the empirically gathered data. Although in the previous chapter a conceptual model is presented, which includes concepts and dimensions, that could favour a deductive coding method still a lot is unknown about the concepts like for example creating an alignment and the specific actions of these SMEs conducted related to that. Therefore, executing a deductive coding technique was seen as impossible because this technique relies on a complete coding structure prior to the data-analysis (Verschuren & Doorwaard, 2007). Following the inductive coding technique of Boeije (2005) this research executed three phases: I) Open-codes relevant fragments based on the research questions in the text; II) Axial-codes the connection between similar categories of open-codes and III) Selective-codes constructing new codes by comparing the axial-codes to answer the research questions. These three phases are carried out on several case descriptions and are presented in appendix 5. The influential citations or elements out of the documents are described in the result chapter in order to show core empirical evidence that helped answer the research questions at hand.

3.3 Research Quality

According to Rowley (2002), four tests are widely used to assess the quality and limitations of empirical social research (case-study). The first element is construct validity that consists of the correct operational measures for the concepts being studied and thereby reducing and exposing subjectivity (Rowley, 2002). Prominent within this element is to link data-collection questions and measures to the research questions. The thesis has striven to present this link by constructing tables where an overview is given of the concepts and measurement items that are based on the several research questions (Eisenhart, 1989). Secondly, by conducting a semi-structured interview this research strived to remain open for relevant other items that were not included based on theory, but at the same time, this semi-structured interview also ensures that essential elements will be discussed in the interview (Bleijenbergh, 2015). Another limitation that possible hindered the data-collection is the retrospective bias of interviewees because some relevant events happened over a long time. In order to reduce this bias, this thesis has asked questions about specific events that can help the respondent recall a particular event (Miller, Cardinal, & Glick, 1997). Another way to reduce this bias is by using relevant documents to construct better the events which can help the respondent in recalling and secondly these documents act as secondary data (Rowley, 2002). The use of documents and several interviews

within each case is also beneficiary for the construct validity of this research by collecting and combining data from different sources (Rowley, 2002).

The second test proposed by Rowley (2002) in case studies is the internal validity. Internal validity consists of establishing a causal relationship whereby certain conditions are shown to lead to other conditions as is the case in this research where the alignment of certain concepts leads to the development of network capabilities. To increase the internal validity, several measures are implemented. Firstly, the research gathered evidence on the 'why' behind individual relationships found in the data to discover the underlying theoretical reason (Eisenhart, 1989). Secondly, in chapter 5 discussion, a comparison is made with conflicting and similar literature because this ties together underlying similarities in the phenomena (Eisenhart, 1989). Comparing conflicting literature is important because it can help deepen the theoretical insights and if the research ignores these conflict literature readers may assume that results are incorrect or if correct, are too idiosyncratic to the specific cases thereby hampering the internal validity of this research (Eisenhart, 1989). A limitation considering the internal validity of this research is the cognitive bias of the respondent where they create their subjective social reality overstating specific actions and their effects thereby increasing the change of overstating casual relationships (Miller & Salkind, 2001). Conducting several interviews within an organisation combined with using secondary data in the form of documents and an extended line of reasoning with the 'why' of the causal relationship have tried to reduce this cognitive bias. However, this never can be excluded from this case study, and therefore future quantitative research questions are formulated. Considering the deadline of this research, it is not doable to combine both methods in this research because constructing cases based on several interviews and documents combined with collecting a sufficient sample to test these causal relationships statically cannot be adequately done within two months. Therefore, this research focused itself on the gathering of these hypotheses that can be tested in further quantitative research.

The third test described by Rowley (2002) is the external validity of the research. External validity consists of the generalisability of the research results. However, this external validity is seen as the central weakness of case studies because of their often smaller sample size (Schell, 1992). Therefore, this research is not after statistically generalisation but analytic generalisation, where replication is visible in several cases (Rowley, 2002). External validity in case studies is often protected by the research design and following the analytic generalisation

approach by conducting a replication logic (Rowley, 2002). This replication logic is created by following a multiple case design consisting where cross-case analyses have provided returning elements that act as proof for analytic generalisation (Rowley, 2002). Finally, by providing further research question in chapter 5 and formulated hypothesis (appendix 6), the results can be tested on statically generalisation in further research.

The fourth and final test described by Rowley (2002) is the reliability of the research. This reliability consists of how well the study can be repeated, creating the same results. This reliability can be achieved by proper documentation of procedures and an appropriated recording keeping (Rowley, 2002). This has been achieved by recording and a transcription of the conducted interviews combined with the relevant documents in order to build an extensive case study database described in appendix book 'case description'. Secondly, the researcher has constructed notes on an observation-level, theoretical-level, analytical-level and methodological-level, which can be found in appendix 7 (Boeije, 2005). Constructing these notes have increased the documentation of procedures in order to improve the reliability of this research. Together, this detailed documentation of the cases, the documentation of several research notes and an extensive described coding process have increased the reliability of this research by improving the ability for replication of this research.

3.4 Research Ethics

“Research ethics consist of the application of moral principles in the planning, conducting and reporting the results of the research. The fundamental moral standards involved focus on what is right and what is wrong” (McNabb, 2002, p. 36). In order to maintain research ethics, the research has followed the four principles from McNabb (2002): sustaining truthfulness, remain thoroughness in conducting proper research methodologically, remain objective to avoid own biases where possible and lastly remain relevant to avoid irrelevant purposes. Although the research strives to comply with these four principles, well documentation of the research process has created the possibility to check on thoroughness and objectivity of the researcher. In order to remain ethical in the reporting of the research, the principles of Maylor & Blackmon (2005) are followed by maintaining privacy to preserve confidentiality, honest representation of data and taking responsibility for the research findings. Additionally, in the data-collection respondents had the freedom to withdraw from the research any time, and before the interview, possible implications on how the findings may be applied was described in the introduction of the interviews. Finally, the researcher has signed an integrity form that states the intention to comply with the principles of The Netherlands Code of Conduct on Scientific Practice.

Chapter 4 Results

In this chapter, results are presented regarding the several formulated sub-questions. The presentation of these results is based on the data-analyse following an inductive method (appendix 5). The overarching concepts within each sub-question are based on the selective codes. Within these concepts, the elements described are founded on the axial codes, which is supported by the open codes in the form of citations and examples. Although the formulated research questions were focused on the development of network capabilities alone, these results also include, based on the data, aspects of the way SMEs manage their network capabilities. To give an overview of the several cases, table 4.1 is constructed.

4.1 Network capabilities for overcoming product-service innovation barriers

In this subchapter, the results regarding sub-research question one will be presented. Firstly, it will be described how SMEs used network capabilities for overcoming the financial gap. Secondly, examples will be given how SMEs have overcome knowledge gaps.

4.1.1 Network capabilities in relation to financial gaps

Multiple SMEs describe the initial inability to introduce further product-services innovations because of insufficient financial resources. Organisation #2 describes product leasing as the business model of the future in which they can build better long-term relationships with clients. However, a lack of financial resources, mainly needed for financing the investments upfront, prevented the introduction of this business model. To overcome this barrier, this SME started to collaborate with a financial institution that was willing to supply upfront loans to the organisation. According to Organisation #2, starting this collaboration created the availability of financial resources that helped overcome their financial barrier towards offering a leasing business model. Another example where collaboration helped in overcoming the financial barrier is that of Organisation #10, which is active in the manufacturing of machines to clean water for livestock farming organisations. Within the implementation of new product-service innovation, Organisation #10 encountered a financial barrier. To overcome this barrier, the organisation started a collaboration with a partner in the ecosystem. According to Organisation #10, this partner consisted of ample financial resources, and secondly was searching for how to improve food adoption rates. Driven by this shared goal, Organisation #10 started a collaboration to increase the food adoption rate of the animals of their shared customers. In this collaboration, this larger organisation was able to provide the water cleaning machines in a leasing model to their shared customer, which enabled Organisation #10 to implement their product-service innovation overcoming their financial barrier of having insufficient resources.

Case:	Sector:	Description:	Service-solution:	Network capabilities development and managing policy:
#1:	Printing solutions (North-NL)	Organisation #1, together with 150 employees, develops and produces communication solutions ranging from direct mail towards customer loyalty programs with the required security throughout the complete process.	The service solution provided by the organisation is a full-service solution consisting of the developing, producing, transporting and analysing of the communication solution to ensure the best ROI. (level: D; Brax & Visintin, 2017)	Hiring criteria Training on the job Data-driven collaborations
#2	Air Extraction Systems (North-NL)	Organisation #2 is a developer and manufacturer of air extraction systems. Together with 52 employees, this organisation supplies complete systems to ensure the production facility consists of clean air for their employees.	The service solutions this organisation provides are service contracts consisting of regular maintenance and advice to realise performance optimisations in the production facility. (level: C; Brax & Visintin, 2017)	Hiring criteria Separation of the service unit
#3	Building constructor (Central-NL)	Organisation #3 is a lead contractor for the construction and exploitation of buildings. Together with 180 employees across several brands, Organisation #3 helps several customer groups with the focus on utility buildings like schools and hospitals.	Organisation #3 offers the concept: 'Building-as-a-service'. In this concept, the organisation constructs a building including data-gathering sensors which are combined with other data in a data platform to manage the building as optimal as possible. (level: F; Brax & Visintin, 2017)	Hiring criteria Internal development program Physical collaboration space Network organisational structure Pilot projects Data-driven collaborations Separation of the service unit
#4	Compressed air installations (South-NL)	Organisation #4 develops and produce compressed air installations for a wide range of customers segments like hospitals or manufactures. Together with more than 150 employees, the organisation designs, sell and supports compressed air installations throughout the Netherlands.	Organisation #4 offers several product-service solutions. Firstly, the organisation gives its customers support and advice considering their systems. Secondly, the organisation leases and rent out systems in full-service contracts. (level: E; Brax & Visintin, 2017)	Hiring criteria (characteristic-tests) Internal development program Pilot projects Separation of the service unit
#5	Buss door systems (North-NL)	Organisation #5 is a bus component supplier which makes complete door systems for several bus manufacturers. The organisation develops, designs and produces door systems that are built-in by their customer during the production of a bus.	The service solution provided by organisation #5 consist of training and advice on how to use the door system optimally. Secondly, the organisation provides maintenance and failure support for their door systems at the user. (level: C; Brax & Visintin, 2017)	Hiring criteria Pilot projects Separation of service unit
#6	Energy Systems (North-NL)	Organisation #6 is a manufacture of complete mobile energy systems in order to fulfil the temporary or crisis-based energy need. Together with over 170 people, Organisation #6 produces and place mobile energy systems consisting of hybrid energy solutions combining electronic energy machines and fossil energy machines.	Organisation #6 offers a comprehensive service solution ranging from the leasing of systems towards pay-per-use service solutions. The organisation describes these comprehensive service solutions as 'energy-as-a-service'. In this vision, the organisation sees itself more as a service organisation than a producer of products. (level: G; Brax & Visintin, 2017)	Hiring criteria Internal development program Pilot projects Data-driven collaborations

#7	Coating machines (North-NL)	Organisation #7, together with 73 people, offers complete coating production lines. The organisation produces machinery that applies several coatings on surfaces in a production process.	An essential element of the service solution of organisation #7 is the experience centre where the organisation works together with its customer to co-develop solutions like process improvements and maintenance. (level: B; Brax & Visintin, 2017)	Hiring criteria Physical collaboration space Pilot projects
#8	Lifting machines (North-NL)	Organisation #8, together with 65 employees, produces and designs lifting machines that assist the production process of the client. Organisation #8 is a worldwide supplier of complete machine lifting solutions that help customer lift parts or production goods from 50 towards 500 kilograms.	The organisation provides after-sales services like predictive maintenance, personal training and supply of spare parts. An essential element in this service solution is the motion terminal that is the connector between the several lifting machines. This motion terminal developed with a strategic partner provides the connections between the systems and sends signals to the organisation to provide maintenance. (level: C; Brax & Visintin, 2017)	Hiring criteria Technological related collaboration projects External consultant for developing
#9	Servitization Consulting (East-NL)	Organisation #9 does not fit the criteria of this research, but it offers relevant insights because this organisation is specialised in helping SMEs fulfilling their servitization transition. As a consultant, this organisation helps SMEs in the transition towards servitization business models.	The service solutions implemented within clients differs from the more basic additional services towards more complex product-service-offerings. The more complex product-service-offerings are mostly focused on creating connectivity of products to develop new commercial models where the customers pay-per-use. (level: N/A)	N/A
#10	Water cleaning machines (North-NL)	Organisation #10 is a machine supplier for the livestock farming, industrial and medical sector. With this machine, clients can produce their disinfectant without any additional chemicals. The organisation describes itself as a technology company that provides clients with the knowledge to produce their disinfectant to increase business performance	Clients can buy, lease or rent the machines and receive the support of product experts called microbiologists. The experts share their knowledge in order to improve performance. A second service is providing regular maintenance to the machine and offering a 24/7 support service when machines breakdown that is agreed within a service contract. (level: G; Brax & Visintin, 2017)	Hiring criteria Internal development program Pilot projects Data-driven collaborations
#11	Sprinklers & Sweepers Vehicles (South-NL)	Organisation #11 is a producer of sprinklers and sweepers vehicles to help customers clean the street or prevent glibly roads. Together, with 80 employees Organisation #11 foresees the Dutch government, several provinces and local municipalities from vehicles. Organisation #11 is part of a more considerable holding with a head office in Switzerland.	Organisation #11 provides modular service solutions where customers can configure their service package based on the several possible service solutions. These service solutions range from providing consult towards full-service contracts where customers pay a standard monthly fee combined with a pay-per-use model for every action. (level: G; Brax & Visintin, 2017)	Hiring criteria Internal development program (Service 2.0) Solution driven department structure Pilot projects Data-driven collaborations

Table 4.1 Description of cases

4.1.2 Network capabilities in relation to knowledge gaps

Several SMEs describe that their organisations experienced a knowledge gap when introducing product-service innovations. To overcome this knowledge gap, several SMEs in the cases used their ability to network to overcome this knowledge barrier by collaborating. However, based on the cases, a distinction has to be made within the knowledge gaps because the type of knowledge gap affects the applied approach used in practice by SMEs. Firstly, SMEs describe a technical related knowledge gap. The technical knowledge gap described by most SMEs is related to the implementation of innovations like 'Artificial Intelligence' or 'Internet of Things'. These two innovations are described by the managers of the SMEs as an essential way to improve product and service performance. An example of a product-service innovation seen relevant by the SMEs is the service-solution 'predictive maintenance' where organisations can predict when a specific machine needs maintenance and which parts are needed to be replaced in order to prevent downtime. This proactive service offering requires machine connectivity and algorithms to predict maintenance. This specific technical knowledge is not enough available within SMEs because their current knowledge is more emphasised on the product as described by Organisation #5: *“We currently do not have the technical competences to translate the big data we are gathering to practical implications”*. To overcome this gap, multiple SMEs are using their ability to network to start collaborations with organisations specialised on these technological innovations. In these collaborations, SMEs execute pilot projects that enables them to learn quickly and overcome the knowledge gap, as described by Organisation #10: *“A pilot project with a hardware partner to develop new services helped us to obtain the required knowledge quickly and test new ideas which lead to a successful introduction of new services.”* In these collaborations, the SME knowledge of the product is combined with the partner knowledge on the technological trends to develop new service offerings as described by Organisation #11: *“Machines we are making really good, but for offering new data-driven service offerings we are co-operating based on our ability to collaborate to attain that specific knowledge.”* Secondly, SMEs describe the service-related knowledge gap that consists of knowledge in order to offer services. At the start of implementing product-service innovation, SMEs describe that they are being hampered by the knowledge gap about how to offer services. Network capabilities of SMEs to collaborate with the external network were not used to overcome this gap because SMEs saw it as knowhow that had to be developed internally. Several SMEs described that they overcome this gap by developing this internally by hiring an external expert on the servitization topic and hiring service experienced employees combined with service-related training programs as will be described in 4.3.4 HRM-strategy.

4.2 Strategy in relation to network capabilities

In this subchapter, the results regarding sub-research question two will be presented. According to SMEs, the strategy plays a vital role in creating the motivation for the development of network capabilities. Based on the selective codes resulting from the data-analyse (appendix 5), four overarching strategic elements are found for the development of network capabilities which will be addressed below.

4.2.1 The role of strategy content

SMEs described the strategic content as the plan on how to achieve their organisational goals including their strategic intent. A requiring element in the strategic content within nine out of the eleven cases is that their strategic content is emphasised on the outcome that their product fulfils. This outcome is then made explicit by the SME by formulating a strategic mission and vision for the organisation consisting of this product functionality. Examples of these functionality-based missions used by SMEs are: *"We keep your machines running!"* (Organisation #1), *"We supply energy reliability."* (Organisation #11) or *"An involved partner in communication output."* (Organisation #1). According to the SMEs, this focus helps the development of capabilities because it explains the reason for the development of network capabilities. It makes clear what to achieve as an organisation as described by CFO of Organisation #6: *"By changing this strategy you are experiencing that the mindset becomes clearer and that we are not speaking about a product but a service, we are a service provider."* This outcome related strategy implemented by the SMEs creates and improves the motivation for employees to develop their network capabilities and apply a different mind-set when collaborating with customers and partners. A second requiring element in the cases of SMEs was that the strategic content often consisted of a long-term vision. As stated by the CEO of Organisation #4: *"Everything within our organisation is emphasised in the long term, the short term does not interest me. I prefer to invest this year so I can continue to grow my business than making more profit this year."* This long-term vision affected the way in how these SMEs approached their customer. The goal of these SMEs was to build a long-term relationship that connected with their long-term vision. According to the SMEs, having the strategic intent to build long term relationships positively affects the collaborations with customers. Secondly, having this long term strategic intent enables employees to use their network capabilities successfully continuously because it is supported and encouraged by the management of the SME to build long term relationships. Thirdly, it helps employees to focus on building lasting relationships instead of being forced to deliver short term performance early in the relationship. SMEs describe that building these lasting relationships helps employees develop their network

capabilities because it enables employees to develop their network capabilities during this relationship and better understand the involved customer and partners in order to learn from these collaborations. Secondly, a few SMEs even extended their long-term focus with an ecosystem perspective like for example, Organisation #6: *“Real steps can be made on the next level, that is your ecosystem. By looking broadly to your value chain, with suppliers and customers, new smart business models can be developed. We, as an organisation, want to remain to offer value in the bigger picture. Therefore, we always are looking for out-of-the-box ways to connect our business model to the initiations of others.”* According to Organisation #6, incorporating the ecosystem perspective in the strategic content can widen the possible collaborations that can create a better fulfilment of the customer their functionality. An example where ecosystem collaboration leads to better fulfilment is that, as described earlier, of Organisation #10 that collaborated with food supplier to increase the animal food adoption rate of their shared customers. Creating this wider-perspective motives employees to seek out these ecosystems’ broad collaborations. A third element that was present in some SMEs as part of the strategic content was 'co-creation'. SMEs already included this element of co-creating in the strategic content resulting in a relationship with the customer, which created a higher strategic involvement. Secondly, this established relationship in earlier stage helped when introducing product-service innovation. Organisations already had created an interfirm relationship and employees were experienced on how to collaborate with the customer by having co-creation as part of their previous strategy. Introducing product-service innovations changed the content that was collaborated upon, but employees were able to adapt quickly because they were familiar with each other and did know how to collaborate with their customer. An essential element described by some SMEs within the creation of the strategy was the involvement of the service manager. Mostly all SMEs had a management team (MT) that consisted of a service manager. This involvement of a service manager ensured that these managers could influence strategic decisions to shape the strategic content based on service experiences. Organisation #5 describes it as a crucial change in order to transform the current product-minded organisation towards a more service-minded organisation. According to the service manager of Organisation #5, service was not taken into account on a strategic level, which resulted in a dominant product view. Changing the MT-structure by including a service manager helped to shape the strategic content from a service perspective. By being part of the MT, the service manager of Organisation #5 was able to change the hiring criteria and add development programs to create and improve network capabilities. A second often action of SMEs when developing the strategic content was the involvement of an external expert on the servitization topic. Because SMEs

their general unfamiliarity on servitization, at first, on the strategic level, an external expert was hired to help form the strategic content and think along how to implement this strategy and create the required capabilities as will be discussed later in this chapter.

4.2.2 The role of strategic focus

The second requiring strategic element out of the data is the strategic focus set by the SMEs. A requiring action of SMEs within this strategic focus by eight out of the eleven cases was their decision to put their attention on a few customer segments. As described by Organisation #11: *“We have defined five customer groups based on their service need. This ranged from customers that only need a product pure on price. Meanwhile, the highest customer group fully outsourced their anti-slipperiness task.”* Other SMEs are also critical in their customer selection, as described by Organisation #4: *“We often say no to a client. If they ask us to offer the lowest price than we make the consideration if we can help the client good enough and deliver the service, they expect from us.”* SMEs describe that this focus on specific customer groups fitting their service value proposition helps in creating successful collaborations. SMEs describe it as choosing based on quality instead of quantity to ensure the right relationships can be created. This critical customer selection certifies that employees can build partnerships with their customer because they are complying with the focus and services of the SME. A second requiring element in this concept is that SMEs tried to establish a central role in the distribution chain of the customer, as described by Organisation #9: *“Successful Servitization SMEs are able to take a central role in the distribution chain which enables them to be leading and to network with other organisations.”* The strategic focus of being the central player helps them to coordinate the involved parties to create more customer value. Having this leading role in the distribution chain helps employees to manage and coordinate the collaborations in this value chain. Having this role helps the organisation to improve the fulfilment of the customer task because they oversee the complete process, which secondly enables employees to learn more out of the interaction with the customer. In some cases, SMEs executed forward integration of activities to increase the value provided to customers. An essential criterion, described by SMEs in establishing this central role, is distribution chain acceptance. This acceptance can be already present, as in the case of Organisation #3 because of their traditional role as a lead contractor when constructing buildings. On the other hand, acceptance of this central role has to grow as in the case of Organisation #1. For this organisation, creating this acceptance took a while, but based on successful projects, customers and other partners increasingly saw them as a central player, thereby coercing the central role in the distribution chain.

4.2.3 The role of strategy implementation

As neatly described by Organisation #3, a critical element within the strategy is the implementation of it: *“In order to make your strategy a success you have to ensure that people believe it and support it. Important in creating this support is the way how you implement this strategy.”* As described in the case descriptions, most SMEs implemented their strategy following a top-down approach. Some SMEs described it as their strength in which they can react quicker on changing customer demand. However, in order to make their strategy work, according to several SMEs, the top-down implementation on its own is not sufficient because it needs support base throughout the organisation. SMEs create this support base partly by frequent communication of the strategy and explaining the reason why. Not only by the management team of the organisation but also by the customer itself. According to the SMEs, sharing the strategy helps to reinforce the strategy throughout the organisation, which reinforces the motivation of employees to develop their network capabilities. Secondly, successful stories, when executing the service strategy, are shared throughout the organisation to convince employees of the service strategy, which enforces the service strategy, as described by organisation #3: *“Sharing best practices is important to further extend the support base for the strategy and strengthen the willingness to execute the strategy.”* A second important element described by the SMEs, besides having a support base for the service strategy, is having the service strategy embedded in the employee's way of thinking. Several SMEs describe the need for a different mindset when providing product-service solutions. As described by the CEO of Organisation #4: *“People have the knowhow, and that is what you have to stimulate. And what you need when implementing a services strategy, and that is hard enough anyway, is that people think completely differently, that is not meant negatively, but it is a fact.”* Alternatively, by the CEO of Organisation #1 states: *“Employees have to change the way they compete in order to provide services. It is not about what the customer asks and that we do it; it is about starting a dialogue leading to better service solutions.”* Both statements address the need for employees to incorporate a service-mindset which should be embedded in their behaviour when using network capabilities in collaborations. Organisations strive to create this mindset by sharing best practices and providing servitization training as will be described in 4.2.4 HRM-strategy.

4.2.4 The HRM-strategy in developing network capabilities

Several SMEs describe the importance of their HRM-strategy in order to develop network capabilities. An important element in the HRM-strategy for the development of network capabilities is the hiring approach and the policy for the development of employees. Ten out of the eleven cases indicated that they included network-related criteria in the hiring profile for

their service-related functions. SMEs are selecting new employees based on their ability to collaborate with partners. Secondly, SMEs also select specifically on service experience in a previous organisation to ensure the employee consists of the required service-mindset. By including network capabilities hiring criteria, SMEs strive to increase the network capabilities of the organisation. However, SMEs also try to improve the network capabilities of their current personal. Most of the SMEs describe that they execute monthly to yearly training programs for the development of network capabilities. Several organisations even execute specific service-related sales-training to ensure their sales can ask the right questions and listen to the customer properly, which is part of their ability to network. An example of a service training program is that of Organisation #11: *"Service 2.0 is an internal program, that we executed based on our servitization strategy. It consists of a hefty training program on the way of working and thinking in service-offerings."* This training program created with an external organisation is repeated once in the two years to refresh the capabilities of the current employees and train the new employees. The CEO of Organisation #3 also stresses the need for organisational training. In knowledge sessions, this organisation develops the skills of their employees. In these knowledge sessions, external experts are hired to train the employees in so-called 'seminars'. However, most SMEs acknowledge that besides the different hiring requirements and additional training programs included in the HRM-strategy, employees learn the most on the job itself. Several organisations are applying the philosophy: 'Learning by doing'. Alternatively, as described by the CEO of Organisation #3: *"Doing is the new thinking."*

4.3 Organisational structure in relation to network capabilities

In this subchapter, the results regarding sub-research question three will be presented. Several SMEs describe the importance of creating an appropriate organisational structure to enable network capabilities development and to ensure successful use of these capabilities in practice, as described by CEO of organisation #4: *"I think it (structure) is the most important element. Our structure enables us to take action and learn from it."* Based on the selective codes resulting from the data-analyse (appendix 5), three organisational structure elements are found as will be described below.

4.3.1 Organisational design in relation to network capabilities

The first organisational structure element requiring element in the data is the created organisational design by SMEs. In this design, several SMEs described the need for sufficient autonomy in the service organisation. According to the SMEs, this autonomy is vital to be able to adapt to changing customer demand and creating the organisational flexibility for offering

product-service innovation. Based on the need for service autonomy several SMEs describe that they created an organisation consisting of a flat organisational structure, which they see as crucial for offering services as is described by CEO of Organisation #9: *“The flat organisational design helps when offering services because it gives the service unit the freedom to operate.”* Secondly, this flat organisational design of SMEs consists of minimal management layers to increase the manoeuvrability of the service organisation as described by the service manager of Organisation #4: *“I think the most important thing of our design is that we consist of flat organisational design. Manoeuvrability is present throughout the whole organisation, maybe it is because we are a family organisation, but it helps to adapt in your service offering.”* CFO of Organisation #6 also addresses the need for autonomy which they created by having the responsibility as deep in the organisation as possible. According to the SMEs, creating sufficient autonomy in the organisation for employees helps in the creation and development of collaborations with customers and partners because employees have to freedom to operate. A second important element found in several SMEs is the need for integration between the several departments. SMEs create this integration partly by their organisational design. As described by Organisation #3: *“We have created a network organisation where knowledge sharing takes place, and when you need to find more information, you can find the right people and connect. And in that way, you create a network organisation with connected employees.”* Organisation #11 described the need for integration and found a solution in creating a different department structure. Here the organisational design was not based on tasks but based on roles. In this new department structure, one department was responsible for developing service solutions. This department formed internal and external project teams that helped to integrate several departments. Sufficient integration between organisational members and departments is seen by SMEs as essential for the network capabilities of an organisation, because it helps employees in the successful coordination and managing of these collaborations. Besides, that these mentioned organisational structure changes are beneficial for increasing the integration between several departments; it also increases the autonomy of employees. The third element in organisational design described by the SMEs is on how the service unit is placed in the organisation. On this element, the cases of SMEs contrasted the most. A few organisations (for example #2, #3, #4) saw it as essential to have a separate service organisation that was not hampered by the product organisation. This separate service organisation ensured that the service unit could operate freely and that this unit can build-up their required service competences. However, other SMEs saw service as an integral element of their organisation and thereby decided to integrate it into the current organisation (for example #1, #6, #11).

Separation of the service unit, based on comparing these cases, was done within SMEs that were offering a relatively lower degree of product-service innovation. Integrating the service unit on the contrast was done within the SMEs that offered a higher degree of product-service innovation. These organisations described that they saw service not as a separate activity but as their central activity leading to the decision to integrate the service unit. According to these SMEs, this integration improved the collaborations when providing product-service innovation.

4.3.2 Collaboration design in relation to network capabilities

The second organisational structure element described by the SMEs is the collaboration design organisations develop with their partners. SMEs describe this collaboration design as necessary because a proper collaboration design enables employees to execute their network capabilities, and secondly enables employees to learn from the collaboration to improve their network capabilities. A central finding throughout the constructed cases is that service collaborations are generally focused on set outcomes like Total Cost of Ownership (TCO) or Return of Investments (ROI). TCO or ROI goals are described in the contract and monitored throughout the collaboration. These targets ensure that the goal of the collaboration is clear for both parties and secondly organisations describe it as a more transparent way of collaborating. A development that actively enabled this outcome-driven collaboration is the connectivity of products. According to the CEO of Organisation #3: *"Gathering data and interpreting it helped us to talk with customers based on facts and best-practices how to improve the performance of the building. Instead of that, we think that we are, now we are able to show them improvements based on facts."* This data-driven collaboration changed the way organisations are talking with their customers. Organisation #3 describes it as instead of talking about opinions, factual data now provides evidence of improved performance which makes the collaboration more transparent. A second finding described by SMEs that is essential for organisational members to learn is that new business development is executed in pilot projects. SMEs test new service offerings in pilot projects together with customers and partners. These projects enable employees to test new ideas and learn quickly. As described earlier, some SMEs follow the philosophy 'learning by doing' which is translated in these pilot projects. If these pilot projects seemed successful, these projects are scaled-up and implemented widely. Secondly, successful stories of pilot projects are shared within the organisation to reinforce the support base of the set strategy. CFO of Organisation #6 described these pilot projects as 'launching platforms' which enabled the organisation to launch new service concepts and learn quickly. Secondly, it also enabled the SME to develop their network capabilities during the execution of pilot

projects. The third finding within collaboration design is that some SMEs, like Organisation #3 (Work Café) and Organisation #7 (Experience Centre), constructed physical places that act as meeting places. According to Organisation #7, these physical meeting places helped to build a better relationship with the partners, which positively influence the collaboration performance. Organisation #3 describes their 'Work Café' as an open office where employees and partners come together based on their projects. This open-office space improves the integration between different projects which is, according to Organisation #3, beneficial for their project outcomes and secondly enables employees to learn more from each other during this process.

4.3.3 Data-infrastructure in relation to network capabilities

Described by several SMEs as necessary for creating the data-driven collaboration and integration between several departments is the data-infrastructure of an organisation. CEO of Organisation #4 describes the importance of creating a good overview of information for their employees: *"I have seen my employees get a burnt out because they were worried about what other people were doing. Honestly, that is just a lack of overview. Therefore, we created a data-infrastructure called: database, matrix and agenda."* In the data-infrastructure, employees are able to quickly get an overview of the vital information instead of searching for it in the ERP-module. Secondly, SMEs described that they automate the information flow between employees with programs like Microsoft Teams or FLOW. Automating the information flow ensures that information arrives at the right time at the right people creating better integration between departments. Another described positive effect of automating this information sharing is that it enables employees to put more time in relational activities to improve the relationship with partners, because less time is spent on updating and searching for information.

4.4 The environment in relation to network capabilities

In this subchapter, the results regarding sub-research question four will be presented. Several SMEs described the environment as influential in creating the willingness of organisations to collaborate, thereby creating the opportunity for employees to use their network capabilities and further develop these capabilities during these collaborations. Based on the selective codes resulting from the data-analyse (appendix 5), two overarching environmental factors are found as will be described below.

4.4.1 Industry characteristics in relation to network capabilities

Several SMEs describe that specific circumstances influenced their ability to use and develop network capabilities. A positive element described by SMEs related to the execution of network

capabilities is the specialisation taking place in the value chain. This specialisation of organisations on their core-business enabled SMEs to offer full-service solutions on their core business activities. Offering these full-service solutions and acting as a central organisation was accepted by the industry, because of this specialisation development in the industry, as described by organisation #1: *“Because of specialisation in the market, some departments do not have the knowledge we have anymore inhouse. So, that specialisation in the industry resulted that we could jump in that vacuum with our service offerings and at the same time, we are seen as relevant in the network because we are adding knowledge.”* Besides that this specialisation increased the market acceptance for extensive service offerings it also, according to the SMEs, increased the willingness of organisations to collaborate which enabled SMEs to use their network capabilities and develop them during that process. A second environmental driver described by the SMEs is the changing customer demand. This changing customer demand both positively and negatively influence the introduction of product-service-innovation and network capabilities development of an organisation. A positive effect is found when customers were taking into account outcome-related factors, like TCO and ROI, in their buying and using process. Taken into account, these outcomes enabled the organisation to execute data-driven collaborations which resulted in stronger relationships and the development of more sophisticated product-service offerings. A negative influence of customer demand is described by, for example, Organisation #10 in the situation where customers prefer to remain the owner of the products. Several SMEs described the challenge where a customer preferred to remain the owner of the product. SMEs describe that this preference of ownerships disables organisations to introduce higher degrees of product-service innovations. Organisation #11 described solving this partly by making their value proposition of leasing products relatively more interesting to offset this current ownership bias of customers. A fourth environmental driver described that enables the start of collaborations between organisation is the increasing competition customers are experiencing in their market. As described by Organisation #5: *“International competition in the market of one our customers have started a strategic alliance in which we now co-develop products and services, to create a joined advantage.”* This increased willingness of customers to collaborate enables employees to use their network capabilities and further develop them during these collaborations.

4.4.2 Legislation in relation to network capabilities

Within the SMEs, one specific legislation is mentioned that influenced the introduction of product-service innovation and the use of their network capabilities. As mentioned by

Organisation #10, the new General Data Protection Regulation (GDPR) resulted in an introduction delay between the three to five years. The GDPR negatively influenced the possibility of gathering and interpreting data in order to offer sophisticated services. SMEs describe that this GDPR hampered the use of network capabilities because SMEs were afraid to infringe with these regulations which postponed some collaborations with customers.

4.5 Alignment in relation to network capabilities

In this subchapter, the results regarding sub-research question five will be presented. Based on the selective codes resulting from the data-analysis (appendix 5), three alignments will be described that several SMEs have created in order to develop network capabilities successfully.

4.5.1 Alignment of a top-down strategic approach in a ‘loose’ organisational structure

The first alignment found within SMEs is between the strategy of the SME and its structure. As described earlier, the product-service innovation strategy was often implemented top-down into the organisation. However, the top-down implement strategy was then set in a flat organisational structure. According to the SMEs, in this structure, employees have the flexibility to execute the strategy and adapt to changing conditions as described by Organisation #10: *“Our flexible structure helps in the offering of services because it gives employees the autonomy to act and move when collaborating with customers.”* The autonomy in the structure helped employees in developing the product-service innovation by executing the needed collaborations in the form of pilot projects to help organisational members to learn and adjust the strategy quickly, as described by Organisation #11: *“In our flat organisational structure employees are able to execute pilot projects with partners and customers, that enable them and us to learn quickly. In essences, it is learning by doing.”* These learnings and successful pilots were then gathered by the top management and shared through the organisations. As described earlier, top-down implementation resulted in the needed manoeuvrability to seize the product-service innovation opportunity. However, SMEs described that the development process required ample flexibility to adapt to the changing conditions and learn from the interaction with the customers and partners to use and develop network capabilities.

4.5.2 Network capability development approach based on industry complexity

A second alignment, based on the data analysis that is often created by SMEs is between the HRM-strategy and the industry complexity. In this alignment according to the data analysis, a distinction can be made between SMEs active in a complex industry, where organisational members should consist of specific knowledge, and SMEs that were active in less complicated

industries. SMEs active in a complex industry followed a different approach in the development of network capabilities, as described by Organisation #10 that is active in a complex industry: *“When our employees are collaborating they have to be able to talk on a certain level. Therefore, our hiring policy is to attain this knowledge that enables us to talk with the important people of our customer, but we have to support this policy with communicative training to make it work.”* SMEs in complex industries described that they hired an employee with the specific industry knowledge and then developed the network capabilities through an internal development program. Meanwhile, SMEs active in less complicated industries described being firmer in their network capabilities hiring criteria upfront and executing a less heavily internal development program. This industry complexity, therefore, affects the network development policy of an SME, because the specific knowledge required influenced the applied approach.

4.5.3 Service unit integration or separation based on industry characteristic

The third alignment found in the cases of SMEs is the interaction between the service strategy, organisational structure and the environment. In this alignment, SMEs described that their industry characteristics affect the decision to integrate the service unit. Besides that, this decision is affected by the degree of service offering, as described earlier. The environmental factor industry characteristics also play a role as described by the CEO of Organisation #3: *“Because we started a new organisation we were able to do new things, that was not possible in the current organisation. Existing employees in current organisations would react to these new things like this is never going to work. The beautiful thing is that with establishing this separate organisation, we created a test environment and the knowledge created there is now flowing back to the other organisations, and they are learning from it as well.”* Or as described by the service manager of Organisation #3: *“The idea of creating and exploitation a building was so disruptive for our industry, that it required a different organisation to execute both elements successfully.”* Both citations show the effect of the current industry norms on the decision to separate the service unit in a different organisation. The extend in which the new business model differs from the current industry standards influences the need for separating the service unit to develop the service-mindset and network capabilities successfully. Separating the service unit in a new organisation enabled Organisation #3 to develop a new way of thinking and hire a different type of employee. In this way, Organisation #3 was able to develop the network capabilities required and deliver the product-service innovation without being hampered by the current beliefs. This example shows how the interplay of strategy, structure and environment affects the organisational structure decision.

Chapter 5 Discussion, Limitations & Further research questions

In this chapter, firstly, a discussion will take place on the theoretical contributions of this research. Secondly, the managerial implications will be addressed. Finally, the limitations of the executed research and further research questions will be described.

5.1 Theoretical Contributions

The main contribution of this thesis is providing new insights based on empirical evidence how SMEs create alignments between strategy, structure and environment for the development and managing of network capabilities. This thesis gives a better insight into this interplay by providing a pathway on how to develop and manage network capabilities when implementing product-service innovations. These findings elaborate on the further research questions of Kohtamäki et al. (2019) by providing alignments leading to various network capabilities development success. These alignments challenge the overly simplistic explanations proposed within the current product-service literature that state mainly direct effects on network capabilities development success. This thesis challenges these simplistic direct effects by following a configuration perspective that sheds a different light on previous research and secondly delve a deep understanding of this interplay. A challenge proposed by this thesis on the current literature is on the direct effect described by Kucza and Gebauer (2011) that SMEs should separate the service unit to ensure development success. However, by taking into account environmental factors, this thesis comes to a different finding where organisational separation is needed only in a particular organisational context. Therefore, the thesis proposes a ‘fit’ between structure and environment to ensure development success, instead of the proposed direct effect. Secondly, this thesis elaborates on the finding of Fliess and Lexutt (2019), stating the importance of adapting the HRM-approach when implementing product-service innovations. This thesis elaborates on this view by the finding that the HRM-approach is affected by the environment of the SME. The followed HRM-approach by an SME, therefore, should be aligned with the industry complexity of the SME. Thirdly, this thesis elaborates on the findings of Ambroise et al. (2019) by offering a general approach followed by SMEs consisting of an interplay between strategy and structure. This general approach applied by SMEs questions the conclusion of Brax and Visintin (2017) that within an SME ‘any-way-goes’ by providing a general approach that is applied within SMEs consisting of a top-down implementation of the strategy in a structure with ample autonomy and integration to ensure employees are able to collaborate successfully to learn and develop their network capabilities. However, this approach can differ in some parts based on environmental factors of the SME.

Besides the above described theoretical contribution, a second main contribution of this thesis is providing new insights on how SMEs ensure the successful development and managing of network capabilities. Several authors have proposed the need for customer-centricity in the strategy to execute successful collaborations with customers (Ambroise et al., 2018; Kohtamäki et al., 2013; Ritter & Gemünden 2004). In line with this finding, this thesis proposes an additional theoretical insight into how SMEs ensured customer-centricity. SMEs applied a critical customer selection *ex-ante* in order to ensure strong relationships are able to evolve. Ritter and Gemünden (2004) describe the need for developing a network orientated mission and vision. However, this thesis found out that SMEs formulate outcome related missions and visions, that indirectly imply collaborations for reaching the best fulfilment of the functionality, but the need for collaborating with partners is not stated formally. Elaborating on the ecosystem perspective of Lütjen et al. (2019) a central part of the SME their strategy is establishing a central role in the distribution chain of the customer which enabled them to better manage and coordinate the involved stakeholders in order to use and develop their capabilities to network successfully. Secondly, this thesis is providing insights on how to create the appropriate organisational structure. Previous studies have stressed the need for autonomy and integration (Gebauer et al., 2010; Raja et al., 2018; Sjodin et al., 2016). However, this thesis proposes several ways of how SMEs achieve a structure consisting of ample autonomy and integration. Secondly, this thesis broadens the scope of the organisational structure concept by including success factors for the collaboration design and the importance of establishing an appropriate data-infrastructure. Thirdly, this thesis elaborates on the finding of Wilden, Gudergan, Nielsen and Lings (2013) stating that the industry competitiveness positively affects the ability of organisations to develop capabilities. However, this thesis broadens this perspective by proposing that the customers their industry competitiveness also influences this ability because customers active in competitive markets are more inclined to start collaborations that enable SMEs their employees to use their network capabilities and execute collaborations to develop these network capabilities during these collaborations.

A final theoretical contribution of this thesis is providing new insights based on empirical evidence on the role of network capabilities for overcoming barriers when implementing product-service innovation. This thesis provides insights based on empirical evidence that the possession of network capabilities to collaborate helps in overcoming financial gaps. However, within the knowledge gap only technological related barriers are overcome with the possession of network capabilities which differentiate from the view of De Jesus Pacheco et al. (2019) that

described that network capabilities also overcome service-related knowledge gaps. However, SMEs in practice overcome this service-related knowledge gap by adapting their HRM consisting of an internal development program and changed hiring criteria. To give an overview of the findings discussed in chapter 2 and the findings of this thesis, table 5.1 is constructed.

5.2 Managerial Implications

Based on the findings within the successful SMEs, a strategic roadmap is created that can be found in appendix 8. Firstly, organisations should examine the environmental factors: industry characteristics, customer demand and legislation. Secondly, based on this environmental analysis, organisations should develop the strategic content consisting of the strategic plan and strategic intent on how to achieve the set organisational goals. In this development process, SMEs should include the service manager, so this person can influence the strategic direction of the organisation. This strategic content should include an outcome related mission combined with a long-term vision to formalise the goals of the organisation, to set the future direction of the organisation and motivate employees to start the development process. This motivation should be supported by establishing service-related training programs and seminars to develop knowledge position of employees. To ensure network capabilities success, the strategy of the organisation should imply forward integration of activities and critical customer selections to establish a more central role in the distribution chain of the customer and ensure strong relationships can evolve out of collaborations. The new strategy should then be implemented top-down in the organisation. However, the organisational structure must offer enough autonomy and flexibility for employees to enable them to adapt to changing customer demands. This autonomy can be established by creating a flat organisational structure, and organisational design based on roles or introducing a solution-driven department structure. To create sufficient integration between departments, one person or department should be responsible for leading the inter- and intrafirm project teams. Secondly, SMEs should strive to construct a data-infrastructure that automatically shares the information to the right people in order to unburden employees from the sharing activity and reduce the possibility of forgetting to share relevant information. This data-infrastructure creates a good overview that enables employees to learn. In the implementation, the organisation should support the execution of small pilot projects where co-creation leads to new product-service solutions. Collaborations should be driven by outcomes to create a transparent relationship driven by factual data. Executing these pilot projects enables employees to learn quickly from the collaborations with the involved partners. These learnings should then be gathered by top-management to shape the strategy and share the

Concept:	Current literature insights:	Thesis insights:
Network capability	According to the literature, the network capabilities of organisations plays an essential role in overcoming the specific barriers SMEs face when implementing product-service innovations. A higher degree of network capabilities helps overcome the financial- and knowledge gap. A second role described by the literature of the network capabilities is its increasing importance when implementing higher degrees of product-service innovations because these solutions are more of an integrative character.	This thesis can partly confirm the role of the network capabilities in overcoming specific product-service innovation barriers. This thesis encountered several examples of collaborations to overcome the financial gap SMEs face. However, within the knowledge gap, a distinction has to be made between technological related knowledge gaps and service-related knowledge gaps. These technological gaps are regularly overcome by collaborating with knowledge partners. Meanwhile, these service-related knowledge gaps are overcome by internal training and hiring requirements, because SMEs saw it as important to develop the service knowledge internally.
Strategy	The strategy of an organisation can play an essential role in the development of network capabilities by defining a clear strategy and enabling the development of network capabilities by training and recruiting of employees. Positive strategic elements for the development of the network capabilities are a network orientated mission and vision, and technological related strategy and a network focused HRM-management.	This thesis did not find evidence in the cases that technological relatedness helped in developing network capabilities. Secondly, this thesis found a different insight on the mission and vision of the organisation. Successful SMEs formulated, instead of network orientated, outcome-related or functional missions and visions to start the network capabilities development. The network-related HRM-management can be confirmed where SME executed internal training programs and different hiring criteria. Finally, this thesis found three important strategic elements in addition to the current literature: the strategic content (co-creation, service involvement), strategic focus (central role, customer focus) and strategy implementation (top-down, creating a support base)
Organisational Structure	The structure of an organisation plays an essential role in the development of network possibilities because it sets the boundaries where under the development of network capabilities takes place. It enables or disables the possibilities for employees to learn and develop the needed skills in order to fulfil the set strategy of an organisation. Positive organisational structure elements for the development of the network capabilities are slack resources, an open-culture and integrative communication.	This thesis can partly confirm the need for an open culture. However, SME put more emphasis on that the organisational design creates sufficient autonomy in order to adapt quickly to changing customer demand. In addition to the need for integrative communication proposed in the literature, this thesis has found practical implications how to create this integration and secondly this thesis proposes two important organisational structure elements: the collaboration design (outcome-driven, pilot projects) and the creation of a proper data-infrastructure that improves the information flow between organisational members that both unburden and give employees the overview for executing successful collaborations. Finally, this thesis denies the need of always separating the service unit, but instead, organisations should base this on their industry context and product-service solution.
Environment	The environment plays a vital role in moderating the success of strategic and structure decision an organisation makes. Positive environmental elements for the development of the network capabilities are a competitive environment, technological innovations and supportive legislation. However, Kohtamäki et al. (2019), in their literature review, found out that only a few (7 out of the 52 articles) of the service-related papers included environmental factors.	The thesis confirms the competitive environment as a driver for starting the development of capabilities. However, this thesis elaborates this view with the competitiveness of the environment of the customer. Secondly, the supportive effect of the legislation is found in the cases but SMEs also describe a negative effect of legalisations by, for example, the new privacy legislation. In this thesis, the role of technological innovations was not present in the cases. An additional element of this thesis is the role of industry characteristics. These specific characteristics like complexity, market transparency, customer demand, and market specialisation influenced the pathway or success with developing network capabilities within SMEs.
Alignment (interplay)	The success of the development of network capabilities depends on the interplay between strategy, structure and environment. Where large organisations can more easily obtain and internalise competencies and resources to create and establish the right 'fit', SMEs are found vulnerable because of their general lack of resources available and lack of internal competencies. None of the research papers adopted this view in the specific context of network capabilities development within an SME to overcome their specific barriers.	This thesis proposes three alignments SMEs created in practice. Firstly, the thesis describes the alignment between the top-down implementation of the strategy with an organisational structure that consists of enough autonomy to ensure employees can adapt. The second alignment is the network capabilities development approach that differs between complex and more simple industries. Thirdly, this thesis describes the alignment between the service unit integration or separation and the industry characteristics. Together, these three alignments prove the interplay between strategy, structure and environment and describe how SMEs differ in their approach based on environmental elements. Finally, this thesis describes a general approach on how SMEs implemented product-service innovation in their organisation and how they developed network capabilities successfully.

Table 5.1 Comparison literature and thesis insights

learnings as best-practices throughout the organisation to build additional support base for the strategy and reinforce the motivation for network capabilities development. SMEs should base their strategic decisions of integrating or separating of the service unit on the disruptiveness of the innovation and the product-service innovation degree. Secondly, the development approach between hiring employees with sufficient network capabilities or internal training of employees should be based on the industry complexity. Finally, the developed network capabilities can be used to overcome encountered financial- and knowledge gaps. The financial gaps can be solved by collaborating with resourceful partners in the ecosystem with the shared goal of optimising the value chain output. Technical related knowledge gaps can be solved by collaborating with knowledge partners on a specific topic. Meanwhile, service-related knowledge gaps have to be solved internally by executing service training programs or the hiring of an external servitization expert. To conclude, SMEs should realise that the change process is a gradual process which on average took SMEs between three to five years. It requires a constant interplay between setting out the strategic direction, testing it in practice and using this interaction to shape the strategy, supported by internal training programs and hiring the right people fitting this service direction. Constant communication by the board of best-practices and explaining the 'why' of the new strategic direction combined with the execution of pilot projects is needed to get the service-mindset deeply rooted in the organisation. In this approach, employees will develop their network capabilities continuously, supported by an organisational structure in which network capabilities are able to accel, ultimately leading to achieving product-service innovations in collaborations with customer and partners.

5.3 Research limitations

A well-known limitation of a case study is the limited generalisation of the findings. The research tried to minimise this limitation by conducting a multiple case study design of eleven cases. Secondly, analytical generalisation is followed. This analytical generalisation weakens the findings of this case study because there is a possibility that the findings are too context-specific. A possible solution could have been executing a multiple methods research design. However, because of the strict timeframe of this thesis, it was impossible to execute multiple methods. In response, further quantitative research questions are formulated in appendix 6. A possible limitation considering the internal validity of this research is the cognitive bias of the respondent where they create their subjective social reality overstating specific actions and their effects thereby increasing the change of overstating casual relationships (Miller & Salkind, 2001). Another limitation of the research is that often only one interview is conducted per case.

The initial idea was to conduct several interviewees per case. However, the researcher was unable to arrange this in all cases. In response, the researcher tried to collect an extensive number of documents; however, here, the researcher depended on the willingness of organisations to share these documents. Although, documents were fully anonymised organisation were hesitating to share them based on the sensitive information these documents contained. Another limitation is that two cases are not complying with the upfront criteria as described earlier. In some cases, the researcher encountered retrospective bias where respondents were unable to recall past events. This retrospective bias was especially the case within Organisation #11, where the interviewed organisational member did not experience the service transition himself. Sadly, enough more interviews with other organisational members were not possible. To reduce this adverse effect, more documents were gathered to construct the case. A final limitation is that interviews were conducted digitally, due to COVID-19, which made impossible for the researcher to pick-up non-verbal signs.

5.4 Further research questions

As described, the following questions are formulated to be tested on their statistical generalisation: is there a statistical relationship between industry complexity and development approach? Is there a statistical relationship between the degree of product-service innovation and the integration of the service unit? Is there a statistical relationship between success factors of the collaboration design and collaboration performance? Hypotheses are formulated in appendix 6 based on these questions. Secondly, more research is needed on how SMEs can create revenue models out of product-service innovation. Several SMEs described this as the main challenge in their current product-service innovations. Another further research direction is comparing the circular business model research with servitization research. These two topics seem to be closely related. Integrating these two topics can lead to new insights, and secondly, the circular thought can act as an overarching goal to accel the development of servitization research from a more sustainable perspective. Thirdly, more research is needed on the requirements of network capabilities in an ecosystem context. Two SMEs mentioned ecosystem collaborations as the next step for improving their product-service innovations. However, these SMEs experienced difficulties in starting ecosystem collaborations. Therefore, more research is needed on how network capabilities function in an ecosystem and if the described elements of network capabilities are also relevant in an ecosystem context. Finally, more research is needed on what the internal service training programs entailed to get a better insight into how these internal programs develop network capabilities of employees in practice.

Chapter 6 Conclusion

In this chapter, an answer will be given firstly on the several sub-questions as formulated in chapter 1. Secondly, a conclusive answer will be given on the central research question, and a new conceptual model will be presented.

6.1 Sub-question one: network capabilities

To conclude, this thesis can support the double role of network capabilities. Secondly, network capabilities can be seen as an essential element for overcoming the financial and technological related knowledge gap by collaborating with partners. However, the service-related knowledge gap in practice is not solved by the possession of network capabilities.

6.2 Sub-question two: strategy

To conclude, the strategy of the organisation is the starting point for the development of network capabilities. The strategy creates the motivation for employees to develop network capabilities by formulating the organisational goals and formalising the strategy in a mission and vision that is outcome related. The HRM-strategy of SMEs supports the created motivation for developing capabilities by offering training programs on service-related competences and adding network capabilities as hiring criteria when recruiting employees. Secondly, the strategy can ensure network capabilities success by setting the right organisational focus. Focus is created by defining customer groups to ensure successful collaborations are able to evolve that can grow into strong relationships which enable employees to learn out of the collaborations. Collaboration success is also created through the strategic focus of SMEs by establishing a leading role in the distribution chain that helps SMEs to manage and coordinate the involved partners. Besides the strategic content and focus, the success of the strategy in developing network capabilities also depends on how the strategy is implemented, and more importantly, how this strategy is supported by the organisations. At first, SMEs implement the new strategy top-down into the organisation. Support base has to growth by communicating the 'why' of the strategic direction and sharing best practices throughout the organisation. This service strategy is then gradually embedded in the employees way of thinking and working, which is reinforced by constantly sharing best-practices and having the right HRM-strategy in place to develop network capabilities continuously.

6.3 Conclusion sub-question three: structure

To conclude, the structure ensures the continuity of the development that is done by creating sufficient autonomy for employees in order to adapt to changing customer demands. This autonomy is created by establishing a flat organisational design. Secondly, responsibilities are

set deep in the organisation by designing a structure based on roles instead of tasks. A second important element for ensuring successful collaborations and constant learning is done by creating an integration between organisational departments. This integration is created by implementing a data-infrastructure to ensure the information automatically flows through the organisation. This unburdens employees from registration and sharing tasks. Thirdly, integration is created by making one person or a dedicated department responsible for leading service-related projects. This entity then has to integrate inter- and intrafirm members. An essential element for the development of network capabilities is that product-service innovations are often tested in pilot-projects. These pilot-projects with customers and partners ensures employees can test new ideas and learn quickly from it. In these collaborations, employees learn by doing it, in order to develop their network capabilities on the job.

6.4 Conclusion sub-question four: environment

To conclude, single environmental factors affect the willingness of other organisations to collaborate and thereby creating the opportunity for SMEs to use their network capabilities and to develop them during that process. Industry characteristics like customer demand and market specialisations positively influence the willingness to collaborate. Another decisive environmental factor for the willingness to collaborate is competition in the industry of the customer. Extensive competition in the customer's industry increases the willingness to collaborate. In general, the single effects of the environment are less impactful than the single effects of the earlier concepts. However, environmental factors do influence the development approach applied by SMEs, as will be described below.

6.5 Conclusion sub-question five: alignment

To conclude, three alignments are found within SMEs. The first alignment created is the 'fit' between the industry complexity and the development approach of an SME. In complex industries, the specific knowledge is crucial and therefore leading when hiring employees. Network capabilities are then internally developed by the organisation. This differs from the situation in less complicated industries where network capabilities hiring criteria are more empathised when recruiting. The second created alignment is the 'fit' between industry norms and the decision to separate the service unit. When the product-service innovation is experienced as disruptive, separation is needed to successfully develop the required service-mindset and network capabilities to avoid being hindered by current industry beliefs. Thirdly, an alignment is created by establishing a 'fit' between strategy and structure consisting of a top-down strategy set in a structure consisting of the ability for employees to adapt and learn.

6.6 Conclusion research question

To conclude, the strategy plays an essential role in starting the development of network capabilities. Meanwhile, the organisational structure ensures the continuity of this development and the possibility for employees to use the developed network capabilities successfully. The environment changes the approach followed by SMEs when developing network capabilities. An essential finding in the interplay between strategy, structure and environment is the general approach applied by SMEs in the development of network capabilities when implanting product-service innovations. The SMEs followed a general approach of top-down implementing the new strategy into the organisation. This top-down strategy is then set in an organisational structure consisting of ample autonomy and flexibility, which enables employees to adapt to changing customer demands created by environmental factors. This top-down implementation is needed to create organisational manoeuvrability to seize the product-service innovation opportunities but has to be complemented with autonomy for employees to adapt and learn on the job quickly. Learnings of the interplay between structure and environment are translated into best-practices and used to shape the strategy of the SME. These best-practices are communicated top-down throughout the organisation to ensure employees learn from it and secondly to reinforce the motivation for the development of network capabilities. Finally, a new conceptual model (figure 6.1) is presented, which is an elaboration on the conceptual model presented in chapter 2. The conceptual model consists of two blocks. The first block focus itself on the interplay and the second block focuses itself on overcoming the specific barriers. The question marks from the previous conceptual model are filled in with the findings of this thesis, and within the interplay block, the general approach is made visible.

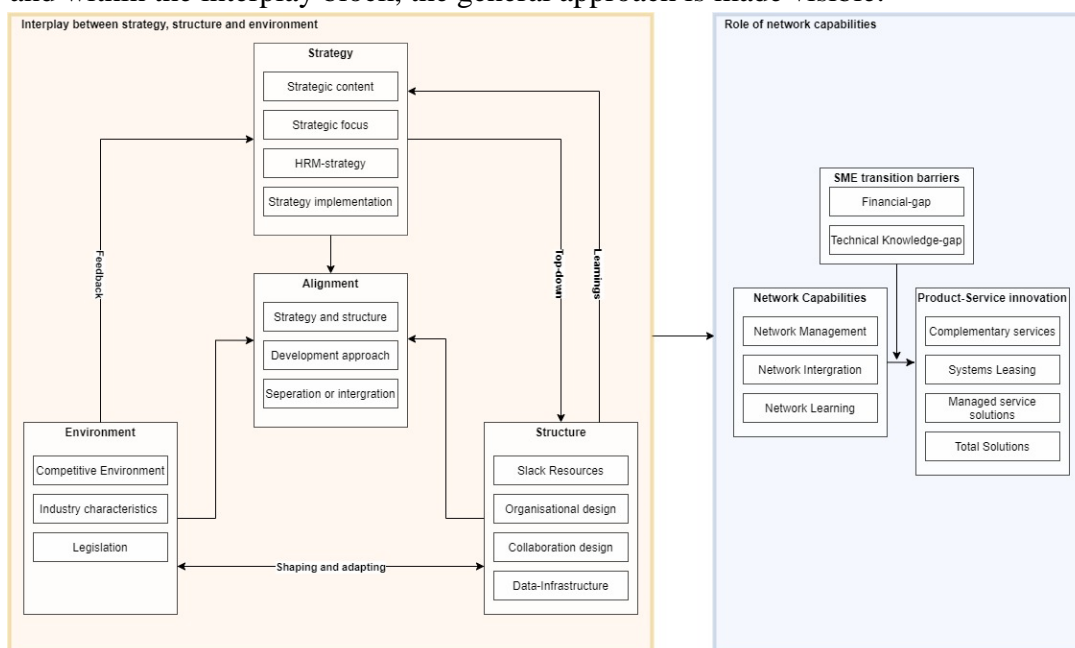


Figure 6.1 Final Conceptual model

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Appendix 1 Table overview of degrees of product-service innovation

Researcher:	Degrees of Service Innovation:
Tukker (2004)	<ol style="list-style-type: none"> 1. Product orientated 2. Use-Orientated 3. Results-orientated
Parida et al. (2014)	<ol style="list-style-type: none"> 1. Add-on customer service 2. Maintenance and product support services 3. R&D-oriented services 4. Functional and operational services.
Kindström & Kowalkowski (2014)	<p><i>Customer process focus:</i></p> <ol style="list-style-type: none"> 1. Process support services 2. Process availability services 3. Customer solutions <p><i>Product focus:</i></p> <ol style="list-style-type: none"> 1. Product life cycle services 2. Product availability 3. Product performance services
Brax, & Visintin (2017)	<ol style="list-style-type: none"> A. Products with limited support B. Installed and supported products C. Complementary services D. Product-oriented solutions E. Systems leasing F. Operating services G. Managed service solutions H. Total solutions

Table appendix 1.1 Overview of several degrees of service innovation in the current literature

Appendix 2 Table overview of literature on network capabilities

Network capabilities dimensions:	Important elements within dimensions:
Network management capability (Kohtamäk et al., 2013)	<p>Schreiner et al. (2009)</p> <ul style="list-style-type: none"> • Coordination • Communication <p>Parida et al. (2014):</p> <ul style="list-style-type: none"> • Involve new and existing partners • Develop partner understanding and • Align partner incentives <p>Lütjen et al. (2019) ('Reconfigure'):</p> <ul style="list-style-type: none"> • Creating an open mindset for a diverse set of partners • Evaluating opportunities with different partners • Screening distant markets and technologies • Gathering information of institutions, regulators and influencers
Network Integration capabilities (Kohtamäk et al., 2013)	<p>Schreiner et al. (2009):</p> <ul style="list-style-type: none"> • Provide reliable and timely responses • Being proactively • Spend time to connect • Attending seriously on partners views and ideas <p>Parida et al. (2014):</p> <ul style="list-style-type: none"> • Linking disconnected development processes • Adopt a value-based pricing strategy • Increase focus on flexibility and customization • Establish relationship management unit <p>Lütjen et al. (2019) ('Seizing'):</p> <ul style="list-style-type: none"> • Integration of value-adding and none-value-adding partners in the decision-making process • Pursuing a keystone position in the ecosystem • Controlling the bottleneck of the ecosystem • Management competence for open innovation
Network learning capabilities (Kohtamäk et al., 2013)	<p>Kale & Singh (2007):</p> <ul style="list-style-type: none"> • Codification • Sharing • Internalization • Articulation <p>Lütjen et al. (2019) ('Reconfigure'):</p> <ul style="list-style-type: none"> • Orchestrating of service systems • Realignment of knowledge-transfer to adopt cross-industry innovation • Establishing a useful governance structure for the ecosystem • Maintaining relationships to value-adding and non-value adding partners

Table appendix 2.1 an overview of the dimensions of network capabilities and their relevant literature

Appendix 3 Table on overall research approach

Research Sub-questions:	Data-collection method:	Research Activities:
How do network capabilities help overcome the service transformation-related barriers SMEs face?	In-depth interviews	-Pre-assessment of organisations -Conducting interviews - Adding case-description -Data-analysis (coding procedure)
How does the implemented strategy of an organisation influence the development of network capabilities?	In-depth interviews combined with relevant documents (annual-reports, strategic plans, meeting notes, website).	-Pre-assessment of organisations -Conducting interviews -Controlling information with documents - Adding case-description -Data-analysis (coding procedure)
How does the organisational structure of an organisation influence the development of network capabilities?	In-depth interviews combined with relevant documents (organisational hierarchy-structure, strategic plans, meeting notes)	-Pre-assessment of organisations -Conducting interviews -Controlling information with documents - Adding case-description -Data-analysis (coding procedure)
How does the environment of an organisation influence the development of network capabilities?	In-depth interviews combined with relevant documents (industry reports, annual reports, strategic plans)	-Pre-assessment of organisations and context -Conducting interviews -Controlling information with documents - Adding case-description -Data-analysis (coding procedure)
How do SMEs create the right alignment between strategy, structure and environment in order to develop network capabilities?	In-depth interviews	-Pre-assessment of organisations -Conducting interviews -Adding case-description -Data-analysis (coding procedure)

Table appendix 3.1 Overview of overall research approach

Concepts:	Items:	Interview Questions:
Strategy (Kohtamäki et al., 2019)	<p>Serviced strategy</p> <p>Value proposition</p> <p>Revenue generation logic</p> <p>Network Orientation in Mission and Vision</p> <p>Network HRM management</p> <ul style="list-style-type: none"> - Development of personal network skills - Requiring network skills within the organisation - Network related reward systems 	<p>Can you describe the product-service solution your organisation implemented?</p> <p>How does this product-service solution relate to the overall strategy of the organisation?</p> <p>Can you describe the kinds of value this product service solutions offer for the client?</p> <p>Does and if so, how did the strategy take into account the external network of your organisation?</p> <p>Can you describe the revenue model behind the product-service solutions?</p> <p>Do your organisations consist of a mission and vision? And if so, how does this relate to the external network of the organisation?</p> <p>How did adopting product-service solutions impact the HRM-strategy of your organisation?</p> <p>How did the strategy enable the organisation to develop service-related competencies?</p> <p>Does providing a service changed the type of employees this organisation hires?</p> <p>Does implementing a product-service solution changed the rewards systems in your organisation?</p>

<p>Structure (Kohtamäki et al., 2019)</p>	<p>Customer proximity Organisational design Network of actors Resource density and integration Service emphasized culture Slack resources</p>	<p>How would you describe the organisational structure of your organisation? How did the structure of your organisation enable the development of service-related competencies? How did implementing product-service solutions impact the structure of your organisations? Did the organisation appoint coordinators who are responsible for the relationships with the partners? How did implementing product-service solutions impact the culture of your organisations? How resource intensive is the provided product-service solution of the organisation? Can you describe the amount of integration of resources required between several organisations when offering you product-service solutions? Can you describe how the service interaction between your organisation and your customer is created?</p>
<p>Environment (Kohtamäki et al., 2019)</p>	<p>Competitiveness of the environment Supportive legislation for service innovation R&D intensity Industry Characteristics - Economic situation - Need for maintenance - Power of the customer</p>	<p>What were the essential environmental factors that initiated the implementation of product-service innovations? Did and if so, how did the environmental elements impacted the implementation of product-service innovations? Did and if so, how did the legislation play a role in implementing product-service innovation? Can you describe the competitiveness of the organisation's industry? Can you describe the R&D intensity of the organisation's industry? Can you describe the industry characteristics of the organisation's industry? (Growth, need for maintenance and power of customers)</p>
<p>Network Capabilities (Kohtamäki et al., 2013)</p>	<p>Network Management capability - Analyse in advance possible achievements with partners - Constantly assisting additional partners - Coordination ability in assessing new partners Network integration capability - Knowledge about partner - Good relationships with partners - Act flexibly towards partners Network learning capability - Re-alignment of knowledge transfer to adopt - Codification of new knowledge - Sharing of the knowledge between partners</p>	<p>Can you describe how the organisation determines in advance possible partners with whom to discuss the building of relationships? Do the organisations analyse what it would like to achieve with each partner? How does the organisation remain informed about the goals, potential and strategies of partners? Does the organisation regularly discuss with the partners how it can support one another in its success? Is this information about partners codified in the organisation and if so, can you describe how this is happening? Did the organisation appoint coordinators who are responsible for the relationships with the partners? How would you describe your organisation's ability to build good personal relationships with partners? Can you describe how your organisations solve problems that arise together with its partners? Did the organisation implemented specific changes for the better collaboration with partners and if so, what was implemented?</p>
<p>Barriers (De Jesus Pacheco et al., 2019)</p>	<p>Knowledge gap - Low design awareness - Lack of customer insights - Lack of managerial competencies Financial gap - Lack of financial resources - Insufficient ROI - Low-profit margins</p>	<p>Which challenges did your organisations experienced when implementing product-service solutions? How did the organisation overcome the experienced challenges? When implementing service solutions did the organisations experienced the challenge of insufficient resources, and if so, how did the organisations overcome this challenge?</p>

Alignment between three domains (Kohtamäk et al., 2013)	Strategy Structure Environment	Can you describe how the strategy and structure impacted each other when implanting product-service solutions for the development of service-related competencies? Can you describe how the environment impacted the service strategy of the organisation? Can you describe how the environment impacted the service structure of your organisation?
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Table appendix 3.2 Concepts and research questions

Appendix 4 Semi-structured questionnaire for in depth interviews

Organisation:	
Interviewee:	
Date:	

Introductie: Zoals vermeld is het doel van dit onderzoek om te achterhalen hoe de organisatiestrategie heeft bijgedragen aan het succesvol implementeren van services ter aanvulling op het productportfolio (Servitization). Het interview wat ik met je/u ga afnemen heeft een geschatte duur 45 minuten. Dit interview zal volledig geanonimiseerd verwerkt worden naar een interview transcript waarin elke mogelijke verwijzing naar de organisatie wordt aangepast/verwijderd. Tevens, wordt dit geanonimiseerde interview transcript enkel aan de beoordelaars van mijn scriptie onder geheimhouding verstrekt en niet opgenomen in eventuele publicaties. U heeft ten alle tijde het recht tijdens om te stoppen met dit interview. Indien er onduidelijkheden zijn schroom dan niet om mij te onderbreken. Heeft u voor dat het interview officieel begint vragen?

Kunt u uw organisatie omschrijven?

Wat is uw rol binnen de organisatie en waar bent u zoal mee bezig?

Welke servitization oplossing biedt uw organisatie momenteel aan?

Wat is de rol van producten binnen deze servitization oplossingen?

Welke afwegingen heeft de organisatie gemaakt bij het invoeren van servitization?

Als terugkijkt op dit proces, was servitization een succes of waren er problemen? Hoe kwam dat?

Hoe heeft de organisatie uitdagingen omtrent servitization opgelost?

Welke samenwerking moesten worden aangegaan om servitization door te voeren?

Waren daar problemen bij? Welke afwegingen waren daarin leidend?

Welke samenwerking met partijen ziet u als belangrijk en hoe zijn die geregeld?

Wat doet de organisatie omtrent de coördinatie tussen deze verschillende partijen?

Hoe heeft de organisatie getracht relaties op te bouwen met deze belangrijke partners?

Hoe wordt de informatie omtrent de samenwerkingen geregistreerd binnen de organisatie?

Heeft het bedrijf bewust ernaar gestreefd om samenwerking met klanten en andere partners te verbeteren, om het makkelijker te maken om servitization in te voeren? Hoe is dit bereikt?

Heeft het bedrijf bewust ernaar gestreefd de service vaardigheden van het personeel te verbeteren en voor het invoeren van servitization? Hoe is dit bereikt?

Hoe heeft het bedrijf gewaarborgd dat het personeel en de organisatie leert van de samenwerking tussen de verschillende partijen?

Heeft het invoeren van servitization de relatie tussen het bedrijf en de klant veranderd? In welke zin?

Hoe heeft de strategie van de organisatie servitization belemmert of bevordert?

Hoe heeft organisatiestructuur servitization belemmert of bevordert?

Hoe heeft de omgeving servitization belemmert of bevordert?

Waren er aanpassingen nodig om de strategie en de organisatiestructuur beter op elkaar aan te laten sluiten voor het doorvoeren van servitization?

Heeft de omgeving een rol invloed gehad op de strategie en organisatiestructuur? In welke zin?

Zijn er meer personen binnen uw organisatie die ik zou kunnen interviewen om mij een beter beeld te krijgen van het doorvoeren van servitization binnen uw organisatie?

Zijn er naast de open toegankelijke documenten nog meer documenten die mij kunnen helpen een beter beeld te krijgen van het doorvoeren van servitization binnen uw organisatie?

Kent u nog meer goede voorbeelden van servitization binnen het MKB die ik kan benaderen voor mijn onderzoek?

Appendix 5 Data-analyse (Inductive method)

As described in the 3.6 data-analyse this thesis will follow the inductive coding method of Boeije (2005), where the aim is to stay close with the empirically gathered data. The eleven case-description, which can be found in appendix book ‘Case description’, are analysed using the inductive method of Boeije (2005) in the tables constructed below consisting of three phases: I) open-codes relevant fragments based on the research questions in the text; II) Axial-codes the connection between similar categories of open-codes and III) selective-codes constructing new codes by comparing the axial-codes with theory to answer the research question.

Phase 1: Open coding	
Code no.	Fragment:
O1.	“In this process the organisation tries to advise the client in order to achieve the highest ROI possible.”
O2.	“Here organisation #1 is adding his technical knowledge to ensure the highest RIO is achieved.”
O3.	“Fourthly, the organisation analysis for the client how well the communication activity has performed to gather insights on the possible ROI of the action.”
O4.	“In this way Organisation #1 is unburdening the client and tries to cooperate as early in the process as possible to achieve the highest ROI”
O5.	“The above set direction started 6 years ago when the organisation made a vision document.
O6.	“This vision document consisted of the new direction of the organisation based on focus segments and focus products fitting the ambition of organisation #1.”
O7.	“This focus on added value changed the way the organisation was operating towards a more unburdening approach in helping the customer in its complete communication process.”
O8.	“A second central element in the strategy is that Organisation #1 strives to play a central role in the distribution chain of the client.”
O9.	“Thereby, the organisation is collaborating with different stakeholders and employees of the client that are active on higher strategic level where prices are of less importance.”
O10.	“An important activity to create the needed support base of this set strategy was constantly telling employees why this change is needed. Secondly, the organisation shared best practices of this new way of working with the organisation to empower the new way of thinking.”
O11.	“New employees where selected of their fit with the new direction.”
O12.	“A second organisational structure change was increasing the hiring requirements for certain jobs within the organisation.”
O13.	“Another important element in the organisation is that ICT is used to help the organisation reduce their working activities and thereby creating more capacity on relational activities with clients.”
O14.	“The organisation has their own ICT developers and they created a Word Document which include a standardized format when new ICT solutions has to be developed.”
O15.	“This documentation secondly helps to ensure more employees are able to learn from the development process and the knowledge is not kept within the involved persons.”

O16.	“Specifically, the transparent industry made it important to add services that where less transparent in order to improve the profit percentage of the organisation and distinguish the organisation from its competitors.”
O17.	“A second environmental impact is that their clients are more and more focusing themselves only on the creative side of communication solutions.”
O18.	“Realising this gap in the distribution chain made the strategy and set actions of organisation #1 relevant and accepted by the involved partners.”
O19.	“The strategy plays an important role in setting the direction, but in order to make the organisation move it has to be embedded in the organisational structure: the way people think, how they work and approach challenges.”
O20.	“This development within current personal was done mostly by training on the job giving them freedom to experiment with new collaboration and give they the autonomy to be pioneer.”
O21.	“Secondly, when new personal was hired this ability to network was an important requirement criterion.”
O22.	“A second element in the development of the network capability was the role of sales that changed towards consultants. Because sales set the boundaries at the start of the relation their pre-order process is important for the future relationship created with the client.”
O23.	“This involvement in an early stage changed to type orders the organisation required creating an effect on the back office and production of the organisation. Although, this created friction at the start, a good explanation why and sharing best practices reduced this friction.”
O24.	“A second barrier was the absence of acceptance by clients of the new role organisation #1 tried to fulfil therefore the organisation had to create a new image by sharing best practices outside the firm and proving their potential added value as central player in the communication distribution chain of the client.”
O25.	“The driver for implementing this type of services, one year ago, is based on a client wishes to reduce the downtime of machines.”
O26.	“In order to realize this goal, the organisation is focused on the functional performance of their systems creating the following promise: “We Keep Your Machines Running.””
O27.	“Thereby, setting this strategy helped to make the unconscious deliver value conscious delivered values and it helped in improve the value creation for clients.”
O28.	“The service department was creating as a separate department because it was conflicting with the installing mechanic departments.”
O29.	“This different structure created the autonomy to focus on providing services.”
O30.	“Secondly, it improved the integration between sales and services which is seen as important by the organisation. This integration offers the possibility to increase sales and the value creation for the client.”
O31.	“Besides reporting to the sales organisation, the service department codifies information in the Service-module of the ERP-system of the organisation.”
O32.	“It was the initial client which that was the driver for developing these offerings.”
O33.	“This organisation created is constructing a strategy that is emphasized on the functionality of products. In order to fulfil this, promise the organisation created a separate structure that gives the service organisation the freedom develop itself and provide the specific services needed.”
O34.	“The organisation hired an external service employee from a competitor to start the service process.”

O35.	“This new service employee was selected on the skills to communicate with clients to advise improvements and to argument them properly.”
O36.	“By codifying information with the organisation, it is ensured that the important employees learn from the service interaction and ensuring there is sufficient integration between the departments.”
O37.	“Because of the financial resources this solution requires the organisation is not able to provide this solution yet.”
O38.	“These organisations, internally referred to as brands, all focus themselves on a specific client segment and they are specialised in fulfilling the specific customer demand. The unique proposition of this organisation is that it both offers the construction, or called realisation, and exploitation of a building.”
O39.	“These contracts are agreed on several performance coordinators which are evaluated on regular basis.”
O40.	“An important element of this service solutions is that it is data-driven.”
O41.	“This platform is shared with the client and it is stakeholders to ensure a transparent relationship with the partners.”
O42.	“The strategy of the organisation is emphasized on playing a central role in the distribution chain during the realisation and exploitation of buildings.”
O43.	“Here the strategy consists of an increasing servitization of the business model and forward integration of the activities as described in the service solutions.”
O44.	“These complementary brands focus themselves on different customer group and stages of the building process.”
O45.	“Important to support this strategy is the long-term vision towards an integral construction organisation which created a shared goal both for the organisation and the collaboration partners.”
O46.	“This vision is needed to create the suiting mindset needed for realising this vision that consist of creating further partnerships.”
O47.	“This was done by focusing on a small group of employees that where positive about this strategic change and support them in the development of pilot projects.”
O48.	“This small group was encouraged to learn by doing it and try to execute several experiments to learn what works and what not.”
O49.	“This creates the need to extensive collaboration and service models that are positively received because it is experienced as more sustainable way of operating.”
O50.	“The structure of organisation can at best be described as a network organisation where employees do not have a task but roles.”
O51.	“To facilitate this network acting of employees Organisation #3 consist of an open office (working café where employees and stakeholders within the project are working together).”
O52.	“This network based organisational structure ensure employees have enough freedom and flexibility to fulfil project successfully.”
O53.	“Secondly, the working café acts as physical meeting place for both employees and partners which improves the relationship which enhances the collaboration between the partners and employees.”
O54.	“Together, this open working environment enables the network environment and cross-pollinations between projects.”

O55.	“The organisation has created a data-warehousing system which automatically shares the information with the right people and sets out actions in the ERP-system of the organisation.”
O56.	The organisation sees this activity of sharing information crucial to ensure people are learning and to integrate knowledge for the creation of successful projects.
O57.	“Another important element in the organisational structure of the organisation was to create a separate organisation at the start of the strategic direction of ‘building-as-a-service’.”
O58.	“Therefore, starting a separate organisation that learns by doing this innovation by conducting pilot projects and sharing the success of these project was seen as a successful way for creating change.”
O59.	“Because the traditional role of the organisation as head contractor in the construction of a building it was accepted that they played a central role in distribution chain.”
O60.	“Another positive environmental factor that enabled servitization was de shifted focus towards TCO.”
O61.	“New collaboration needed to improve TCO based on data-driven solutions where supported by the local government with several grants to enable these projects.”
O62.	Another environmental development that created a need for further collaborations was the specialisation of organisation to focus only on their core business.
O63.	“The need for creating a separate structure as described above, was needed because the new strategy of the organisation differed completely for the current organisation and industry beliefs.”
O64.	“This strategy was set in a network organisation based on self-steering teams that are working together on projects creating an open office where they could meet and integrate easily. This organisational structure helped created the freedom helped to start the right collaboration when needed to execute the strategy successfully.”
O65.	“This data-driven collaboration creates a transparent relationship and shared goal for the involved stakeholders that is agreed upon upfront.”
O66.	“A first element to ensure network capability is the inclusion of network capability related criteria in the requirement process of new employees.”
O67.	“Secondly, the organisation host regular knowledge session where employees are updated on new developments in the market by external specialist.”
O68.	“To ensure that not only the organisation develop knowledge a yearly HackaThon is organised where employees, partners and clients are creating new building concepts for the future. In this HackaThon the organisation discusses the future of their organisation with their partners and the role they have to play in it.”
O69.	“This concept thinking is crucial for creating new solutions and partnerships that can create better performing buildings.”
O70.	“The current challenge of the organisation towards the next phase is creating a revenue model of the data-driven solutions. The CEO does not know how to translate this gathering of data creating building optimisation into a revenue model.”
O71.	Therefore, these costs must be shared with partners to make it viable business case on a larger scale. The organisation sees the creation central platform and selling the access to the data as possible business model that needs to be tested in the near future.”
O72.	“The organisations see offering these services as the ultimate way to create a long-term relationship with the client, because these services consist of long-term agreements.”

O73.	“Organisation #4 sees these lease or rent business model as the model of the future because it consist of long term relationships with clients to ensure continuity for the organisation and secondly it is a business model where optimal fulfilling from the functionality (Providing Air) is created in the best and efficient way for the client.”
O74.	A core element in the strategy of Organisation #4 customer centricity. This customer centricity is the central element and the driver for the organisation to fulfil their need for air, the functionality, the best way possible.
O75.	“This long-term focus in client selection ensure that Organization #4 consist of clients that suit the organisation their core values to enable fruitful collaboration resulting in clients that are staying.”
O76.	“The set long term strategy is then set top-down in the organisation.”
O77.	“This top-down approach ensure that the organisation is able to transfer thoughts or ideas quickly into actions.”
O78.	“A second element is the strong KPI’s created on specific services target like achieving a balance of 60% service revenue against 40% product sales. This balance is according to Organisation #4 the right balance to create profit and timely refreshment of systems.”
O79.	“Finally, in the strategy service is treated as a shared task of the organisation, it is not seen as separate organisational unit, but as one organisation to ensure the client is helped in the best way as possible throughout its customer life cycle.”
O80.	“An important point in the structure is the belief of the organisation its management that information flow is the key activity to ensure organisational performance.”
O81.	“Therefore, the organisation has put a lot of attention to the information infrastructure and design the system: ‘Database, Matrix and Agenda’.”
O82.	“Secondly, the organisation tries to automate the information sharing and translation to tasks by the program FLOW.”
O83.	“This overview improves intrafirm collaboration and will be expended to also suppliers and other partners to also improve interfirm collaboration.”
O84.	“A second important structure decision of the organisation was to reduce the management layers in the organisation to create a more flatten organisation. This decision was creating more manoeuvrability for the organisation to adapt to its environment.”
O85.	“This proximity of the CEO to the service operation shifted the mind-set of the CEO form seeing service as a cost item towards a revenue item ensuring that service became a more central element in the strategy.”
O86.	“The organisation decide to follow a relational approach consisting of smaller service teams and regular meetings to shape a save environment where service employees were willing to share their opinion which was translate into action by the service manager part of the MT.”
O87.	“Organisation #4 is trying to reduce their dependence of these manufacturers by starting new collaboration that are able to provide Organisation #4 with parts on a longer basis.”
O88.	“Finally, the service manager of Organisation #4 see his membership of NDSM as important decision, because regular meetings with this service relation club inspires him to initiate new plans and secondly he is able to discuss challenge with several service managers from other organisations that help him to find solutions for challenges.”

O89.	“The strategy top-down approach is resulting in a flat organisational structure consisting of minimal management layers to be able rapidly change the organisation based on evolving customer demands.”
O90.	“Another alignment is the need for strategic collaboration with different part suppliers to reduce the dependence on large manufactures and their increasing rapid change of products disabling customer support for Organisation #4.”
O91.	“This value chain thinking enables to organisation to start collaborations.”
O92.	“Centralising this to one person it is clear who is in charge. Most of the time this coordinating person is active in the sales department of the organisation or a member of the MT.”
O93.	“Here the goal is to overreach this expectation, but also use this expectation of the partner to decide to collaborate or not.”
O94.	“To improve the network capability of the organisation an important element in the hiring strategy is the inclusion of personality test where they are looking for a specific creative and social profile, which is hard to find in combination with technical expertise.”
O95.	“A second element to ensure people are learning from each other are the daily stand-up meetings to discuss the day and key moments with each other.”
O96.	“This preference of ownership is decreasing the need for leasing and rent business models which offers Organisation #4 the opportunity to develop product-service innovations.”
O97.	“However, the organisation is still challenged by the fast pace of new information and the fact that not all information is transferable. Tacit knowledge is kept to certain employees meanwhile it can be of value for other employees as well.”
O98.	“However, the organisation is challenged in providing this service because it requires data-handling knowledge and information of the practical implications.”
O99.	“Therefore, the organisation started a collaboration with a sensor supplier, and it hired a new employee that is now doing a pilot with a bus user to gather data and information.”
O100.	“The organisations want to achieve a service solution that is more locally done by the agents than the current global support they are giving now.”
O101.	“A change in MT, that now consist of a more divers set of employees like the service manager helped to change this dominant product-logic more towards a service-logic.”
O102.	“In this new MT the service manager can influence decisions and propose new decision that helps change the mind-set of the organisation.”
O103.	“A second important criteria of the strategy are the element co-creation that is part of the strategy.”
O104.	“This top-down lead structure is clear for the organisation and feels save the employees.”
O105.	“This client which was leading in the redesign of some functionalities to complete client tasks to reduce the involvement of organisational members in certain task.”
O106.	“This process control is enforced with special ISO for the automobile sector. These ISO’s influence the operations of the organisation and the way they provide services, because they have to make sure they comply with the set rules.”
O107.	“A second environmental influence is the increasing willingness for clients to co-operate created by the increasing competition within the bus industry. New competition from for example China is pressuring local bus manufacturer to increase their performance.”
O108.	“The service influence on strategy level combined with the environmental pressure of clients has enhanced the service-related capability development.”

O109.	“The ability to cooperate with the client and other organisations is set as an important hiring criterion.”
O110.	“Secondly, because co-creating is a central element of the strategy of the organisation it is the DNA of the organisation to co-operate with clients.”
O111.	“New service offerings within the organisation, on for example predictive maintenance, are created with collaboration with knowledgeable partners and hiring of an external expert. The combination of these two actions reduce the knowledge barrier the organisation face when introducing these new services making them able to achieve a higher degree of service innovation.”
O112.	“Finally, a pilot project is started with a client to gather data and information on when to replace which part to in the future be able to predict when a part has to be replaced.”
O113.	“Codifying the data in the organisation and the establishment of an inter-firm project team ensure both organisations learn from this process.”
O114.	“Organisation #6 provides has the central concept ‘Energy-as-a-service’. This concept is delivered with completed with several services like advice, maintenance, replacement and training.”
O115.	“In pilot projects with client new concepts are tested on how to fulfil the client wish better. These small-scale pilots help develop these concepts within the organisation and get a better feeling how they can execute these offerings with success.”
O116.	“According to the organisation it is not with what, that should be central, but it should central what should be achieved and then Organisation #6 can offer the best solution for reaching the client goal both from a business perspective as from an environmental perspective. Additional elements are based on the wishes of the client.”
O117.	“Secondly, successful pilots are used as evidence to convince the internal and external environment of the importance of servitization. Sharing these successful stories helps to motivate people to develop the service-related capabilities and improve service offerings.”
O118.	“This changed the strategy towards a different line of thinking consisting of how we as organisation at can best complete the energy need of our clients and the products are only a way to achieve this.”
O119.	“A broad mission consisting of service-related elements and a clear future vision on what the role of Organisation #6 is in the ECO-system of the future set the direction of the organisation.”
O120.	“Reinforced by hiring people that consisted of a servitization mindset.”
O121.	“Inviting students and external experts on the servitization concept to explain this within the firm.”
O122.	“A second element was creation launching platforms of servitization concepts. Clients that consisted of a matching vision on how they see the future of the organisation where put in partnership on the strategic level combining R&D of both organisations to develop new and better concepts.”
O123.	“This launching platform build practice evidence to reinforce the servitization frame within the organisation. Sharing these success stories not only from the management team but also from the client perspective helped to enforce the motivation to implement services and develop service-related capabilities.”

O124.	“Selecting on the criteria of future fit, enabled to organisation to co-operate better and focus the internal organisation on the clients they can offer the most added value. This future fit applied in the selection of clients helped the organisation to select client fitting their organisation creating fertile partnerships with clients where they need is at best fulfilled.”
O125.	“This shared goal makes the separate units unite and work together when needed, instead of seeing it as different departments.”
O126.	“A second important element in the structure of the organisation is laying the governance as deep in the organisation as possible to ensure people are taken and executing their responsibilities to fulfil the client wish.”
O127.	“Because having a governance in place supported by a forgiving culture enables employees to take responsibility for trying to find the right approach based on the client wish.”
O128.	“Besides having a governance in place consisting of having the responsibility as deep in the organisation supported by an organisational culture where making mistakes are allowed to ensure people are experimenting the organisation made some changes in order to be able to fulfil the client wish better.”
O129.	“At first a step that is made was combining the R&D with New Business to make sure the client wish was leading in the development of new products and not the product. The R&D is also integrated with strategic collaborations integrating the client wish in the development of new products.”
O130.	“In summary, it is clear that the set strategy top-down explaining why and how to change, placed in structure that is able to experiment and collaborate with partners can reinforce and shape the servitization frame reducing the resistance to develop service related capabilities.”
O131.	“Constant communicating, giving to good example as MT and sharing best practices from a client perspective helped to enforce this servitization frame towards an organisation that is client central and sees itself as service provider instead of a product provider.”
O132.	“As discussed early on several strategic partnerships where started based on having complementary visions of their future, starting to together explore new concepts that fit that vision.”
O133.	“Firstly, they train their employees how to listen and how to communicate in a professional matter.”
O134.	“Listening and asking the right questions is seen as important capability to understand their needs in order to design the best service solution.”
O135.	“A third element to develop organisational network capabilities was including the ability to network, consisting communicating skills, analytical skills, conceptual skills, in the hiring requirements when hiring new personal.”
O136.	“A fourth element to ensure that the organisation learns from their service interaction is by having a constant flow of students in the organisations that are asking different questions, because they are not hindered by the organisational filter or past knowledge.”
O137.	“These conversation helps to envision the future role of Organisation #6 that help shape the organisation timely to fit the changing client wishes. Here the organisation looks broader than its own distribution chain but more from an Eco-System perspective.”
O138.	“From this perspective the organisation strives to find new business models outside their own system to get to better ‘out-of-the-box’ solutions. In the circularity challenges the organisation is

	offering this opportunity to organisation outside their value chain to start talking to interchange ideas and to develop new business models collectively in order to develop a more sustainable organisation.”
O139.	“The challenge consist that partners do not see it a sharing, but as competition disabling the need collaboration between the partners. The Eco-System partners see it as forward or backward integration which is experienced as hostile action instead of the intended idea of searching new sustainable business models together. Over coming this challenge is according to the organisation a manner of time where the trust is increased by having more interaction with each other.”
O140.	“The challenge consist that partners do not see it a sharing, but as competition disabling the need collaboration between the partners. The Eco-System partners see it as forward or backward integration which is experienced as hostile action instead of the intended idea of searching new sustainable business models together. Over coming this challenge is according to the organisation a manner of time where the trust is increased by having more interaction with each other.”
O141.	“As described in the above part an important element of the strategy is co-creation with the client as done in the ‘experience lab’ located at the headquarter of the organisation.”
O142.	“However, the head of the back office is recently transferred to a new function called: ‘Technical Consultant’. In this new function he is able to provide customers with technical support on a regular basis. He tasks is to build a relationship with the client and ensure that key-accounts delivered machines are operating optimally.”
O143.	“Secondly, this technical consultant is in charge of the ‘experience centre’ which helps him to co-create with these key-accounts.”
O144.	“The organisation decided on purpose to transform an already internally active employee to this new function because the industry of organisation #7 is complex and therefore hiring an external person would have cost more time.”
O145.	“Therefore, the industry complexity can make internal service development of an employee a beneficial and quicker way to expand the service offerings of the organisation.”
O146.	“In this vision employees are hired a then in the process the employees strive to collaborate with the client as best as possible.”
O147.	“This ‘experience lab’ offers employees the possibility to experiment with the client and gives employees the possibility to invite clients.”
O148.	“Learning for the organisation is ensured by storing the information digitally so it can be shared with the whole organisations.”
O149.	“A second barrier for the organisation is how to transfer the service offered by the organisation in a good revenue model that is both suiting for the client as for the organisation. The organisation sees the revenue potential but is challenged how it can tap the value of this opportunity.”
O150.	“An important element in this service solution is the motion terminal that is the connector between the several lifting machines.”
O151.	“This motion terminal developed with a strategic partner provides the connections between the systems and sends signals to the organisation to provide maintenance.”

O152.	“This combination of maintenance and providing improvements based on customer use helps extend the life cycle of their systems and ensure that machines are used efficiently and in best way throughout this life cycle.”
O153.	“A core part of the strategy of the organisation which according to the organisation is described as their DNA is customer centricity.”
O154.	“However, the strategy also made the introduction of services difficult. This is created because the organisations strive to growth internationally. In this international growth services are less of a focus point because of the increasing distance between the client and the organisation.”
O155.	“According to the organisation the structure is based on the principle of self-steering teams that are able to form their own networks within the organisation.”
O156.	The organisation propose that they need to further professionalize this service unit by designing a dedicated services organisations that consist of structured documentation, a complete integrated information system within the organisation and a service manager that is only responsible for providing service solutions to clients.
O157.	“A second driver is the client that wants to ensure and the point of selling the TCO of their investment providing a pressure to upfront better communicate and present the service contracts and activities.”
O158.	“This absence of service structure prevents the organisation in executing and selling more service contracts and in addition it prevents the organisation in developing service related capabilities because the responsibility on this aspect is unclear in the current organisation structure.”
O159.	“The network capability development is mostly realised with hiring the right people.”
O160.	“Secondly, the organisation hires external consultants that help the development of the service solutions.”
O161.	“The ability to be able to think conceptually about how integrative solutions of services can be offered is seen as crucial in the design of collaboration with clients or other strategic partners.”
O162.	“A second important element for the development of network capability was an external consultant, described by the organisation as coach. This coach did several sessions with the organisation to analyse the customer journey. Based on this analyse the customer journey was changed to improve the collaboration between the client and the organisation.”
O163.	“Based on this capability to network the organisation have started a strategic alliance with the developer of the motion terminal. In this way the organisation has reduced their knowledge gap on this new technology. In this partnership the organisation develops their knowledge to overcome the knowledge barrier that prevents offering services.”
O164.	Based on this capability to network the organisation have started a strategic alliance with the developer of the motion terminal. In this way the organisation has reduced their knowledge gap on this new technology. In this partnership the organisation develops their knowledge to overcome the knowledge barrier that prevents offering services
O165.	“A crucial element considering the strategy of an organisation the consulting organisation sees within successful firms is the need that the board of the organisation is committed on a servitization strategy.”
O166.	“This has then to be executed top-down in the organisation.”

O167.	“A second important element is that the organisation should consist of a vision on the future of servitization consisting of the implications for the business model and the role the organisation is going to play in this new way of collaboration. Having a vision on impact and the future role helps in guiding the organisation towards new commercial business model, which requires a clear servitization vision propagated within the organisation.”
O168.	“A culture where solving a client their functionality the best way as possible is a leading way of thinking.”
O169.	“A second element visible in successful organisation is that the structure of the organisation was based on workstreams. Thereby, the client task is central and then translated in a specific workstream.”
O170.	“In order to integrate the several workstreams when needed top-down guidance is needed to bring several workstreams together in project teams.”
O171.	For example, it will be beneficial if the service is conflicting with the product sales and secondly if the tasks are so different comparing to the current business then it can be beneficial as well.
O172.	“Creating this focus enables the client feedback in the internal processes of the organisation, meanwhile in unsuccessful organisation it is seen as a formality, in successful organisation the after sales is a key-department ensuring feedback is given throughout the organisation on a regular basis.”
O173.	“The readiness of the market plays a crucial role in which speed new servitization products are adopted by clients. It is of important the market is adopting the services to change the standard of the industry.”
O174.	“This mimetic tendency decreases the adoption rate of servitization business models. It needs a revolutionary organisation in the industry that gathers market share to accelerate servitization adoption.”
O175.	“This new legislation delayed the process of servitization between the three to five years, because it makes it harder for organisation to gather data and ensure the connectivity of their products.”
O176.	“Finally, some countries were better in servitization, like Germany, because they embraced the fundamental technologies for servitization like IoT and Industry 4.0 in the complete industry.”
O177.	“An important element of this network capability is that organisation is able to select partners on output related KPI and not on their image.”
O178.	“A third element within this network capability is that organisation envision themselves as coaches helping to reach the situation where the functional it fulfilled at the best way possible. Having this part of the culture is essential in the approach to a client.”
O179.	“The ability to network is something that has to part of the workers mentality which in ensured by communication the strategy of the organisation within the organisations and the board commitment to collaborate with key stakeholders.”
O180.	“Data is gathered in some cases, but the translation to practical solutions and improvements is not made by the organisation. The second difficulty is then how to translate this into a proper business model consisting of a good revenue model. SME’s are unknown about how to translate this into a structured offering and thereby missing the commercial opportunities that connecting machines brings for their organisation.”
O181.	Based on this data organisation #10 tries to help the client and see how they can improve by using their system.

O182.	“This service is more a way to prove the customer that he done the right investment. This need is driven by the more emotional driven customer segment. Organisation #10 tries to change this by combining data with product experts to come with factual evidence for the added value of their products.”
O183.	“This achieved by focusing the organisation on the functionality of the products.”
O184.	“This strategy focused on outcomes and performance set by top management is top-down enforced in the organisation and reviewed once per year.”
O185.	“A second important element of the strategy is that it focusses itself on three business segments.”
O186.	“A third important element of the strategy is that the organisation tries to be a central partner in the distribution channel of the client. By gathering the data and giving advice on the core-business of the client and collaborating with other partners of their client it ensures a central role in the distribution chain. Because of this central role the organisation increases their added value by collaborating with several partners of their client.”
O187.	“The organisation consists of a flat structure where there is ample flexibility to meet customer requirements.”
O188.	“A second important structural element is that the members of the organisation consist of double rolls. One roll can be that an employee is a product expert meanwhile he also plans the service activities for clients.”
O189.	“Before the organisation can provide more product-as-a-service solutions the new technology they are offering has to be accepted by the market seeing it as the best way to fulfil the need. Step-by-step this acceptance is improved but is more a gradual process that a disruptive process.”
O190.	“The need for product-ownership by clients.”
O191.	“Less transparent performance indicators make it difficult to provide a performance related business model.”
O192.	In conclusion, there is a top-down set and communicated strategy that is then set in a flat organisational structure that has enough flexibility to adapt to client wishes in order to prove the added value of the old fashioned industry standards thereby changing the industry with evidence based consulting services.
O193.	“Secondly, the current environment stresses the needed to prove the new technology thereby creating the need for gathering data an offer services to prove the increased performance.”
O194.	“However, the organisation firstly seeks a knowledgeable product expert and then screens the employee on its network capability.”
O195.	“Secondly, the organisation tries to improve this capability by regular trainings consisting of role-playing customer conversations and learning communicating methods that can help to better listen to the client and ask the right questions. The set strategy of the organisation builds on proving new technology needs this collaboration between client and organisation.”
O196.	“A second important element in the network capability development is the central role the organisation takes in the distribution channel of the client. Thereby, enabling themselves to coordinate the collaboration and managed the distribution their performance.”
O197.	“In this way they are trying to even better fulfilling the functionality organisation #10 is providing, because their machines improve the nutrition conversion of life stock.”

O198.	“This collaboration can overcome the financial barrier of organisation #10 and their clients in buying the capital-intensive machines, meanwhile it also helps the large feeding supplier increase their performance and build a better client relationship. This collaboration is a great example how collaborating can help overcome financial gaps by finding partners to better fulfil the functionality.”
O199.	The largest barrier for organisation #10 currently in the servitization transition is finding a revenue model for the offered services.
O200.	“Firstly, the organisation cannot pre-finance the machines, because it consists not of enough financial resources to be able to do this on a large scale.”
O201.	“Secondly, the client wishes the remain in ownership of the machines.”
O202.	“Together, these several service solutions offer customer the possibility to fully out-source their sprinkling and sweeping of routes which is described as ‘Organisation #11-as-a-service’.”
O203.	“The strategy of the organisation is described as servitization as a manufacturer.”
O204.	“The organisation has defined five customer groups based on their servitization readiness and organisational targets.”
O205.	“The organisation has defined five customer groups based on their servitization readiness and organisational targets.”
O206.	“Based on these five levels to organisation strives to configurate the best modular solution.”
O207.	“In formulating this strategy an external consultant was involved that together with the management of the organisation set out a clear vision considering the role of services.”
O208.	“This performance-based thinking helps the organisation to think how they can help the customer better and is used the evaluate the offered services of Organisation #11.”
O209.	“Finally, the ensure support base for the strategy best practices of new service offerings and new innovations are shared throughout the organisation the motivate the further execute the strategy.”
O210.	The departments and employee roles had to change towards a more solution driven design.”
O211.	“A new department called ‘solution development’, this department has to task to develop solutions as by making integral project teams across the organisation and outside the organisation to develop new solution based on customer questions.”
O212.	“A negative environmental factor was that the shareholders of the organisation did not understand the servitization strategy that well.”
O213.	“Customers changing the way of thinking towards more TCO approach created the possibility to offer more sophisticated service solutions.”
O214.	“This influence made, especially in the winter products, pay-per-use models not relevant, because the price per usage has to be too high.”
O215.	“As described in organisational structure, this solution development department was able to form integral project teams and develop new services based on customer demand.”
O216.	“A second example of creating alignment was the adjusting of the revenue model on the seasonal influences of the product.”
O217.	“These changes where a result of a service internal training program that the organisation calls: ‘Service 2.0’. In this training program organisation members where trained to think in how to offer services. Sales was trained on how to sell services and what they should ask to client to get a better insight in the demand a which performance Organisation #11 has to deliver.”
O218.	For some employees this strategy was not fitting their liking, because they wanted to sell products. This meant that some employees left the organisation.

O219.	“Because of this created vacancy’s the organisation was able to hire new employees based on a different selection profile more emphasized on the skills required to offer services.”
O220.	“A second important element within the organisation in the execution of collaboration is that the organisation learns by doing. The organisation, based on a customer question, start a pilot project for the development of a solution.”
O221.	“As described in the strategy this is also done to increase the support base and to reinforce the way of thinking.”
O222.	“Most external collaboration partners, beside the customers, are empathized on offering data-solutions. This is because creating this data-solutions of gather information and designing algorithms is far from the core-business of Organisation #11.”
O223.	“However, Organisation #11 needs to collaborate with external partners to develop these solutions to internalize this expertise for the development of these solutions.”
O224.	“Regularly explaining the concept of servitization and sharing best practices helped to convince the shareholders that created more financial resources that where needed to further execute the strategy. This lack of support base of the shareholders made the transition towards a service organisation take longer than was expected by the management team.”

Table appendix 5.1 Open-coding

Phase 2: Axial codes		
Code no.	Code description:	Open codes:
A1.	Focus on performance outcome in service offerings	O1, O2, O3, O25, O39, O60, O78, O157, O213.
A2.	Early involvement in developing process	O4, O23.
A3.	Long Strategic Vision of ECO-system	O5, O45, O72, O73, O76, O119, O132, O136, O167, O197.
A4.	Strategic decision to focus on customer segments	O6, O38, O44, O75, O124, O177, O185, O204, O205.
A5.	Strategy focused adding value in the value chain through the customer journey	O7, O91, O162.
A6.	Strategic decision to take the central distribution role	O8, O42, O43, O185, O196.
A7.	Collaboration on strategic level	O9, O164.
A8.	Frequently communication of strategy in the organisation	O10, O131.
A9.	Including network related criteria in hiring process	O11, O12, O21, O35, O66, O94, O109, O120, O135, O146, O159, O219.
A10.	ICT automation of information sharing between partners	O13, O31, O55, O81, O83, O98, O99.
A11.	Digital documentation of internal processes and expertise’s	O15, O36, O80, O113, O148.
A12.	Product price transparency driver for servitization	O16, O191.
A13.	Market specialisation open-up space for further services offerings	O17, O18, O62.

A14.	Importance that strategic is embedded in the people's behaviour	O19, O46.
A15.	Sharing best practice for building strategic support base	O24, O117, O123, O130, O165, O209, O221, O224,
A16.	Strategic focus on functionality (Customer tasks fulfilment)	O26, O74, O114, O116, O118, O152, O153, O169, O178, O182, O202, O203.
A17.	Service as a separate organisational unit (i.e. disruptive innovation)	O28, O57, O156, O172, O215, O63.
A18.	Importance of autonomy in service unit (i.e. governance deep, solution based)	O29, O33, O52, O64, O126, O210.
A19.	Integration between sales and services (i.e. double role)	O30, O188.
A20.	Changing of customer demand as driver for servitization	O32, O108.
A21.	External advisor when developing servitization strategy and implementation	O34, O121, O160, O208.
A22.	Financial barrier for developing full-service models	O37, O198.
A23.	Data-driven (evidence based) collaboration	O40, O41, O61, O65, O151, O181, O208.
A24.	Pilot projects in collaboration with partners to develop service offerings	O20, O47, O48, O99, O112, O115, O122, O130, O147, O220, O223.
A25.	Circularity as overarching strategic goal to collaborate	O49, O93, O138.
A26.	Network organisational structure based on roles	O50, O155.
A27.	Physical meeting place for collaborating partners	O51, O53, O54, O140.
A28.	Importance to share information to learn (I.e. daily stand-ups)	O56, O80, O95.
A29.	Organizing knowledge seminars from external experts to broaden knowledge	O67, O68, O89
A30.	Developing conceptual thinking of employees	O69, O162.
A31.	Challenge to find a revenue model in new service offerings	O70, O149, O180, O199, O200.
A32.	Top-down implementation of strategy	O77, O89, O104, O130, O166, O169, O185, O192.
A33.	Service integrated in the organisation	O79, O125.
A34.	Flat organisational structure	O83, O85, O89, O188, O192,
A35.	Relational approach to create open culture for bottom-up service improvements	O86.
A36.	Collaborations to reduce dependency in long term service offerings	O87.
A37.	Environmental pressures create need for collaboration	O90, O107.
A38.	Central person/department for coordinating the collaboration	O92, O142, O143, O211.
A39.	Challenge for leasing models when customer wants to remain owner	O96, O190, O202.
A40.	Offset international challenge by training agents	O100.

A41.	Service Manager part of the MT to have influence in strategic decisions	O101, O102, O108.
A42.	Co-creation core element of the strategy	O103, O110, O141.
A43.	Regulations influencing service offerings (i.e. ISO, AVG)	O106, O175.
A44.	Collaboration for overcoming knowledge and financial gap in data-solutions	O71, O111, O163, O222.
A45.	Safe organisational environment	O127, O128.
A46.	R&D Combined with new business for service development	O129.
A47.	Organisational training on network related capabilities	O133, O134, O195, O217.
A48.	Student involvement for building a learning organisation	O136.
A49.	Internal development of service people because industry complexity	O144, O145, O194.
A50.	International strategy hampers servitization process	O154, O158.
A51.	After-sales department key for creating feedback mechanisms	O172.
A52.	Market readiness's for servitization	O173, O214, O216.
A53.	Mimetic strategic tendency of organisations	O174.
A54.	Innovative product uses service to prove concept	O189, O182, O193.
A55.	Modular service design to adapt to different customers' demands	O206.

Table appendix 5.2 Axial-codes

Phase 3: Selective codes		
Code no.	Code description:	Axial code:
S1.	Collaboration design for creating collaboration success	A1, A2, A7, A16, A23, A25, A38.
S2.	Positive contribution of strategic content	A3, A6, A21, A41, A42, A54, A55
S3.	Positive contribution of strategic focus	A4, A5, A53
S4.	Alignment structure and strategy	A8, A14, A23,
S5.	HRM-strategy for developing network capabilities	A9, A30, A47
S5.	Data-infrastructure for organisational development	A10, A11,
S6.	Environmental effect on offering services	A12, A13, A20, A37, A43, A52,
S7.	Positive contribution of organisational design	A17, A18, A19, A26, A27, A33, A34, A45, A46.
S8.	Network capabilities for overcoming barriers	A22, A36, A40, A44
S9.	Learning by doing	A24, A35, A48, A51.
S10.	Servitization challenges	A22, A31, A39.
S11.	Strategic implementation approach	A32.
S12.	Alignment of development approach	A49.
S13.	Negative contribution of strategic content	A50.

Table appendix 5.3 Selective code

Appendix 6 Quantitative hypotheses for further research

As described in chapter 3.3 and chapter 5.3 in this appendix further hypotheses will be proposed that need to be tested statistical generalisation within a larger manufacturing SMEs sample. Below the findings of this thesis are translated to hypothesis:

Hypothesis group 1 Role of network capabilities:

H1a: SMEs consisting of a higher degree of network capabilities are more successful in overcoming financial barriers.

H1b: SMEs consisting of a higher degree of network capabilities are more successful in overcoming technological-related knowledge gaps.

H1c: There is no difference between organisation consisting of a high degree of network capabilities or low when overcoming service-related knowledge gaps.

Hypothesis group 2 Role of strategy in developing network capabilities:

H2a: SMEs consisting of outcome related mission and vision are more successful when providing product-service innovations.

H2b: SMEs consisting of (less) focus customer groups are more successful when collaborating.

H2c: SMEs acting as a central player in the distribution chain of the customer are more successful when providing product-service innovations.

H2d: SMEs consisting of an HMR-strategy focused on developing network capabilities are more successful when providing product-service innovations.

H2e: SMEs implementing the strategy top-down are more successful when providing product-service innovations.

H2f: Sharing best-practices regularly in the organisation increases the support-base for the product-service strategy.

Hypothesis group 3 Role of structure in developing network capabilities:

H3a: The more autonomy an organisational structure of SMEs consists of the more successful the SME is when providing product-service innovations.

H3b: The more integration between departments an organisational structure of SMEs consists of the more successful the SME is when providing product-service innovations.

H3c: The more data-driven the collaboration is, the more successful the collaboration will be.

H3d: SMEs executing more pilot projects are more successful in offering product-service innovation.

H3e: SMEs executing more pilot projects consist of a higher degree of network capabilities.

H3f: SMEs implementing a higher degree of product-service innovation are more successful when integrating this in the current organisational structure.

Hypothesis group 4 Role of environment in developing network capabilities:

H4a: Specialised industries consist of more successful collaboration between SMEs

H4b: Competitive industries consist of more successful collaboration between SMEs

H4c: Price transparent industries are favouring product-service innovations.

Hypothesis group 5 Alignments for developing network capabilities:

H5a: SMEs implementing the strategy top-down in an organisational structure consisting sufficient autonomy and integration are more successful when implementing product-service innovation.

H5b: SMEs operating in a complex industry with an HRM-strategy consisting of an internal development program for network capabilities consist of higher degree of network capabilities.

H5c: SMEs operating in simple industries with an HRM-strategy consisting network-related hiring criteria for network capabilities consist of higher degree of network capabilities.

H5d: SMEs implementing a disruptive product-service innovation are more successful when this is done in a separate organisational structure.

Appendix 7 Research notes

Research note #1 Current literature (10-03-2020)

Description: A possible limitation of this research considering construct validity is the amount of overlap between concepts and usages of the same concepts in different ways within the literature.

Implication: making it challenging to distinguish items and concepts in this research that can decrease the construct validity of this research.

Action: more use of tables to give a better overview to the reader. Secondly, the research was less strict on the concepts.

Reflection: because of the qualitative nature of this research distinction between concepts was less important. However, it limited the research to a certain degree when comparing research.

Research note #2 COVID-19 Restriction (17-03-2020)

Description: because of the COVID-19 restriction physical interviews were impossible.

Implication: the implication of this restriction is that during the interview non-verbal signs cannot be picked-up by the researcher which can lead to validity limitations.

Action: in replacement of the physical interviews digital interviews were executed. Where within some interviews the respondent agreed to do the interview with the camera on to reduce the limitation.

Reflection: to reflect minimal validity issues are expected, because of the execution of digital interviews. However, the researcher cannot say that with 100% confidence.

Research note #3 exception organisation #7 (28-03-2020)

Description: Organisation #7 is currently extending its product-service offerings. In order to develop these new service solutions.

Implication: there is a possibility of gathering fewer interesting findings or even conflicting findings because of the different organisational size.

Action: because it was early in the research process and the research was not confident in getting enough interviews the researcher decided to execute the interviews. Secondly, the research read about an innovative concept about co-creation which could lead to new insights.

Reflection: Looking back to the situation **Organisation #7** introduced an innovate concept to enable co-creation with the customer, which resulted in relevant insights considering the research questions.

Research note #4 exception organisation #11 (02-04-2020)

Description: Organisation #9 is a consulting organisation implementing servitization solutions within SMEs and therefore not meeting the set criteria.

Implication: there is a possibility of gathering fewer interesting findings or even conflicting findings because of the different organisational size

Action: because it was early in the research process and the researcher was not confident in getting enough interviews the researcher decided to execute the interviews. Secondly, the researcher read about an innovative concept about co-creation which could lead to new insights.

Reflection: because this organisation has guided several transitions, this resulted in a general overview of several cases at once to understand better changes organisations made to develop network capabilities. Secondly, in the early interviews, it was regularly described that SME used consultants when implementing product-service solutions. Therefore, this case gave a better insight into the role of this consultant and his perspective in the transition.

Research note #5 retrospective organisation #11 (30-04-2020)

Description: retrospective bias was especially the case within Organisation #11, where the interviewed organisational member was reasonably new to the organisation, and therefore he did not experience the service transition.

Implication: not a good insight on how the service transition is received by the organisation and what is done by the organisation.

Action: at first it was tried to arrange more interviews but sadly enough this was not possible. Secondly it was tried to gather more documents to get a better insight on the case.

Reflection: the documents helped to get a better insight on the cases. The best solution was sadly enough not possible, but the extra documents helped to still construct a case with enough insights.

Research note #6 general availability of documents (02-06-2020)

Description: the researcher depended on the willingness of organisations to share these documents. Although, documents were fully anonymised organisation were hesitating to share them based on the sensitive information these documents contained.

Implication: not a good insight on how the service transition is received by the organisation and what is done by the organisation and secondly fewer effective data-triangulation.

Action: it was stressed to the respondents how important the document sharing was and that these documents are anonymized in the reporting. Secondly, the researcher did extensive research to articles within the specific context.

Reflection: within some cases the number of documents was low, but overall, there were extensive documents. However, the quality of the documents could have been higher.

Appendix 8 Strategic Roadmap

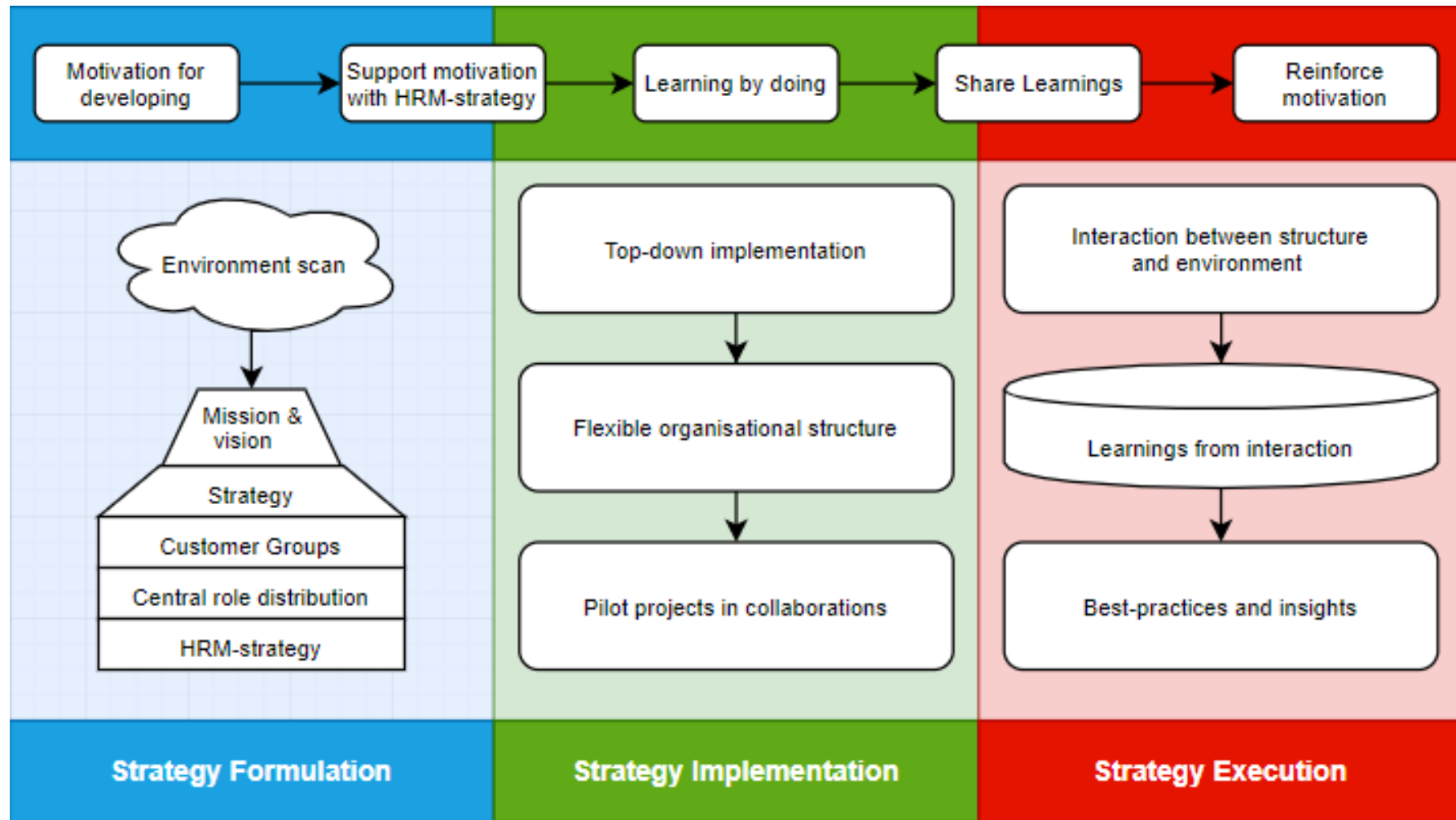


Figure appendix 8.1 Strategic roadmap for developing network capabilities