UNIVERSITY OF LIVERPOOL

Upstream network actors' operational capabilities for servitization through service offshoring: Impact on the performance of manufacturers' service offshoring contracts

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor in Philosophy

by

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March 2020

Declaration

This thesis has not been submitted for any degree and is not concurrently submitted for the application of any other degree from any other university.

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Abstract

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Drawing on the operational capabilities perspective, this thesis aims to investigate how upstream network actors (manufacturers' service delivery centres & local service specialists) contribute to manufacturers' operational capabilities through captive offshoring and offshore outsourcing contracts, and how these capabilities influence manufacturers' service offshoring performance.

To address this research aim, this thesis adopts a mixed-methods research design integrating qualitative and quantitative examinations. The qualitative study conducts 26 semi-structured interviews with senior managers in service offshoring companies to explore and identify operational capabilities contributed by manufacturers' offshore upstream network actors. Thematic analysis to the qualitative data identifies seven operational capabilities from manufacturers' captive offshoring and offshore outsourcing (i.e. 'process improvement' ('PI'), 'scalable service-enabling technology' ('SST'), 'scalable and well-trained service talents' ('SWS'), 'service and process innovation' ('SPI'), 'product/service customisation' ('PSC'), 'in-country relationship management' ('IRM') and 'security and IP protection protocols' ('SIP')). The subsequent quantitative study proposes seven hypotheses regarding the contributions of seven operational capabilities on manufacturers' service offshoring performance, as well as the moderating effect of service offshoring modes on these relationships. Through a large-scale survey in five cities of the Yangtze River Delta region of China, the research collects 360 sets of responses from 1734 firms involved in manufacturers' service offshoring contracts. Hierarchical multiple regression analysis confirms that 1) all capabilities contribute to manufacturers' service offshoring performance and 2) service offshoring mode only moderates the relationships between each of the three operational capabilities (i.e. 'SST', 'SWS' and 'SPI') and performance.

This thesis makes four major theoretical contributions. First, it focuses on manufacturers' offshore upstream network and discusses the uniqueness of the identified operational capabilities, which complement the downstream capabilities in the servitization literature. Second, it evaluates the importance of operational capabilities to manufacturers' service offshoring contracts. Third, this thesis provides an alternative perspective (other than transaction costs) to explain manufacturers' service offshoring choices, given that 'SST' is more important for captive offshoring (Mode 1), while 'SWS' and 'SPI' are more important for offshore outsourcing (Mode 2). Fourth, the qualitative stage of this thesis identifies in-country outsourcing as a new mode of offshoring (Mode 3) which updates our understanding of manufacturers' service offshoring arrangements and suggests further investigation.

This thesis also provides important practical implications. First, servitizing manufacturers should consider the transferability of specific operational capabilities when choosing service offshoring modes. Second, service delivery centres should work with local service specialists for operational capabilities development. Third, local service specialists should understand the capability requirements of manufacturers & service delivery centres and develop mutual trust with them. Fourth, local authorities should consider developing a comprehensive set of infrastructure and environment to attract investors from the service offshoring sector.

Despite the author's efforts, this study is subject to several limitations which require future research, such as developing objective measures for the performance of manufacturers' service offshoring contracts, considering both upstream and downstream network actors of manufacturers' servitization activities, and comparing onshore and offshore servitization.

Acknowledgements

My deepest and most sincere thanks must go to my PhD supervisors, namely, Dr Woonkian Chong, Dr Lixian Qian and Dr Chris Raddats. Throughout my doctoral study, they have offered tremendous support, generous encouragement and professional friendship.

I am grateful to Xi'an Jiaotong-Liverpool University and the University of Liverpool for the scholarship that has made this study possible and for the opportunities to work with helpful academic staff from International Business School Suzhou (IBSS) and University of Liverpool Management School (ULMS).

I am grateful to the service offshoring professionals who have responded to my interview and survey invitations and helped with my research project.

I would like to thank my editor from Elite Editing, who proofread and edited this thesis. Editorial intervention was restricted to Standards D and E of the *Australian Standards for Editing Practice*.

I would like to thank my parents for their encouragement which makes me the first doctorate researcher in the family.

Finally, I would like to thank my wife Junmei, for her patience and encouragement during my PhD study.

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Chapter 1: Introduction

1.1 Research context

Organisations have increasingly acquired goods with higher domestic production costs from international sources, including wholly-owned business units and third-party local specialists. This is known as ‘offshore outsourcing’ (Oshri & Uhm, 2012). Offshore outsourcing has evolved from the relocation of manufacturing processes (e.g. semiconductor & running shoes) since the 1960’s for cost-effectiveness to also include the relocation of services (e.g. software development) since the 1970’s, not only for cost savings, but also for additional resources and capabilities (Bartlett & Beamish, 2018; Metters & Verma, 2008; Roza et al., 2011).

The evolution of offshore outsourcing might be attributed to manufacturers’ increasing attention to the provision of services. Several manufacturers (e.g. Caterpillar, IBM, and Rolls Royce) have gradually added services to core product offerings for the purpose of creating additional customer value. This evolutionary shift of a manufacturer’s mission and business model to take services as its engine of growth is termed as ‘servitization’ (Raddats et al., 2019). Servitizing manufacturers evolutionarily extend their product-centric business models by providing services that 1) allow customers to own and use products (e.g. spare parts supply, warranty and self-help services), 2) allow customers to conduct basic maintenance (e.g. basic repairs), with manufacturers providing the important repairs and overhauls, and 3) deliver specific capabilities through product performance, with manufacturers taking over

customers' business processes (e.g. R&D, consulting and financial services) (Baines & Lightfoot, 2014).

Drivers of servitization include customer requirements for solutions (Baines & Lightfoot, 2014), the pressure to deliver differentiated offerings (Dachs et al., 2014), competition from new entrants (Gebauer et al., 2011), business environment changes (Parida et al., 2014), new and stable sources of revenue (Malleret, 2006) and innovations (Visnjic et al., 2016). According to the latest industry reports from Infosys Consulting (2018), over 70% of the 750 global manufacturers plan to deliver services in the next three to five years, since servitization can bring considerable benefits (e.g. reduced logistics costs, reduced lead times and inventories and increased flexibility and responsiveness).

Services can be categorised progressively from base services to more complex services (i.e. advanced services) (Gebauer et al., 2010). According to Baines and Lightfoot (2014), base services are defined as those involving 'outcomes focused on product provision' (e.g. spare parts supply, repairs and reactive maintenance), while advanced services can be defined as those involving 'capability delivered through product performance' (e.g. R&D, consulting and financial services) (p. 4). While base services mainly support the functioning of products and are exchanged in a transactional manner, advanced services involve delivering specific capabilities that arise from the use of manufacturers' products or the involvement of manufacturers in customers' business processes (Brandl et al., 2018; Lightfoot et al., 2013; Martinez et al., 2017). Advanced services may help manufacturers to generate higher customer value (Kindström & Kowalkowski, 2014; Reim et al., 2019) and obtain greater profits

(Böhm et al., 2017; Eggert et al., 2011). One advanced service, business process outsourcing (BPO), involves manufacturers providing services that support customers' operational activities (e.g. product design and facilities management) (Barthélemy & Quélin, 2006; Finne & Holmström, 2013; Graf & Mudambi, 2005). Renowned examples of manufacturers' BPO activities include Cannon's pay-per-page contracts and process design services that integrate analysis, skills and performance for customers [1] and IBM's smart building solutions, global software and consulting services.[2]

Servitization can be challenging to achieve, with many manufacturers finding it hard to profit from the services they have developed, as their substantial investment in extending services leads to increased service offerings and higher costs but not corresponding higher returns (Gebauer et al., 2005)—the so-called 'service paradox in manufacturers'. Despite their capabilities in producing physical products, manufacturers may not inherently possess the capabilities to develop and deliver services, which are often intangible, heterogeneous and perishable in nature (Gebauer et al., 2013; Hübner et al., 2018). Servitizing manufacturers may thus need to reconfigure their existing capabilities and develop complementary capabilities through interactions with other service organisations in their service networks (Kowalkowski et al., 2017; Raddats et al., 2017).

The concept of service network appears in the marketing and supply chain literature. Lusch et al. (2010) draw on the service-dominant logic and develop the concept of the value network, which denotes a structure where social and economic actors interact

[1] https://cbps.canon.com/managed-services/business-process-outsourcing
[2] https://www.ibm.com/services/process/outsourcing

through spatial and temporal dimensions to co-produce service offerings and exchange services. Value networks often feature a global presence and structural complexity, forcing network actors to sense and respond to environmental changes (Flint & Mentzer, 2006). As one type of value network, manufacturers' service networks may include backwards links to upstream network actors and forwards links to downstream intermediaries and customers (Gadde et al., 2003; Gebauer et al., 2013; Parida et al., 2015; Prahalad & Ramaswamy, 2003). Interactions with service network actors can be achieved through different inter-organisational arrangements, such as acquiring business partners (mergers and vertical integration), strategic alliances and buyer-supplier relationships (e.g. outsourcing) (Hillman et al., 2009; Lai et al., 2013).

In short, when developing services of increasing complexity, manufacturers may face challenges such as 'service paradox' which lead to higher costs. Some manufacturers may lack the necessary in-house operational capabilities. In response, these manufacturers may need complementary capabilities from service networks, including upstream network actors and downstream intermediaries and customers. The next section (research problem) will discuss the extant studies about the capabilities developed from manufacturers' downstream network actors and justify the need to explore the capabilities of upstream network actors through service offshoring contracts.

1.2 Research problem

This thesis focuses on the capabilities developed in a manufacturer's offshore service network through interactions between the manufacturer and upstream network actors in the form of service offshoring. This section introduces the manufacturer and

downstream-actor perspectives in an exploration of capabilities for servitization success. It also highlights the research problem, which is under-explored in the literature: for their servitization efforts to be successful, manufacturers may need capabilities from upstream network actors in an offshore context.

To date, a large number of servitization studies have investigated the capabilities required for manufacturers to develop and deliver services. These studies (e.g. Baines & Lightfoot, 2014; Cui et al., 2019; Sjödin et al., 2016) often take a focal-firm perspective. For instance, Sjödin et al. (2016) explore the capabilities (e.g. service development, network management and digitalisation) required for cultural change and innovation within a focal firm, Baines and Lightfoot (2014) identify different categories of technology and methods for focal manufacturers to successfully deliver advanced services, and Cui et al. (2019) investigate the capabilities required for a global heavy-vehicle manufacturer to adjust its strategic decisions as the servitization model grows more complex.

Unlike these focal-firm perspective holders, Tax et al. (2013) argue that a manufacturer's capability constraints may require interactions with its service network actors for service capabilities. In line with this, a multi-actor perspective has recently become more common. This perspective takes into account the servitization capabilities that are achieved through interactions between manufacturers and service network actors (Kuijken et al., 2017; Raddats et al., 2019). Further, among the emerging literature regarding the importance of manufacturers' service networks (Reim et al., 2019; Story et al., 2017; Weigel & Hadwich, 2018), most attention has been paid to the interactions between manufacturers and their downstream customers

in delivering services in local markets. For instance, Reim et al. (2019) highlight the importance for manufacturers to interact with customers; that is, involving customers in service development to improve customer knowledge and readiness in performing basic repairs to equipment.

In comparison, scant literature has focused on the importance of the upstream environment (e.g. product and service component providers) for manufacturers to develop advanced services. Manufacturers' upstream networks can be understood as cooperation between a manufacturer and the firms that are supplying resources and capabilities to it; the cooperation can vary between hierarchical integration (e.g. focal manufacturer and service deliver centre) and contractual arrangement (e.g. buyer-supplier transactions) (Weigel & Hadwich, 2018). Upstream network actors contribute complementary resources and capabilities that enable manufacturers to improve scales of service and expand markets while focusing on core capabilities through service outsourcing contracts (Gao et al., 2014; Tsay et al., 2018).

Some investigations (Ardolino et al., 2018; Finne & Holmström, 2013; Reim et al., 2019; Zhou et al., 2020; Ziaee Bigdeli et al., 2018) mention interactions between manufacturers and upstream network actors. For instance, Ardolino et al. (2018) explore the different paths for manufacturers to develop digital capabilities that can facilitate their service transformation; these authors recognise that external sources such as (upstream) suppliers can serve as an important source of digital capabilities required for manufacturers' service transformation and suggest that future research is needed to address this knowledge gap. Finne and Holmström (2013) stress that manufacturers providing integrated solutions rely on the capabilities of service

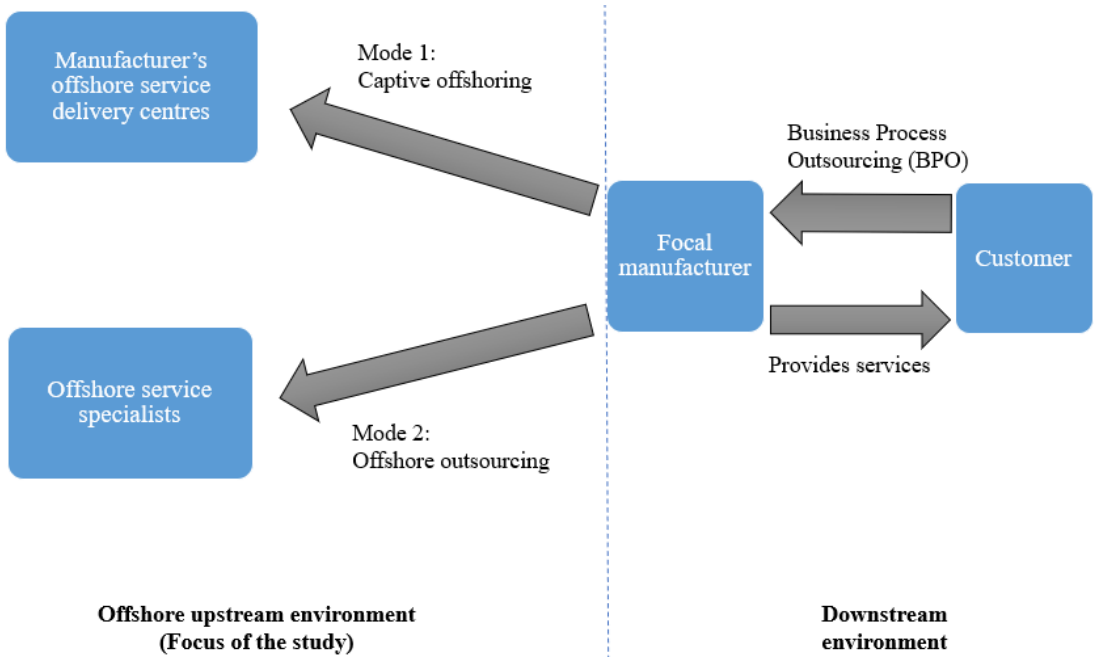
providers and that relationships between manufacturers and upstream network actors are critical to ensuring the requisite capabilities for service provision. Likewise, Zhou et al. (2020) confirm the importance of the relationship between manufacturers and upstream network actors for manufacturers' servitization performance. Reim et al. (2019) recognise the importance of global service network actors in servitization, but limit their focus to these service network actors themselves; that is, how these actors may implement strategies to address market-related challenges for themselves, instead of how these actors contribute capabilities for manufacturers' servitization activities. Notably, these studies do not focus on the capabilities derived through service offshoring, one of the most important interactions between manufacturers and their upstream network actors for capabilities in an offshore context.

Service offshoring refers to 'the transnational relocation of service activities that a firm previously conducted within its home country' (Pisani & Ricart, 2016, p. 386). Focal firms can engage in service offshoring internally through captive offshoring (i.e. relocating services to fully owned service delivery centres in foreign locations) or externally through offshore outsourcing (i.e. procuring services from foreign service specialists) (Luo et al., 2013; Pisani & Ricart, 2016). To develop capabilities for their services, manufacturers may relocate some business processes to upstream network actors from offshore locations through service offshoring contracts.

Figure 1.1 depicts a manufacturer's interactions with its service network actors; importantly, it also depicts the focus of this study: the interactions with actors in an offshore upstream network environment through service offshoring contracts. As Figure 1.1 shows, a manufacturer interacts with its downstream customers by taking

over some of their business processes but also outsources some services to upstream network actors in offshore locations.

Figure 1.1: Manufacturers' interactions with downstream and offshore upstream service network actors (source: the author)



The manufacturer may develop some capabilities internally through captive offshoring (Mode 1), and other capabilities externally through offshore outsourcing (Mode 2). These two offshoring modes may contribute to the manufacturer's capabilities in different ways. For instance, IBM's global service delivery centre in Shanghai provides consulting, finance and training services to customers, thereby allowing its parent firm to achieve economies of scale (Raassens et al., 2014), cost reductions (Raassens et al., 2014) and improved service quality (Kalaignanam et al., 2013). In contrast, due to ever-growing complexity and rapid technological changes, the aircraft manufacturer Boeing outsourced 70% of the B787 program to service specialists in Asia and Europe, who provided financial and risk-sharing services. These service

specialists were selected because of their abilities to develop the agreed capabilities, to finance Boeing's R&D activities and to share risks (Beaugency et al., 2015).

Some offshoring studies have highlighted the importance of capabilities from service specialists (one type of upstream network actor). For instance, the survey conducted by Mohiuddin et al. (2019) finds that access to the capabilities of service specialists drives focal firms to service offshoring activities, while Manning et al.'s (2018) panel data confirm that the availability of service specialists' capabilities affects focal firms' offshoring mode choices between captive offshoring and offshore outsourcing. However, these studies fail to address how capabilities could be interactively developed through service offshoring contracts. Baum and Hans's (2018) investigation of 7,000 Swedish manufacturing firms confirms that offshoring improves innovation capabilities, yet the focus is on the offshoring of manufacturing activities rather than the advanced services that this thesis focuses on. Therefore, how manufacturers can develop operational capabilities by service offshoring to offshore upstream network actors remains understudied.

As discussed earlier, servitization-specific studies have not paid sufficient attention to the role of service offshoring for manufacturers to develop capabilities for servitization. To achieve the expected performance from service provision, manufacturers need to build on service network actors' capabilities to optimise business processes outsourced from actors in the global value chains (Kuei et al., 2011). However, there is limited knowledge of the capabilities developed from manufacturers' upstream network actors in an offshore context, although these actors may provide competitive advantages to manufacturers (Beaugency et al., 2015).

In addition, there is a lack of ways to measure the performance of manufacturers' service offshoring contracts. The financial measures such as cost savings that are frequently investigated in service offshoring studies (Elia et al., 2014; Mukherjee et al., 2019) may not be enough to evaluate the performance of manufacturers' service offshoring contracts, some of which counter-intuitively take place in high-wage countries. For instance, Huawei, a Chinese mobile phone manufacturer and telecommunications service provider, has offshored R&D services to 16 European Union members, with the aim of developing business ties and technological capabilities rather than cost savings (Drahokoupil et al., 2017). In this case, financial performance alone is not sufficient to address Huawei's service offshoring contracts. Thus, measures to manufacturers' service offshoring contracts require further investigation.

Moreover, there is a lack of empirical studies that provide confirmatory analysis on the impact of upstream network actors' capabilities on manufacturers' service offshoring performance, nor is there adequate exploration of the moderating factors that affect this relationship. For instance, the service offshoring literature has recognised the moderating effects of offshoring mode choices on the relationship between focal-firm characteristics and offshoring performance (Narayanan & Narasimhan, 2014). However, it is unclear whether service offshoring mode choices can moderate the relationship between upstream network actors' capabilities and the performance of service offshoring contracts.

Addressing the above research gaps is important for two reasons. First, it can explain how service offshoring to upstream network actors delivers the operational capabilities that ensure measurable performance in manufacturers' service offshoring contracts. Second, it can explore how manufacturers manage relationships through different offshoring modes. This exploration is important because well-managed inter-organisational relationships may help multinational manufacturers to reduce dependence on specific service specialists and prevent opportunistic behaviours from offshore business partners (Oshri et al., 2009; Spring & Araujo, 2014). This study employs the operational capabilities perspective to investigate these relationships, with the rationale introduced in Chapter 2.

1.3 Aim of study and research questions

The aim of this thesis is to investigate the operational capabilities of offshore upstream network actors that manufacturers require as part of servitization. To this end, this thesis focuses on the service-related activities that manufacturers outsource to upstream network actors in offshore locations to answer the following research questions:

RQ1: How do upstream network actors contribute to manufacturers' operational capabilities through offshore outsourcing service contracts (Mode 1)?

RQ2: How do upstream network actors contribute to manufacturers' operational capabilities through offshore outsourcing service contracts (Mode 2)?

RQ3: How do upstream network actors' operational capabilities influence the performance of captive offshoring service contracts (Mode 1)?

RQ4: How do upstream network actors' operational capabilities influence the performance of offshore outsourcing service contracts (Mode 2)?

RQ5: How does offshoring modes (i.e. captive offshoring and offshore outsourcing) moderate the relationship between upstream network actors' operational capabilities and the performance of offshore outsourcing service contracts?

1.4 Research design overview and research contributions

1.4.1 Research design overview

To address these five research questions, this study follows a mixed-methods approach that consists of two stages of research investigation because the research questions require different types of data (Creswell & Clark, 2017). The first stage involves an exploratory qualitative study that identifies the potential operational capabilities embedded in manufacturers' offshore upstream networks, and the second stage is a confirmative quantitative study that collects survey data from a large number of service offshoring firms (N = 360). Chapter 3 specifies the research philosophy, design and methods of this thesis; it also specifies how the firm-level qualitative data are processed to explore the latent variables (operational capabilities and performance) and quantitative measurements and metrics for each variable for hypothesis testing. Table 1.1 provides an overview of the research questions, measured variables, research methods and corresponding data sources.

Table 1.1: Research questions, methods, data types and data sources

Research question	Measured variable	Research method	Data source
RQ1	Operational capabilities developed through captive offshoring	Qualitative	Semi-structured interviews
RQ2	Operational capabilities developed through offshore outsourcing	Qualitative	Semi-structured interviews
RQ3	Operational capabilities developed through captive offshoring Performance	Quantitative	Survey

Research question	Measured variable	Research method	Data source
RQ4	Operational capabilities developed through offshore outsourcing Performance	Quantitative	Survey
RQ5	Moderating effects of offshoring modes	Quantitative	Survey

The research methodology in Chapter 3 justifies the need for two types of data: qualitative data from semi-structured interviews and quantitative data from a survey. By combining qualitative and quantitative approaches and data, this study enhances the perceived quality of the research and provides the optimum means to explore and examine the research topic (Blumberg et al., 2008).

1.4.2 Research contributions

This study makes four theoretical contributions. First, it identifies seven operational capabilities (i.e. 'process improvement', 'scalable service-enabling technology', 'scalable and well-trained service talents', 'service and process innovation', 'product/service customisation', 'in-country relationship management and 'security and IP protection protocols'), each making a unique contribution to manufacturers' service offshoring contracts. In doing so, this study complements the existing servitization literature, which primarily focuses on the perspectives of focal manufacturers or their downstream environment (Cui et al., 2019; Story et al., 2017; Weigel & Hadwich, 2018). Although the importance of upstream network actors has been recognised (Reim et al., 2019), little is known about upstream network actors' contribution of operational capabilities to servitizing manufacturers. This study fills this literature gap by identifying seven operational capabilities from offshore upstream network actors that can support manufacturers' development of advanced services.

Second, this study evaluates the relative importance of offshore these operational capabilities to the performance of manufacturers' service offshoring activities from the perceptions of offshore upstream network actors. More importantly, it develops a hierarchy of operational capabilities regarding their contribution to manufacturers' service offshoring contracts. Specifically, 'security and IP protection protocols' contributes the most to manufacturers' service offshoring contracts, followed by 'cultural alignment', 'service and process innovation', 'scalable and well-trained service talents', 'product/service customisation', 'in-country relationship management' and 'scalable service-enabling technology'. Third, this study distinguishes the operational capabilities that can develop from captive offshoring (ode 1) and offshore outsourcing (Mode 2). In particular, 'scalable service-enabling technology' is most important for Mode 1, while 'scalable and well-trained service talents' and 'service and process innovation' are most important for Mode 2. This complements the strategic-level capabilities (dynamic capabilities) perspective to explain how focal firms change their operational routines to address environmental changes (Helfat & Winter, 2011), rather than how to directly improve performance (Eisenhardt & Martin, 2000). Fourth, this study identifies a new service offshoring mode (in-country outsourcing; Mode 3), which elaborates the conceptual framework. The identification of Mode 3 is important, as it explains how a service delivery centre could develop the operational capabilities for process improvement, service and process innovation and customisation, which could then be diffused to focal manufacturers via their offshore service delivery centres.

In addition to the theoretical contributions, this thesis provides important managerial implications for servitizing manufacturers and their service delivery centres, local service specialists and authorities of offshore business environments. Servitizing

manufacturers should consider the operational capabilities they lack, and more importantly, the offshoring modes to develop those capabilities. In particular, manufacturers should consider their offshore experience and the transferability of specific operational capabilities when choosing service offshoring modes. Manufacturers should also evaluate the impacts of upstream operational capabilities on service offshoring performance to assess the benefits and costs of service offshoring activities quantitatively, select the operational capabilities according to their needs and avoid the risks of service paradox. Manufacturers' offshore service delivery centres should not overly rely on support from headquarters for new capabilities and should instead develop new capabilities through interactions with local service specialists. Such interactions could take the form of in-country outsourcing and co-developing security and IP protection protocols. Offshore service specialists should 1) work closely with service delivery centres to understand the required capabilities, 2) work closely with local colleges and technical institutes to design and develop customised courses to train and supply scalable technical talents and 3) obtain the trust from foreign customers (i.e. manufacturers and service delivery centres) through infrastructure investment and co-developing security and IP protection protocols. Local authorities that hope to attract manufacturers' service delivery centres and local service specialists should provide a comprehensive set of infrastructure and hardware support for specific industries. In addition, local authorities should consider introducing research universities and technical institutes to provide capabilities for innovation and scalable and well-trained service talents.

1.5 Thesis structure outline

The rest of this thesis is structured as follows. Chapter 2 reviews the related literature on servitization, justifies the theoretical perspective employed for this study, the operational capabilities required by manufacturers and their network actors and the performance indicators for manufacturers' service offshoring contracts.

Chapter 3 describes the research philosophy, research design and methodology used in this thesis. Specifically, the use of a mixed-methods approach is explained in detail, including the collection and analysis of qualitative data as well as the questionnaire design, sampling and collection of survey data. Research ethical considerations are also addressed in this chapter.

Chapter 4 introduces the qualitative stage study with 26 semi-structured interviews and presents the findings to address the first two research questions. It connects parts of the findings to the literature regarding manufacturers' interactively developed operational capabilities.

Chapter 5 presents the quantitative study based on a survey of 360 firms and sets out the multiple regression results to address the last two research questions. It empirically confirms the relationship between the operational capabilities from offshore upstream network actors and the performance of manufacturers' service offshoring performance, as well as the moderating effects of offshoring modes.

Chapter 6 summarises the key results and discusses the theoretical and managerial implications. This chapter also reflects on possible limitations and suggests directions for future studies.

Chapter 2: Literature review

2.1 Chapter overview

This chapter aims to identify and discuss the theories related to manufacturers' service offshoring activities and define the key variables involved in this study. It begins with the introduction of servitization, the importance of advanced services such as BPO (Section 2.2). The purpose is to introduce the context of this research (servitization) and justify the need to explore manufacturers' service offshoring activities. Section 2.3 discusses the theoretical perspectives (i.e. organisational capabilities perspective and the network perspective) related to manufacturers' service offshoring activities. This discussion leads to the justification of an operational capabilities perspective to underpin manufacturers' service offshoring activities. Section 2.4 syntheses the literature on the operational capabilities required for servitization, including the internal capabilities from manufacturers and those from the external from manufacturers' service network. In particular, it compares the capabilities that are developed by manufacturers and their downstream service networks. This section also reveals the gap in the capabilities that manufacturers can develop from upstream network actors. Section 2.5 discusses the interactions between manufacturers and upstream network actors through service offshoring contracts, as well as the operational capabilities and performance measures related to this research. It also introduces the variables involved in this study. Finally, Section 2.6 summarises the literature review and highlights the research gaps informed by the review.

2.2 Servitization

This section starts with a brief introduction to servitization as a research area (Section 2.2.1). Section 2.2.2 categories servitization activities into base, intermediary and advanced services, where the importance of advanced services is highlighted as a critical offering where manufacturers take over customers' business processes (Story et al., 2017). This study focuses on the roles of upstream network actors that help manufacturers to develop advanced services. Section 2.2.3 introduces the challenges for manufacturers to independently develop advanced services (service paradox) and justify the focus of this thesis on manufacturers' service offshoring to upstream network actors.

2.2.1 Introduction to servitization

Servitization can be understood as a process where a traditional manufacturer shifts its focus from selling products to selling services for higher returns and growth (Rabetino et al., 2017). The term 'servitization' was coined by Vandermerwe and Rada in 1988, although manufacturers' practice to provide services dates back to centuries ago (Fliess & Lexutt, 2019; Schmenner, 2009). In the late 1800s, firms began to integrate manufacturing and service activities to control value chain activities and lock out competitors (Schmenner, 2009). Drawing on Hakanen et al. (2017), this thesis defines servitization as manufacturers' transition from selling products to selling advanced services that deliver value-in-use for the customers through relationships with upstream suppliers and downstream customers in the global market.

Servitization has attracted researchers who first made efforts to describe and understand the service provisions from manufacturers (Sakao et al., 2009). The

reported practices of known manufacturers, such as IBM, General Electric, Xerox, Kone, ABB and Caterpillar, together with a growing number of market followers, have further justified the research interest in the area since the 1990s (Fliess & Lexutt, 2019). Scholars from several disciplines have investigated servitization, such as marketing, supply chain and operations management, service management and sustainable development (Baines et al., 2009; Lightfoot et al., 2013). While service provisions such as electricity and insurance for electric vehicles occur in a business-to-customer (B2C) context to address consumer needs (Grahsl & Velamuri, 2014), servitization has been mostly investigated in a business-to-business (B2B) context (Lenka et al., 2017). The tendency to investigate servitization in a B2B context could be explained by the complex interactions between focal manufacturers and their upstream and downstream service network actors (Gebauer et al., 2013; Johnson & Mena, 2008). In particular, complexity might reside in the different stages of service development and the long-term relationships among these actors (Åhlström & Nordin, 2006). For instance, the constantly changing customer needs may require improvements in manufacturers' business processes (Baines et al., 2009). Therefore, following the existing literature, this study focuses on the B2B context to investigate the servitization phenomenon.

2.2.2 The importance of advanced services

Several efforts have been made to classify manufacturers' servitization activities. Boyt and Harvey (1997) categorise B2B services into 'elementary services', 'intermediate services' and 'intricate services'. Likewise, Baines and Lightfoot (2013) categorise services into 'base services' that provide an outcome related to product availability or functionality that allows customers to own and repair products or assets by themselves,

‘intermediate services’ where manufacturers conduct complex repairs and overhauls and ‘advanced services’ where manufacturers take over customers’ business processes and reach a performance-based contract with customers. Importantly, many servitization scholars (e.g. Jovanovic et al., 2019; Sjödin et al., 2016; Story et al., 2017) pay particular attention to the case of BPO as a type of advanced services.

Advanced services are featured by the delivery of capability and performance (Kowalkowski et al., 2015). This type of services captures more interest from servitization researchers for three reasons. First, advanced services allow manufacturers to obtain more revenues from the service market, which is much larger than the product-dominant market (Auramo & Ala-Risku, 2005; Raddats et al., 2016). Advanced services may entail more interactions with customers and thus create more opportunities for manufacturers to market their products and thus increase sales (Gebauer et al., 2011). Advanced services such as engineering, procurement and construction (EPC) projects often include large-scale and complex infrastructure projects. Through these projects, manufacturers can integrate their technical know-how into product functions to meet customer needs and achieve higher profits (Li, 2015).

Second, advanced services are more likely to help manufacturers to achieve differentiation from their competitors (Gebauer et al., 2011; Vandermerwe & Rada, 1988), as a source of sustainable competitive advantage. Advanced services are more likely to support manufacturers’ development of the valuable and hard-to-imitate offerings, thereby contributing to effective market differentiation (Lay, 2014; Oliva & Kallenberg, 2003). For instance, Zhang et al. (2016) introduce how six manufacturers

of electronics, machinery and chemical and textile products from China provide business solutions (e.g. supply chain designs) that take over customers' business processes to differentiate themselves from Western competitors.

Third, advanced services enabled by technology are more likely to help manufacturers to develop competitive advantages than base services. For instance, digitisation may allow manufacturers to use digital technology to connect companies, systems, products and services and achieve different kinds of innovation (Coreynen et al., 2017; Gago & Rubalcaba, 2007). Digitally enabled farm equipment can be connected to produce geolocation data which help to coordinate and optimise the whole farming system (Porter & Heppelmann, 2014).

2.2.3 Service paradox

In spite of the importance of advanced services, many traditional manufacturers have long considered services as a burden. Indeed, developing and delivering advanced services require manufacturers to develop service-related capabilities that are significantly different from their product-related capabilities (Neu & Brown, 2005; Oliva & Kallenberg, 2003; Paiola et al., 2013). For instance, technology-enabled service systems often require investments in technological infrastructures, such as modified facilities, software, research laboratories and operating systems (Porter & Heppelmann, 2014). These infrastructures can be costly, especially when used at low frequency. In addition, manufacturers need capabilities to properly manage relationships with business partners and customers to maintain a high level of trust and knowledge sharing (Dyer et al., 2018). Manufacturers that fail to develop these capabilities may find it hard to achieve the expected benefits from servitization efforts

(Baines & Lightfoot, 2013).

The above challenges in service development and delivery have been documented in several studies as ‘service paradox’ or ‘servitization paradox’ (Cenamor et al., 2017; Gebauer et al., 2005). A manufacturer may face service paradox when it invests substantially in service-business units to increase the types of service provisions, which result in increased costs without proportional financial returns (Gebauer et al., 2005). As a result, many manufacturers remain hesitant in switching into service-oriented business models (Gebauer et al., 2005; Oliva & Kallenberg, 2003).

The threat of service paradox may push manufacturers to interact with upstream network actors for the complementary capabilities to provide advanced service offerings. For instance, a manufacturer may relocate some service components (e.g. inventory control and service design) to service specialists (Gao et al., 2011) or its own service delivery centre which is close to customers. Some of these upstream network actors may come from offshore locations and provide services to manufacturers through service offshoring contracts.

The importance of service offshoring has drawn attention from scholars from several different theoretical perspectives. These perspectives can be used to investigate service offshoring activities, as well as the sources to make these activities economically viable. The following section discusses the theoretical perspectives related to service offshoring activities.

2.3 Theoretical perspectives

The drivers of service offshoring activities have been evolving, from cost savings and resource access to capability access (Fuller et al., 2017; Javalgi et al., 2009). This leads to the development of the service offshoring literature that adopts different theoretical perspectives to explain these drivers, with the research focus developing from focal firms to the role of network actors (Borah, 2019; Paterson & Brock, 2002). This section reviews these theoretical perspectives, including the transaction cost economics (TCE) theory, the eclectic (OLI) paradigm, the resource-based view (RBV), resource dependence theory (RDT), the network perspective and the organisational capabilities (including dynamic capabilities and operational capabilities) perspective. Figure 2.1 provides an initial overview to the six theoretical perspectives regarding their relevance to each of the service offshoring driver.

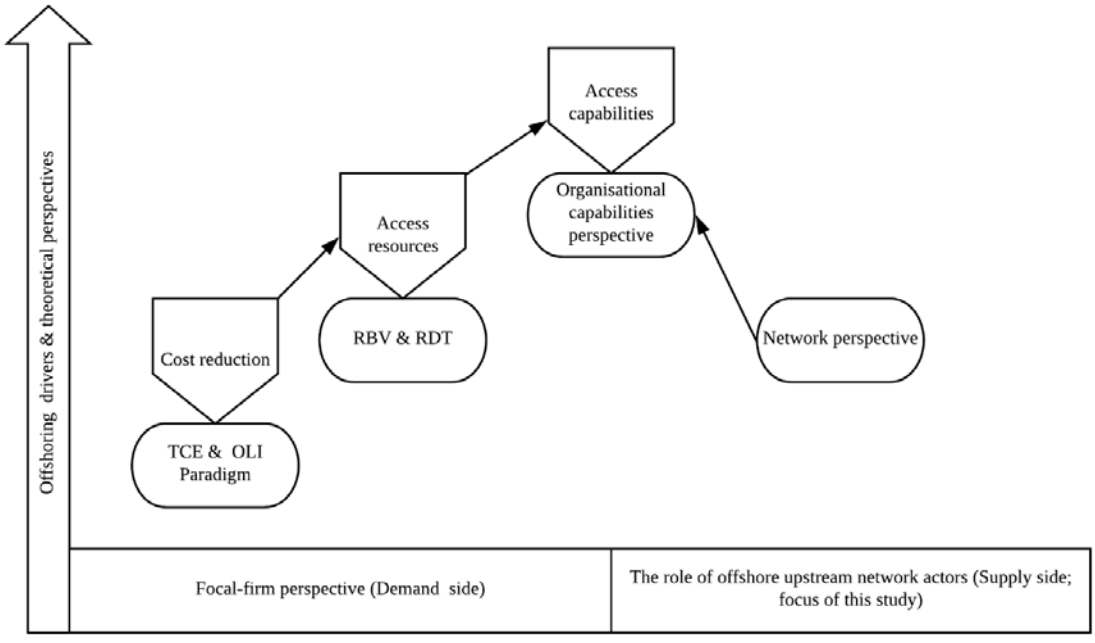


Figure 2. 2: Overview of theoretical perspectives about service offshoring (adapted from Javalgi et al., 2009)

2.3.1 The transaction cost economics (TCE)

According to the TCE, transactions between a supplier and a customer in the market is accompanied by various costs (Williamson, 1985). For the demand side customer, cost-generating activities may include identifying and selecting business partners, settling contractual terms such as prices and performance measures, monitoring and implementing contractual terms, solving conflicts and adding new contractual terms in case of different circumstances (Um & Kim, 2018; Williamson, 1985). This theory suggests that firms should minimise the transaction costs by adopting an appropriate governance modes (Javalgi et al., 2009), i.e. the legitimate authority or administrative power that decides how the resources, information and services within a firm are organised and allocated and how they flow within the firm's value chain Gereffi and Korzeniewicz (1994).

The service offshoring literature usually discusses two governance modes that an offshoring firm could take: the hierarchical mode through offshore service delivery centres (i.e. captive offshoring) and a contractual mode through offshore service specialists (i.e. offshore outsourcing) (Schmeisser, 2013). With a hierarchical structure (captive offshoring), firms can avoid drastic changes to their existing organisational structures, maintain controls and ownership over relocated activities while avoiding the hidden risks originated from local service specialists (Hutzschenreuter et al., 2011). However, the hierarchical structure may put firms into other sets of challenges and uncertainties owing to limited information about the outsourcing destinations. In addition, establishing fully owned service delivery centres may require focal firms to invest in essential resources (e.g. infrastructure & administrative staff), hiring and training new employees and obtaining legislative licenses. These activities can be

costly and not affordable to some firms (Roza et al., 2011).

In contrast, a contractual structure through offshore service specialists (i.e. offshore outsourcing) allows a firm to outsource non-core activities and focus resources on core business activities (Hutzschenreuter et al., 2011). Service specialists often undertake business activities on a larger scale so that they may provide focal firms with cost advantages (Smite & van Solingen, 2016; Termeer & Dewulf, 2014). Moreover, the contractual structure allows the focal firm to obtain critical technical knowledge which is often unavailable within itself (Berry & Kaul, 2015). Offshore service specialists may have superior knowledge and techniques in business activities that are external to focal firms who need external knowledge to design and deliver services to offshore markets with higher efficiency and quality (Heikkilä & Cordon, 2002). However, the offshoring studies also remind of the risks of a contractual structure. For instance, the required efforts for focal firms to communicate and coordinate with offshore service specialists may offset the efficiency gains that offshoring contract provides (Weerakkody & Irani, 2010). Some scholars (Ibrahim & Hanafi, 2013; Parida et al., 2016) warn that focal firms may fail to effectively control and monitor offshored business activities or become overly dependent on offshore service specialists, thus vulnerable to supplier opportunism. For instance, offshore outsourcing may require a focal firm to share some confidential information to offshore service specialists who may leak business secrets to its competitors, especially when these service specialists are providing services to competing firms at the same time (Bean, 2009). Also, focal firms may suffer from intellectual property (IP) breaches in specific offshore locations where the IP protection regulations are either not well-established or loosely enforced (Delgado et al., 2013).

Despite its wide application in the service offshoring literature, the TCE is subject to some criticisms. First, the TCE primarily stresses the minimisation of transaction costs, with an oversight to the value creation aspect of service offshoring contracts (Javalgi et al., 2009). For instance, manufacturers may engage in offshoring activities to design, develop and deliver service offerings that meet customer needs (Paiola et al., 2013). This may involve relocating some important processes to offshore service specialists for the design and delivery of critical service components (Davies et al., 2007). This explains why some knowledge-intensive and advanced services are often counterintuitively offshored to higher-wage countries rather than low-wage countries where the average labour education and skills are lower (Bock, 2008).

Second, the TCE cannot fully explain a firm's governance mode (i.e. hierarchical captive offshoring and contractual offshore outsourcing) choices cannot. This theory suggests negative perspectives for long-term cooperation and relationship development in offshore location (Rilla & Squicciarini, 2011). These negative perspectives primarily involve service suppliers undertaking reduced responsibilities, delivering wrong services or information and failing to deliver promised services (Wacker et al., 2016; Yan & Kull, 2015). These perspectives seem to suggest that the transaction costs increase will drive firms to discontinue their offshore outsourcing activities due to long-term inefficiency and that firms should not offshore activities related to their core competencies (Lewin & Peeters, 2006). However, these perspectives are refuted by 1) Wang et al. (2019) who suggest that informal relationships (in additional to the formal offshore outsourcing contracts) with service specialists, such as trust-building and managers' interpersonal relationships, and 2)

Chandok et al (2013) who remind that the resource and capability restraints of service delivery centres may prevent focal firms from expand business activities in scale, scope and complexity to achieve profitability through captive offshoring. In this case, service delivery centres may need to outsource some non-core business activities to local service specialists, and monitor these specialists on behalf of their parent firms, a governance practice coined as service delivery centres' in-country outsourcing (Oshri & van Uhm, 2012). The primary advantage of in-country outsourcing is that it allows a focal firm to establish and maintain a long-term relationship with offshore service specialists through service delivery centres (Oshri & van Uhm, 2012).

In summary, the TCE raises two issues in service offshoring activities: governance (offshoring) mode choice and supplier opportunism. As the driver of service offshoring evolves from cost saving to resource or capability access, transaction cost alone can no longer explain firms' certain services are offshored in high-wage locations. Also, how focal firms develop mutual trust and long-term relationship with offshore service specialists to reduce opportunistic behaviours require further explanation. In short, Other perspectives are needed to explain the governance (offshoring) mode choice and opportunism issue raised by the TCE theory.

2.3.2 The eclectic paradigm (OLI)

The eclectic paradigm, also known as the OLI paradigm, is frequently adopted in offshoring studies (e.g. Demirbag & Glaister, 2010; Kedia & Mukherjee, 2009; Martínez-Noya et al., 2010; Paul & Wooster, 2010). This paradigm includes three components: the 'O' refers to ownership advantages and/or assets, the 'L' refers to location advantages and/or assets and the 'I' refers to internalisation advantage and/or assets (Dunning, 2000).

The ownership advantages (O) mean the firm-specific advantages developed from owning particular intangible assets such as experience and technology. Ownership can allow firms to develop 1) monopoly power, i.e. setting up barriers and locking out competitors in a specific market (Cantwell, 2014); and 2) superior resources and capabilities (Dunning, 1998). The location advantages (L) include the location-specific gains that a firm can achieve by coordinating its value chain in different geographic locations. In an offshore context, these locational advantages may come from 1) valuable resources and capabilities that are immobile and context-specific (Kozlenkova et al., 2014; Capron & Hulland (1999); 2) capable service specialists that can provide focal firms with competitive advantages (Han et al., 2013); 3) low-cost infrastructure such as IT facilities, data centres and offices (Mani et al., 2014); and 4) qualified labour force with proper education, work experience, professional licenses and accreditations (Corredoira & Mcdermott, 2014). The internalisation advantages (I) may help to explain which organisational structure can facilitate ownership advantages (O) in a specific location (L) (Dunning, 2000). These advantages represent the extent to which focal firms could internalise business processes to avoid market failures in offshore locations (Dunning, 2000). As a firm posses desirable O advantages, it may have more incentive to internalise (through hierarchical governance) rather than externalise (through contractual governance) their use, the more likely it will access or exploit them in a foreign location (Rahman et al., 2018), and vice versa. Therefore, the 'I' variable is used to explain focal firms' captive offshoring over offshore outsourcing governances.

While the location-specific advantages seem important drivers for firms to engage in offshoring, the ownership and internalisation advantages are challenged (Martínez-

Noya et al., 2010). For instance, the ownership advantages are rather static and thus hard to explain firms' offshore activities in today's changing and knowledge-intensive market Dunning (2000). In particular, firms may change from possessing and protecting existing advantages into the co-developing new advantages with local business partners such as service specialists (Contractor et al., 2010). As such, Martínez-Noya et al., 2010 suggest an adoption of externalisation, i.e. offshore outsourcing, instead of internalisation, for offshore advantages. Finally, the 'I' variable is criticised for its exclusive consideration of transaction costs and the ignorance of non-transactional factors such as developing market positions (Jiang et al., 2007).

2.3.3 The resource-based view (RBV)

The RBV explains the sources of a firm's competitive advantage and performance (Barney et al., 2011; Kozlenkova et al., 2014). According to Penrose (1959) and Wernerfelt (1984), firm-specific factors, such as resources, experience and capabilities, can determine its profits. These factors decide whether the firm can improve processes and spare more resources for further development (Kor et al., 2016). According to Barney (1991), the key features of resources that can lead to a firm's sustainable competitive advantage include value, rarity, inimitability and non-replaceability (VRIN). In particular, a firm can achieve a competitive advantage by generating higher economic value than its average competitors in the same market. This competitive advantage can become sustainable when its peer firms are unable to replicate the firm's resources or capabilities (Barney & Clark, 2007; Peteraf & Barney, 2003).

The RBV highlights how a firm relies on internal resources to achieve sustainable competitive advantage; it may explain why firms from the same industry perform

differently (Helfat & Peteraf, 2003). This theoretical perspective seems to favour a hierarchical structure to control offshore operations to protect its resources and competitive advantages (Erramilli & Rao, 1993; Pore, 2018; Yeh, 2018). Grant (1991) and Conner (1991) suggest that a firm should align its resources, capabilities and opportunities in offshore business environment when making decisions on offshoring mode choices. Such resources and opportunities include supporting infrastructure, availability of capable service specialists and skilled labour.

The RBV is subject to criticisms and suggestions for revision. First, Ali et al. (2010) point out that the RBV is static and unable to explain a firm's capabilities to deploy resources and managerial efforts to leverage assets over a period of time; nor can it explain how the static resources could lead to sustainable competitive advantages in a dynamic market. According to Barney (2002), RBV remains valid when a specific industry is static and fixed. However, most industries are embedded in turbulent business environments where technology and market are dynamic and could change in unpredictable manners.

Second, Kraaijenbrink et al. (2010) argue that the VRIN framework of the RBV is not enough for a firm to achieve sustainable competitive advantages. In particular, it is the capabilities to deploy resources, rather than resources alone, that can facilitate such a target (Makadok, 2001; Raddats et al., 2017). In addition, some theorists (e.g. Lenox et al., 2007; Teece, 2007) remind that while the RBV focuses on individual resources, firm interdependencies and complementary assets may also contribute to sustainable competitive advantage.

Third, a firm's resources are heterogeneous and hard to imitate, so the RBV may not be generalised to different contexts (Gibbert, 2006). The RBV may explain the competitive advantage of large organisations that possess market power, but it may not explain how small firms with static and limited resources could obtain the requisite resources and maintain competitive advantage (Connor, 2002). Also, how the VRIN framework could be operationalised remains unclear (Barney et al., 2001). Although the RBV informs of the essential resources for a firm to develop a sustainable competitive advantage, it fails to provide specific paths or procedures of these resources (Connor, 2002).

In short, the RBV ignores firm interdependencies and the complementary resources and capabilities that may also contribute to sustainable competitive advantage. It needs to be integrated with the social context such as a firm's history and network ties (Ginsberg, 1994) to explain firms' capability development.

2.3.4 The resource dependence theory (RDT)

Unlike the RBV which explains a firm's internal resources necessary for competitive advantages, the RDT explains how external partners influence firm behaviours and how firms could address environmental interdependence (Hillman et al., 2009). According to the RDT, a firm must interact with other actors in the environment to develop resources. With uncertainty and risk, focal firms would form closer relationships and improve trust to reduce the risk of opportunism from business partners (Javalgi et al., 2009). However, firms may develop a reliance on resource providers who may hinder its further development (Barringer & Harrison, 2000). The firm may reduce other firms' power over itself by reducing reliance on them (Ulrich & Barney, 1984).

Firms can address inter-organisational interdependencies through various forms of inter-organisational arrangements (Hillman et al., 2009; Lai et al., 2013). Among these arrangements, hierarchical integration (e.g. captive offshoring) and buyer-supplier relationships (e.g. offshore outsourcing) have been common practices (Lai et al., 2013). Hierarchical integration may allow a firm to reduce dependence by identifying and obtaining more external resources, while buyer-supplier relationships may help the firm to address dependency by facilitating and benefiting from cooperation with business partners. As a result, the RDT has been adopted by service outsourcing/offshoring scholars (Hillman et al., 2009; Shook et al., 2009). Shook et al. (2009) suggest that firms' offshoring mode choices depend on the importance of business processes and the number of available suppliers; non-critical processes with many service specialists can be developed externally, while important business processes with few specialists should be developed internally to reduce dependence on those specialists.

However, the RDT rests on a focal-firm perspective. Service offshoring studies (e.g. Lai et al., 2013) adopting this theory often focus on the demand side, i.e. how focal firms make offshoring decisions and achieve business transformation through relationships with business partners. In fact, capabilities and efforts from the supply side (e.g. service delivery centres and service specialists) can considerably affect the performance of service offshoring contracts. Jain et al. (2011) warn that service specialists' tendency to remain silent about issues related to outsourced/offshored business processes can reduce the performance of outsourced processes and even lead to process failures. As such, the RDT needs to be extended to include the supply side,

e.g. how upstream network actors contribute to service offshoring performance through different offshoring modes.

2.3.5 The organisational capabilities perspective

The organisational capabilities perspective is highly related to business strategies such as servitization, which involves manufacturers innovating their capabilities in order to sell integrated product and service offerings that deliver added values (Lightfoot et al., 2013). Madhavaram and Hunt (2008) consider organisational capabilities as a firm's ability to deploy and combine the socially complex and interconnected resources to a specific performance indicator, ensuring that these resources can generate an output of higher value.

The literature on organisational capabilities categorises capabilities into two types: operational capabilities which allow a firm to undertake basic functional activities and make a living; and dynamic capabilities which allow a firm to enhance or upgrade extant operational routines (Helfat & Winter, 2011; Henderson & Cockburn, 1994). The following part of this section compares the two types of capabilities to explain why the adoption of an operational capabilities perspective is more compatible with the context of this research.

- Dynamic capabilities perspective

The dynamic capabilities perspective was firstly proposed in the article of Teece, Pisano, and Shuen, (1997). This perspective further extends the RBV, which stresses firm-specific resources as the sources of a firm's competitive advantage (Barney, 1991; Barney et al., 2001). Teece et al. (1997) suggest that identifying firm-specific resources

is not enough. They propose an ‘efficiency-based approach’ to explain not only how firms obtain resources, but also how firms deploy and protect their bundles of resources and capabilities. This logic of capabilities is termed as the “dynamic capabilities perspective”; this perspective highlights focal firms’ efforts to exploit firm-specific capabilities from internal and external contexts to address environmental changes (Li & Liu, 2014; Teece, 2007).

The dynamic capabilities perspective assumes that firms rely on the capabilities to sense, seize, and reconfigure its existing resources and operational capabilities. According to Helfat and Peteraf (2003), dynamic capabilities represent a higher level of capabilities that change firms’ daily operational routines; this category of capabilities enables a firm to address environmental changes. Dynamic capabilities seem less related to the direct conversion between the input (e.g., infrastructure, technologies & labour force) and output (e.g. service provisions), but more related to the adaptations to external environments through assembling new resources and capabilities (Helfat & Winter, 2011).

The research interest in dynamic capabilities has been tremendous (Wang & Ahmed, 2007; Obaya et al., 2020), yet the nature and role of the dynamic capabilities perspective face questions regarding its direct impacts on firms’ competitive advantage (Eisenhardt & Martin, 2000; Winter, 2003). In particular, dynamic capabilities are criticised as tautological concepts which are hard to operationalise (Barney et al., 2001; Mosakowski & McKelvey, 1997; Williamson, 1999). Therefore, how dynamic capabilities affect firm performance remains vague.

In contrast, operational capabilities refer to a firm's ability to perform functional activities using specific resources and routines (Saunila et al., 2019). Operational capabilities often involve independent and standard operating procedures that allow firms to "make a living" by collecting revenue from customers and converting existing resources into products or services (Helfat et al., 2009; Story et al., 2017; Winter, 2003). Operational capabilities could directly generate competitive advantage by allowing a firm to integrate knowledge, resources, and capabilities into varied and complementary firm-specific abilities in technologies, marketing management, and human resource management (Ali et al., 2010; Hodgkinson & Sparrow, 2002; Raman et al., 2013; Riviere, Suder, & Bass, 2017).

The direct role of operational capabilities and firm performance is documented in the literature. Operational capabilities are positively related to a firm's operational efficiencies and can thus influence the firm's measurable performance (Easterby-Smith & Prieto, 2008). Pentland and Rueter (1994) find that task-level operational capabilities (e.g., quality improvement capability) can influence other firms' operational performance indicators. Taylor (2004) finds that employee productivity could be improved after a firm standardises the operational processes and reduces the amount of workload. Likewise, some basic-level operational capabilities may help firms to reduce the number of flawed products and improve employee productivity and thereby improve the firm's efficiency in delivering products and services (Ferdows & De Meyer, 1990; Nelson, 2009). The improved efficiency can be diffused within the firm by codified know-how, employee training and so on. This explains the firms' tendency to employ the well-established and publicly available or proprietary methodologies to improve business processes (Calvo-Mora et al., 2014). Likewise,

Palvia et al. (2010) investigated 188 information systems service specialists engaged in service offshoring contracts and found that these specialists' capabilities could reduce operational costs and improve satisfaction for service offshoring clients. Therefore, the operational capabilities perspective allows researchers to firm strategies such as service offshoring from the supply-side perspective.

Based on the above discussion, this study focuses on the operational capabilities' perspective. This focus is important to explain manufacturers' efforts to develop the capabilities for the development and delivery of evolutionary services to achieve product differentiation, revenue generation, and profitable business models (Raddats et al., 2016; Story et al., 2017). The adoption of an operational capabilities perspective is also compatible to servitization research, which employs the relational and network-based approaches to investigate the relational and network management capabilities that manufacturers need to develop interactively with service network actors for the fulfilment of differentiated customer needs (Möller, Rajala, & Svahn, 2005; Raddats et al., 2017). The following introduces the network perspective which is related to manufacturers' offshore upstream network actors.

2.3.6 Network perspective

According to Brass et al. (2004), a network can be understood as a set of nodes (actors) such as individuals and organisations that are connected by various relationships. These relationships can be further categorised as formal and informal; whereas formal relationships could happen during resource exchanges and workflows (Ghoshal & Bartlett, 1990; Cui et al., 2018), informal relationships could happen during the personal advice given/received among members of different units (Kilduff & Tsai,

2003). Individual-level relationship is less relevant than the organisational-level relationship in addressing the focus of this study (i.e. relationships between manufacturers and offshore upstream network actors). At an organisational level, the most frequently investigated relationships include strategic alliances, relational contracts, franchising, and outsourcing (Podolny & Page, 1998). The unit of analysis in inter-organisational relationships can include focal firms, suppliers (e.g. service specialists), customers, competitors and subsidiaries (e.g. service delivery centres) (Ebers, 1997). Focal firms develop long-term cooperative relationships with these actors by controlling internal resources and deciding resource deployment with these actors (Ebers, 1997). The literature has included the motivations for firms to join inter-organisational networks: obtaining resources, reducing uncertainty, developing legitimacy, and achieving joint goals (Oliver, 1991). For instance, firms in outsourcing relationships may access external information, resources, markets and technologies; benefit from learning, scale, and scope economies; and share risks by reducing opportunistic behaviours of business partners (Brass et al., 2004).

The servitization literature has recognised network ties as a source of a focal firm's competitive advantage; such an advantage is often embedded in networks with complementary resources and capabilities (Story et al., 2017). For instance, focal firms and their network actors such as suppliers, intermediaries, and customers may improve productivity and co-create value through joint efforts (Grönroos & Helle, 2010). To co-create value with network actors, a focal firm needs the ability to manage the complex relationships with other actors (Håkansson & Waluszewski, 2013) and integrate resources and capabilities from suppliers and customers (Möller & Rajala, 2007). This is particularly true for manufacturers that aim to develop advanced and complex services which require the focal firm to handle part of customers' business

activities which can be challenging (Baines et al., 2014). In this case, a focal manufacturer will have to take advantage of the network for capability development (Kindström et al., 2014).

The network perspective may explain why a focal manufacturer needs to exploit capabilities from networks (Spring & Araujo, 2013) through outsourcing activities (Paiola et al., 2013), even though it has the option to develop capabilities in-house to ensure certain levels of competitive advantage and control (Paiola et al., 2013). Both the in-house mode (captive offshoring) and external network mode (offshore outsourcing) can be disadvantageous for the focal firm. Too much diversification may deprive the focal firm of its core capabilities, while too much reliance on external network actors may expose the focal firm to business partners' opportunistic behaviours and inflated coordination costs (Pagano, 2009). This study, therefore, aims to investigate the capabilities that are embedded in each offshoring mode. This effort may help servitizing manufacturers to decide which capabilities to keep in-house and which ones to develop with network actors.

So far, the servitization literature has taken a focal manufacturer perspective to investigate a firm's ability to develop and manage inter-organisational relationships, a capability known as 'network capabilities' (Story et al., 2017; Walter et al., 2006). Network capabilities include several that are operational-level, such as the ability to develop relational alignment, value co-creation and innovation (Story et al., 2017). One important component of a manufacturer's network capabilities is technological innovation capability, as this is critical in facilitating interactions and relationships within networks through digital information and communications technology (ICT). In particular, ICT facilities and techniques are the basis for a focal firm to maintain

interactions with network actors, manage relationships, and even lock-out competitors (Baines & Lightfoot, 2014; Penttinen & Palmer, 2007). Likewise, a focal manufacturer may need to collaborate with network actors to develop a technological innovation capability to exploit 'big data' (Opresnik & Taisch, 2015). The challenges of servitization may prevent a focal manufacturer from successfully benefiting from this business transition (Benedettini et al., 2015). This, therefore, justifies the investigation of capabilities that network actors can contribute to focal manufacturers, and explains the critical success factors for servitization. In particular, Gebauer et al. (2013) describe the characteristics of service networks for manufacturers to move from products and solutions. According to these authors, upstream network actors are those that provide the service components that enable a focal manufacturer to deliver the bundles of services or solutions. Drawing on Gebauer et al. (2013) and Reim et al. (2019), this study defines manufacturers' offshore upstream network actors as manufacturers' wholly-owned service delivery centres and third-party service specialists that are located offshore and providing service components (e.g. information system design, consulting, financial supports) that allow a focal manufacturer to deliver service packages or solutions to downstream network actors in a global context.

So far, servitization studies that employ the network perspective have mostly focused on the interactions between focal manufacturers and their downstream network actors; that is, customers and intermediaries (Story et al., 2017). Granted, it is important for manufacturers to interactively develop and deploy capabilities that generate the value that customers need (Ulaga & Reinartz, 2011), but what is not yet clear is how the critical operational capabilities that facilitate and enable the functioning of services are

collaboratively developed with upstream actors, which may be delivered to focal manufacturers through service offshoring contracts.

Moreover, the outsourcing literature has identified network theory as a basis to understand outsourcing activities among virtual organisations, i.e. temporary or permanent collection of geographically dispersed organisational units (Bolumole et al., 2015; Håkansson & Johanson, 1992). The focus of the network perspective is on the development of external relationships, organisational structures, and collaborations that are required for a focal firm to integrate the whole business process (Bolumole et al., 2005). Outsourcing arrangement may provide focal firms with an opportunity to exchange resources with network actors and manage value chain activities through relational contracts and network coordination (Snehota & Hakansson, 1995). For instance, third party logistics outsourcing may facilitate collaboration across an efficient supply chain between firms (Lai et al., 2012). So far, both the servitization and the outsourcing literature have considered the hierarchy (captive offshoring) and market (offshore outsourcing) modes that entail the management of headquarter-service delivery centre relationships and buyer-supplier relationships.

The network perspective reminds us that a headquarters may need to allow certain levels of autonomy for service delivery centres to respond to changes in the local business environment (de Jong et al., 2015). Like their headquarters, offshore service delivery centres may also need to develop and manage close relationships with their local actors (e.g. local suppliers, universities and customers); this is termed as local embeddedness (Mudambi et al., 2014). According to Mudambi et al. (2014), a service delivery centre may also need to adapt its operational practices together with local business partners. The complementarity between a service delivery centre's and local

network actors' capability attributes is significant because it may grant service delivery centres with learning opportunities and sources of innovation (Powell, 1990). To develop the necessary capabilities that can facilitate focal firms' performance, a service delivery centre may need to absorb external knowledge and resources from the local network (Inemek & Matthyssens, 2013). However, the capabilities embedded in the local market can be context-specific, so service delivery centres need to be well-imbedded in the local environment to acquire them (Fang et al., 2010). In addition, physical proximity between offshore service delivery centres and local business partners provides a strong link that facilitates their mutual exchange of knowledge and resources (Demeter et al., 2016; Lane & Lubatkin, 1998). Therefore, service delivery centres that are highly embedded in an offshore environment may have to enter into a buyer-supplier relationship with local network actors to obtain valuable local resources such as new knowledge and market information. In turn, a headquarter will be able to better address customer needs in the local market. So far, there are limited studies that consider the association between service delivery centres' capabilities development by interacting with local service specialists. Filling this research gap may help shed light on the indirect impact of service delivery centres' capabilities on focal manufacturers' service offshoring performance.

2.3.7 Summary to theoretical perspectives

The comparison of the theoretical perspectives related to service offshoring activities can help evaluate the relevance of these theories to service offshoring and assess the suitability of each perspective for this study. Table 2.1 provides a summary of these theories and highlights the under-explored areas that this study seeks to answer.

Table 2. 1: Comparison of relevant theoretical perspectives

Perspective	Drivers explained	Relevance to service offshoring	Critiques from the author of this thesis
TCE (Um & Kim, 2018; Williamson, 1985)	Cost reduction	• Short-term relationships with service specialists. • Only offshoring non-core activities. • Transaction cost determines offshoring mode. • Prevent supplier opportunism.	• What else (other than transaction cost) determines firms' offshoring mode choices? • How do firms overcome opportunism from local business partners?
The Eclectic Paradigm (Dunning, 2000)	Cost reduction	• Develop ownership advantages in a specific location • Favour captive offshoring over offshore outsourcing.	• How do firms co-develop locational-specific advantages with local business partners? • What are the contributions of externalisation versus internalisation for service offshoring firms?
RBV (Barney et al., 2011)	Access resources	• Firms should control offshore operations and protect resources. • Favour captive offshoring to protect resources and competitive advantages.	• How do firms deploy resources and improve business processes in dynamic markets? • How are resources and capabilities interactively developed in specific social context?
RDT (Hillman et al., 2009; Salancik & Pfeffer, 1978)	Access resources	• Interactively developing resources • Offshoring mode choices depend on the importance of business processes and the number of available suppliers. • Keep core processes in house & non-core processes to service specialists to reduce risks. • Focus on the demand side.	• A focal firm perspective should be extended to investigate the contributions of the supply side. • What about the core-processes (e.g. R&D) that are offshored to local service specialists?
Organisational capabilities perspective (Lightfoot et al., 2013)	Access capabilities	• Capabilities can be interactively developed from service delivery centres & service specialists.	• Dynamic capabilities are unable to directly affect firm performance. • What are the operational capabilities developed from manufacturers' offshore upstream network actors?
Network perspective (Brass et al., 2004; Spring & Araujo, 2014; Gebauer et al., 2013)	Access resources & capabilities	• Explain manufacturers' offshoring service activities. • Recognise network capabilities. • Define manufacturers' upstream network actors	• What are the operational capabilities developed from captive shoring & offshore outsourcing? • How do service delivery centres manage relationships and develop capabilities from local business partners?

As Table 2.1 demonstrates, these theoretical perspectives all relate to the advantages that focal firms could achieve through the two modes of service offshoring contracts, i.e. captive offshoring and offshore outsourcing. According to Farrell (2005), cost reduction is the initial motivation for firms to undertake service offshoring activities. The TCE and the eclectic paradigm can provide the transitional cost rationale for firms' service offshoring mode choices. As the offshored services grow more complex and advanced, the rationale for service offshoring become resource and capability oriented, with firms aimed at exploring external paths of resources and capabilities (Schmeisser, 2013). The RBV, the RDT, and the network perspective, and the organisational capabilities perspective may complement the TCE and the eclectic paradigm to explain firms' further exploration of external resources and capabilities.

Despite their relevance, most of these theories (TCE, the eclectic paradigm, RBV, & RDT) focus on the demand side perspective (e.g. manufacturers). Service offshoring studies (Bunyaratavej et al., 2008; Whitaker et al., 2019; Zheng & Wang, 2017) often try to identify or confirm the resources and capabilities required for focal firms to achieve expected performance in service offshoring contracts. Although the RDT and the network perspective recognise the importance of interactions between focal firms (demand side) and service specialists (supply side), it s suggests that focal firms should keep core activities in captive offshoring contracts while non-core activities in offshore outsourcing contracts (Griffith, Harmancioglu, & Droge, 2009) to reduce overdependence. This contradicts the core business processes that are offshored, such as General Eclectic's jet engine design services for Honda. Servitization requires frequent interactions between manufacturers and service network actors (Zhou et al., 2020), so an operational capabilities perspective may better 1) address the sources of manufacturers' service-enabling capabilities 2) provide alternative answers to

manufacturers' service offshoring mode choices, and 3) the interactions between manufacturers' service delivery centres and local service specialists. In doing so, this study will provide a complementary view about the operational capability contribution from the supply side (i.e. upstream network actors) in manufacturers' service offshoring contracts. The following sections discuss the existing studies that explore the sources of operational capabilities that enable manufacturers to develop and deliver advanced service offerings.

2.4 Operational capabilities required for advanced services

Operational capabilities can be understood as firm-level skills, processes and routines that are frequently used for firms to solve problems by configuring resources (Wu et al., 2010). In this study, the focus on operational capabilities can help identify the efforts of manufacturers and their network actors to provide advanced services, thereby addressing the changing customer needs and evolving market situation. For instance, operational capabilities are critical for manufacturers to achieve the expected performance from servitization activities (Bagheri et al., 2014; Oliva & Kallenberg, 2003; Raddats et al., 2016) and to address the service paradox issue discussed earlier (Story et al., 2017). The sections below discuss the new capabilities required from focal manufacturers (2.4.1) and the complementary capabilities from these manufacturers' service networks (2.4.2).

2.4.1 Operational capabilities from focal manufacturers

Manufacturers traditionally rely on product-related knowledge, IP rights and reputation for achieving competitive advantage (Tee et al., 2019; Ulaga & Reinartz, 2011). However, the development and delivery of advanced services require

operational capabilities that are different from manufacturers' traditional capabilities (Osterrieder & Friedli, 2018; Paiola et al., 2013). So far, servitization studies have identified six categories of operational capabilities within focal manufacturers for developing and delivering advanced services (Coreynen et al., 2018; Neely, 2008; Ostrom et al., 2010; Tan et al., 2019).

The first category of capabilities for manufacturers to develop is service-focused culture, which includes the abilities to develop a service-focused firm culture and mindset within the organisation (Brax, 2005; Homburg et al., 2003; Kanninen et al., 2017; Neely, 2008; Ostrom et al., 2010). Homburg et al. (2003) empirically test the influence of a service-focused culture within the organisation and a service-focused mindset through the human resource management system and confirm that such culture and mindset can help manufacturers to align with the external environment when developing customer services and thus improve firm performance. When investigating small and medium-sized manufacturers, Gebauer et al. (2012) find that successful service business development requires these firms to enhance their service orientation through modified firm values and employee behaviours involved in the service development and delivery. In particular, senior executives need to set the organisational value for services and effectively communicate the value to all employees (Ostrom et al., 2010). In order to manage employees, manufacturers need new capabilities such as tailoring frontline roles to address the complex market needs as well as recruiting, training and retaining employees with specific behavioural competencies, technical background and service-focused attitudes (Neu & Brown, 2005). For instance, human resource departments need to develop the service-focused mindset during the orientation of new employees, the training of employees to interact

with customers, the introduction of service quality measures and the introduction of incentives to employees demonstrating social competence to customers (Homburg et al., 2003). When operating globally, manufacturers need to adapt the service-focused culture into different countries by developing customer insights and integrating market knowledge to support services in different places (Parida et al., 2015).

The second type of operational capabilities manufacturers need to develop is risk management capability, which includes the abilities to perceive, reevaluate and mitigate the possible risks embedded in business models (Baines & Lightfoot, 2013; Cova & Salle, 2008). When providing advanced services, manufacturers could face operational risks such as customers' careless behaviours when using facilities that are not owned by them (e.g. overloading or excessive usage that harm facilities) and customers' opportunistic behaviours (e.g. maximising manufacturers' service requirements with no additional incentives) (Reim et al., 2016). Manufacturers thus need risk management capabilities to conduct risk analyses to minimise complexity and ambiguity associated with both identifying and managing risks (Erkoyuncu et al., 2013). For instance, manufacturers need capabilities to develop proper pricing systems, which require not only an accurate estimation of costs related to service development and delivery but also the operational risks (capacity constraints) and financial risks (reduced profitability or market share) (Keh & Pang, 2010; Nordin et al., 2011).

Third, manufacturers need to collect information throughout the lifecycle of product usage and monitor customers' business processes (Ainin et al., 2015). This requires the ICT capabilities, which include the abilities to select and employ ICT technologies that can enable manufacturers to diagnose product usage, accurately evaluate and predict

product failures and improve customer satisfaction (Allmendinger & Lombreglia, 2005; Oliva & Kallenberg, 2003). For instance, Cannon adopts the IT techniques for remote services (e.g. data on the status, diagnostics and usage of each printing machine) in order to detect, assess and predict product failures (Allmendinger & Lombreglia, 2005; Paiola et al., 2013). In addition, the capabilities to collect reliable information on product/service demand can help manufacturers to optimise capacity usage. This is important for manufacturers whose profitability depends on capacity utilisation (Oliva & Kallenberg, 2003; Paiola et al., 2013). In the digital age, manufacturers also need the capabilities to adopt the Internet of Things and cloud computing technologies for services, such as identifying users & products, locating users and products, usage and condition monitoring and remote control (Ardolino et al., 2018).

Fourth, innovation capabilities have also been identified as prerequisites for manufacturers to develop services (Auguste et al., 2006; Bock, 2008; Den Hertog et al., 2010; Kindström & Kowalkowski, 2014; Raddats et al., 2015). This category of capabilities is important because it can convert services, business processes and technology into new offerings that cater to customer needs (Zhang et al., 2016). The multi-level study by O'Cass and Sok (2013) confirms that innovation capabilities positively influence the value of manufacturers' service offerings. The qualitative study by Story et al. (2017) identifies several components of innovation capabilities from manufacturers to develop advanced services. Those capabilities include the abilities to integrate the requisite tools, processes and technology into a platform for new service offerings, to identify customers' operational requirements and to deploy ICT facilities to manage the installed product base better and timely respond to problems, thus improving technical and information technical connections to

customers and supporting the delivery of new services. For instance, the 'Pay Per Lux' service by Philips[3] provides customers with a turnkey solution that includes materials, lighting energy bill and maintenance and lighting control for different lighting needs.

Fifth, manufacturers need cross-functional capabilities such as consulting services and financial capabilities, designing capabilities and project management capabilities in order to sell and deliver services (Ceci & Masini, 2011; Davies, 2004; Gebauer et al., 2013; Smith et al., 2014; Ulaga & Reinartz, 2011). Consulting capabilities refer to manufacturers' abilities to understand the business processes and needs of customers and to provide tailored solutions to customer needs (Slywotzky & Wise, 2003). Manufacturers need consulting capabilities to develop solutions that are effective, less expensive to maintain and upgrade and useful to customers (Ceci & Masini, 2011). Financial capabilities refer to manufacturers' abilities to provide financial supports to customers through leasing and instalment payment arrangements with competitive interest rates (Brady et al., 2005). While the financial capabilities promise high value-added, Ceci and Masini (2011) argue that this kind of capabilities is challenging for many manufacturers to develop.

Sixth, manufacturers need relationship management capabilities, i.e. the abilities to develop and maintain lasting relationships with customers and build strong bonds with value chain actors (Song et al., 2007). This category of capabilities is recognised as key elements in developing service provisions (Baines et al., 2013; Brown et al., 2011). Advanced services often include bundling services and products or facilities and thus entail increased complexity embedded in the exchange between manufacturers and

[3] https://www.ellenmacarthurfoundation.org/case-studies/selling-light-as-a-service

customers (Berghman et al., 2006). As such, the nature of manufacturers' interactions with customer changes from transaction-based (selling products) to relationship-based (relying on relationships with the customer to sell services) (Baines et al., 2009). Relationships with customers can facilitate timely communications, understanding of customers' business processes and maintaining flexibility to customers' variable demands (Angelis et al., 2012; Kamp & Parry, 2017; Kreye et al., 2015). Also, manufacturers need capabilities partnering and networking with suppliers and intermediaries (Kohtamäki et al., 2013; Valtakoski & Witell, 2018). Using empirical data from Finnish manufacturing firms, Kohtamäki et al. (2013) confirm the positive impact of relationship management capabilities on the sales growth of service offerings.

2.4.2 Operational capabilities from manufacturers' service networks

In addition to the operational capabilities of the focal manufacturers discussed in Section 2.4.1, manufacturers may also need to develop their operational capabilities in their service network actors. The expenses and complexity entailed in developing advanced services may push manufacturers to use their external service networks to develop the capabilities for advanced services (Gebauer et al., 2013; Gadde et al., 2003; Paiola et al., 2013; Spring & Araujo, 2013). In the global context, Schweitzer and Aurich (2010) highlight the importance of understanding global service networks, whose interactions with customers enable focal manufacturers to deliver advanced services in the local market. Therefore, several scholars (Kim & Lui, 2015; Reim et al., 2015; Sakao et al., 2009) suggest the incorporation of multi-actor, relational, interactional and network perspectives to study how network actors provide complementary capabilities that facilitate manufacturers' service provisions.

Existing research on the interactions between manufacturers and network actors has mainly focused on co-developing capabilities with downstream intermediaries and customers. Intermediaries have the capabilities to control costs that result from selling customised services (Lampel & Mintzberg, 1996). Some intermediaries have the abilities to build a chain of organisations with powerful brand image and can provide a manufacturer with the channels to sell its service offerings; in other words, intermediaries are capable of persuading customers by providing advice and suggestions for product acquisition and use (Olsson et al., 2013). The exploratory study by Story et al. (2017) finds that intermediaries are capable of 1) extending services to manufacturers' existing offerings, 2) understanding how customers use manufacturers' products and suggesting customising value-added services and 3) developing intimate relationships with customers so that intermediaries can develop relationships with customers on focal manufacturers' behalf (Evans et al., 2007; Reim et al., 2019).

In addition, customers play an important role in the successful provision of advanced services, as the prerequisite to successfully sell advanced services to customers is for them to see the superior benefits compared to developing such services independently (Reim et al., 2019). Raddats et al. (2017) suggest several capabilities that manufacturers can develop through interactions with customers. Examples of those capabilities include 1) 'service-enablement'; that is, the ability to provide service components that enable new customer offerings (e.g. financial solutions and technical expertise); 2) 'service development'; that is, the ability to explore new service opportunities, design new services and maximise product performance; and 3) 'risk

management'; that is, the ability to manage complex operations and managing risks to ensure continuous product operations. However, there is limited literature about the capabilities of upstream network actors, although these actors are also important for manufacturers to develop advanced service (Böhm et al., 2017). For instance, a lack of experience in developing advanced service provisions may drive manufacturers to work with upstream service specialists to design services that are compatible with their products (Liu et al., 2014).

Upstream service specialists can bring several benefits to manufacturers, including higher stock returns (Eggert et al., 2017) and providing the best service design techniques for advanced services that could ensure superior quality and address customer needs (Saccani et al., 2014). Despite the above benefits, only a limited number of investigations (Finne & Holmström, 2013; Zhou et al., 2020) mention the interactions between manufacturers and upstream network actors and more importantly they have not specified the operational capabilities that can be developed from the manufacturers' upstream network actors. For instance, the case study by Finne and Holmström (2013) recognises the critical capabilities of 'subsystem suppliers' (service specialists) could facilitate the development of services. However, the focus was on how the sample manufacturer 'moves upstream' to serve as a service specialist for other manufacturers that have interactions with downstream customers. In practice, few manufacturers may have the engineering capabilities and financial strength required for service development. While Finne and Holmström (2013) stress the importance of upstream service specialists' capabilities, their focus is on the collaboration mechanism rather than the specific capabilities developed from such interactions, such as relationship management capability. Zhou et al.'s (2020) survey

to 143 servitizing manufacturers in China and confirm the influence of upstream networks (service supply networks) on servitization performance; in particular, the strength of the relationship between upstream network actors and manufacturers could affect the financial return from servitization efforts. However, they focus on the importance of upstream network actors and their characteristics such as structural and relational embeddedness of the manufacturer in an upstream network, rather than the operational capabilities that are embedded in upstream networks such as monitoring the quality of services delivered by upstream network actors and creating new service bundles. Similarly, the exploratory case study by Reim et al. (2019) recognises the importance of the support from global service network actors, including upstream network actors. However, these authors fail to provide the specific operational capabilities that these actors could contribute to manufacturers' servitization efforts.

Table 2.2: Operational capabilities by manufacturers, downstream network actors and upstream network actors

Focal manufacturers	Downstream network actors	Upstream network actors
• Develop a service-focused culture (Kanninen et al., 2017)	• Persuade customers (Olsson et al., 2013)	• Monitor the quality of services delivered by network actors (Zhou et al., 2020)
• Risk management (Baines & Lightfoot, 2013)	• Extend manufacturers' offerings (Story et al., 2017)	• Create new service bundles (Reim et al., 2019)
• ICT capabilities (Ainin et al., 2015)	• Understand and suggest customised insights (Story et al., 2017)	• Engineering capabilities (Reim et al., 2019)
• Innovation (Kindström & Kowalkowski, 2014)	• Develop intimate relationships with customers (Story et al., 2017)	• Relationship management (Finne & Holmström, 2013)
• Cross-functional capabilities (e.g. Project management, consulting capabilities (Ceci & Masini, 2011)	• Co-create innovation (Story et al., 2017)	

Focal manufacturers	Downstream network actors	Upstream network actors
• Relationship management capabilities (Brown et al., 2011)	• Adapt operational processes (Story et al., 2017)	
	• Develop a change-oriented culture (Story et al., 2017)	
	• Service enablement (Raddats et al., 2017)	
	• Service development (Raddats et al., 2017)	
	• Risk management (Raddats et al., 2017; Story et al., 2017)	

In short, the limited number of studies only stress the importance of upstream network actors' capabilities and the benefits of interacting with upstream network actors, with few specifications about what those upstream capabilities are and how they could be developed (see Table 2.2 for a summary). Therefore, this study focuses on the operational capabilities that upstream network actors can interactively develop with manufacturers for servitization through service offshoring.

2.5 Manufacturers' service offshoring to upstream network actors

Interactions between manufacturers and service networks can happen either through service outsourcing to upstream network actors (Paiola et al., 2013; Story et al., 2017) or through interactions with downstream network actors as explained above. Service outsourcing allows a focal manufacturer to access, instead of controlling, the indirect capabilities of upstream network actors (Loasby, 1998). Service outsourcing refers to a focal firm contracting the management and completion of a certain amount of work, for a specified period of time, cost and level of service to a third-party service specialist (Oshri et al., 2015).

Service outsourcing can take place in focal firms' home country or host countries

(Contractor et al., 2010). As their boundaries organisationally shrink and geographically expand across national borders, focal firms may outsource services to offshore service networks to develop capabilities required for efficiency and effectiveness (Contractor et al., 2010). When services are relocated to offshore locations, the process is termed as 'service offshoring', which is defined as 'the transnational relocation or dispersion of service activities that companies previously performed in their home country, including captive offshoring (internal) through focal firms' fully-owned service delivery centres and offshore outsourcing (external) through offshore service specialists delivery structures' (Pisani & Ricart, 2016, p. 325). Service offshoring activities have evolved from basic manufacturing and service activities to advanced services such as R&D and engineering (Manning et al., 2008). Service offshoring reflects focal firms' motive to access offshore capabilities and knowledge that are more valuable than their existing capabilities and knowledge (Bierly et al., 2009). Moreover, offshoring may allow focal firms to relocate their operations globally and build relationships with offshore service network actors and obtain legitimacy for operations in offshore business environments (Dunning & Lundan, 2008).

Manufacturers often operate in different geographical areas of the world in order to explore location-specific advantages (Vahlne & Jonsson, 2017). In an offshore context, service delivery centres and third-party service specialists constitute a manufacturer's upstream networks. The interactions between manufacturers and their upstream network actors in an offshore context have been documented in the literature (Steiner et al., 2016). For instance, Renault offshored its accident management services to Quindell, a British IT outsourcing company, to better meet customer needs (Eggert et

al., 2017). In addition to cost advantages, service offshoring allows manufacturers to develop high-quality services by utilising service specialists' capabilities (Kalaignanam et al., 2013). However, previous studies have paid little attention to manufacturers' service offshoring activities to upstream network actors. This thesis will address this gap by investigating how these service offshoring activities can help develop the operational capabilities for advanced services and the impacts of these capabilities on the performance of service offshoring contracts.

2.5.1 Two modes of service offshoring

Manufacturers have two options to develop complementary resources and capabilities with upstream network actors. One option is to relocate business processes to fully-owned service delivery centres located in an offshore location (captive offshoring) (Kenney et al., 2009; Manning et al., 2008). The other option is to relocate its value chain activities (e.g. business processes) from home countries to service specialists located in host countries to serve the home or global markets (Bathelt & Boggs, 2003; Hätönen, 2009; Kenney et al., 2009; Lewin et al., 2009; Manning et al., 2008; Manning et al., 2018; Schmeisser, 2013). In this study, offshore outsourcing refers to a focal manufacturer's transfer of the ownership of business processes (e.g. information technology, R&D, software, testing, logistics, & finance) from its home country to offshore service specialists (often from developing countries) to serve customers from home/host markets (Luo et al., 2013). Captive offshoring and offshore outsourcing represent two governance structures for a manufacturer to capitalise on location-specific advantages and develop complementary capabilities in a host country (Hutzschenreuter et al., 2011; Roza et al., 2011). Outsourcing to upstream networks allows manufacturers to focus on core competencies while satisfying diverse customer

needs (Bagheri et al., 2014; Paiola et al., 2013). The manufacturers' servitization performance may thus hinge on the roles and capabilities of offshore service network actors.

Now that servitization is more relational than transactional (Bastl et al., 2012), the traditional 'make or buy' logic in the service offshoring literature (Geyskens et al., 2006) may not apply to servitizing manufacturers' capability development. In fact, when firms outsource part of their business processes, they often develop into relation-oriented organisations that maintain competitive advantages by managing relationships with upstream network actors (Gulati & Kletter, 2005). Some researchers tend to understand captive offshoring a hierarchical arrangement while offshore outsourcing as a contractual arrangement (Davies et al., 2007). While the hierarchical option allows manufacturers to control all business processes and reduce coordination pressure (Nordin, 2008), few manufacturers may have the capacity to develop a large number of capabilities while specialising in a few core capabilities. In contrast, the contractual mode (offshore outsourcing) allows manufacturers to maintain flexibility and avoid sunk costs while obtaining globally available resources (Neely, 2008; Paiola et al., 2013), but this mode bears risks such as loss of control and business partners' opportunistic behaviours, as well as the increased coordination costs (Paiola et al., 2013). Therefore, this thesis investigates the complementary operational capabilities developed from manufacturers' upstream network actors to shed light on the specific capabilities that are embedded in captive offshoring and offshore outsourcing modes.

2.5.2 Operational capabilities from upstream network actors through service offshoring

Upstream network actors can contribute operational capabilities to manufacturers through service offshoring contracts. In other words, the operational capabilities embedded in manufacturers' service offshoring contracts can be regarded as the capability contribution of upstream network actors. In the context of service offshoring, a very limited number of studies (Baum et al., 2018; Brandl et al., 2018; Jarvenpaa & Mao, 2008; Lahiri & Kedia, 2009) have investigated the operational capabilities required for advanced services. Baum et al. (2018) used the United Nations Broad Economic Categories (UNBEC) system data to test the relationship between Swedish manufacturers' offshore outsourcing activities and their innovative capability (examined by the number of patent applications). According to Baum et al. (2018), there the positive impact of offshore outsourcing can influence firm's innovative capability, but these researchers focused on manufacturing activities which are different from advanced service activities; also, they fail to differentiate between offshore outsourcing and captive offshoring.

Lahiri and Kedia (2009) investigate a number of capabilities that upstream network actors (service specialists) need to possess and find a positive relationship between these capabilities and the performance of relocated services. Such capabilities include 1) 'organisational capital'; that is, the aggregate capabilities from a firm's employees to provide analytical, technical and complex service requirements), 2) 'human capital capability'; that is, the collective behaviour of employees and their abilities to use organisational knowledge and routines required for the development of services and 3) 'management capability'; that is, the ability to deploy resources to meet the agreed

contractual terms. Likewise, Jarvenpaa and Mao's (2008) case study identifies three operational capabilities from the case study of four China-based software specialists, including 1) ‘client-specific capability’; that is, top managers’ overseas work experience and familiarity with clients’ culture, 2) ‘human resources’; that is, hiring and training fresh graduates and using experienced expatriates and developing systematic career development systems and 3) ‘process capability’; that is, quality management certifications (ISO & CMM) and standardised operational procedures. However, these investigations focus on the general service sector and are thus different from the focus of this study: manufacturers’ service offshoring activities for complementary capabilities to develop and deliver advanced services. Drawing on Lahiri and Kedia's (2009) capability framework, Brandl et al. (2018) develop a multiple-case study which confirms the capabilities that service specialists could develop from offshore outsourcing activities. These four studies primarily investigate one offshoring mode (offshore outsourcing) and fail to consider the captive offshoring as an alternative mode of capability development from upstream network actors. Also, these studies fail to investigate the effects of these service specialists’ capabilities on the performance of outsourced services.

Building on the emerging stream of servitization literature, this study thus investigates the interactions between manufacturers and their upstream network actors through two service offshoring modes and elucidate how the operational capabilities of upstream network actors help manufacturers to achieve the performance of the outsourced services.

2.5.3 Performance measures for service offshoring contracts

In order to examine the impacts of service offshoring contracts, focal firms can measure financial and non-financial measures and metrics by comparing the goals set before, during and after the offshoring contracts (Gerbl et al., 2015; Gunasekaran et al., 2015). According to the framework suggested by McIvor (2008), focal firms should first evaluate the existing indicators of process performance before outsourcing services.

Before selecting a service specialist, focal firms are advised to evaluate their financial situation and service costs; the specialist's assets, infrastructure, safety and environmental measures (Raiborn et al., 2009). During the service offshoring process, the performance of offshored services depends on the commitments between focal firms and service specialists (Aksin & Masini, 2008). Ellram and Stanley (2008) suggest that service offshoring contracts should be measured according to cost savings, time to develop and deliver services, customer satisfaction, product/service performance and profitability. According to Jiang et al. (2007), after service offshoring activities are completed, focal firms should consider the costs incurred from the negotiation, monitoring and supervising of service specialists. Elmuti (2003) suggests that managers should decide whether the objectives of the offshored activities have been achieved, the infrastructure has been available throughout the offshoring process, the employees have worked with high motives and smooth communications have been conducted to ensure flexibility.

Among various performance measures, transaction cost has been widely used before, during and after the services are exchanged between focal firms and their service

specialists (Zhang & Du, 2010). The possible explanation is that offshoring studies primarily emphasise the transactional benefits for firms to relocate services and business processes to low-cost regions (Caniato et al., 2015). However, some researchers (Ellram et al., 2008; Farrell, 2005) argue that although cost-saving is an important driver for offshoring activities, its influence is more prominent at the beginning stage of service offshoring activities rather than in the whole offshoring process. Ellram et al. (2008) remind that some offshored services might not be measured by financial metrics and that firms should consider non-financial measures 'control over processes' and 'the level of trust' to evaluate service offshoring decisions. Farrell (2005) suggests that new revenue opportunities and infrastructure use capacity should serve as better measurements of offshoring performance than cost savings alone. By taking these suggestions into account, this study investigates the impacts of upstream network actors' capabilities on the performance of manufacturers' service offshoring contracts, in both financial and non-financial perspectives.

Gunasekaran et al. (2015) suggest the performance measures should be selected and adapted according to the specific contexts. In this study, the focus is on the performance achieved in manufacturers' service offshoring contracts. Specifically, this study chooses to measure the financial performance of manufacturers' service offshoring contracts by adapting sales, profits, cost savings from Liu et al. (2018) and Rai and Tang (2010) who investigate the performance developed from service suppliers' capabilities. It measures the non-financial performance of manufacturers' service offshoring contracts by adapting market share, service quality and customer base by adapting Wu et al. (2010) who study the performance upstream suppliers can provide to focal firms.

2.6 Summary to Chapter 2

This chapter links the upstream capabilities required for servitizing manufacturers to develop advanced services through captive offshoring and service offshoring contracts, using operational capabilities as the theoretical perspective. It establishes a link between servitization and manufacturers' captive offshoring and offshore outsourcing contracts to upstream network actors, thus guiding the next steps of this study.

This chapter links the upstream capabilities required for servitizing manufacturers to develop advanced services through captive offshoring and service offshoring contracts, using operational capabilities as the theoretical perspective. It establishes a link between servitization and manufacturers' captive offshoring and offshore outsourcing contracts to upstream network actors, thus guiding the next steps of this study.

Firstly, this review includes the definition of servitization and the classification of manufacturers' service offerings according to complexity, from base services to advanced services. It then introduces the importance of advanced services to manufacturers, thereby justifying the subsequent focus on this category of services.

Then, this review synthesises five dominant theoretical perspectives related to service offshoring activities, including the TCE, the eclectic paradigm, the RBV, the RDT and the organisational capabilities perspective. Comparison of these theoretical perspectives indicates that the operational capabilities perspective is more compatible with the context of this study.

Subsequently, this review explores the operational capabilities that are required by manufacturers and their service network actors to develop advanced services. The extensive review of capabilities from focal manufacturers and downstream intermediaries and customers reveals the research gap: capabilities developed from upstream network actors are understudied. This justifies the aim of this study: the role of upstream network actors in manufacturers' advanced service-enabling capabilities.

Finally, this review introduces a particular way for manufacturers to interact with their upstream network actors in an offshore market: service offshoring. Service offshoring includes the internal captive offshoring and external offshore outsourcing modes. The analysis of the service offshoring and capabilities literature leads to the conclusion that the capabilities embedded in manufacturers' service offshoring contracts are understudied. More importantly, this review identifies the key variables involved in this research, including upstream network actors, captive offshoring, offshore outsourcing, operational capabilities and performance measures of manufacturers' service offshoring contracts.

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Chapter 3: Methodology

3.1 Chapter overview

A methodological fit allows researchers to keep the elements of a research project (e.g. philosophical paradigms, the aim of the study, research questions, research design and theoretical contribution) in a consistent manner so as to develop reliable knowledge to address research questions (Creswell & Creswell, 2017; Edmondson & McManus, 2007). Moreover, the rigour of the research process is important to the conclusions and validity of the research project (Sackett & Larson, 1990). This section illustrates how the consistency between research methodology and research aim is maintained to answer the four research questions with rigour.

This section follows the framework suggested by Creswell and Clark (2017) to include the key elements of a research process: philosophical paradigm, research design and research methods (see Figure 3.1). Section 3.2 compares the prevailing philosophical paradigms and analyses their relevance to this research. It then provides the rationale for a critical realist paradigm in this study. Section 3.3 outlines the mixed-methods research design that integrates qualitative method and quantitative method in this study. Section 3.4 presents a detailed description of the qualitative stage study, and Section 3.5 presents the quantitative stage study. Section 3.6 addresses the ethical concerns throughout the research, with section 3.7 summarising this chapter.

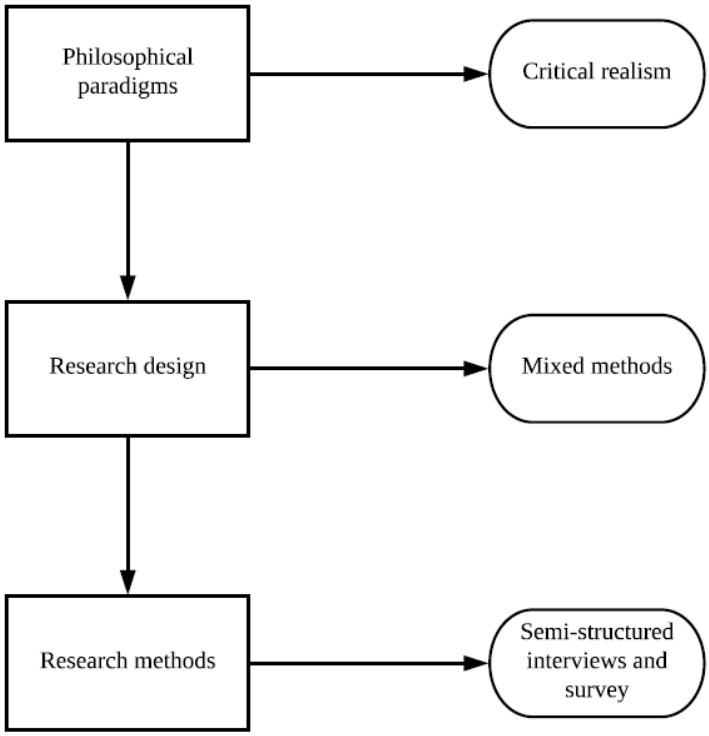

Figure 3. 1: Elements in a research process (adapted from Creswell and Clark, 2017)

3.2 Philosophical paradigms

Researchers' choice of methodologies such as research logic and data collection methods reflect their philosophical paradigms about the nature of reality (ontology) and the ways that reality can be understood (epistemology) (Blaikie, 2007; Kant, 2014). Paradigms can be understood as a researcher's philosophical understanding of the world and the nature of research in a study (Lincoln et al., 2011). Paradigms are also called 'worldviews' (Creswell & Clark, 2017), 'epistemologies and ontologies' (Crotty, 1998) in other research method textbooks.

Research methods are often defined within researchers' philosophical paradigms. Each paradigm entails a different method and criterion to generate reliable knowledge and decide how such knowledge can be described (Hatch & Cunliffe, 2006). Social science disciplines such as management have included several philosophical paradigms (e.g.

positivism, interpretivism and pragmatism) that further explain a researcher's adoption of the corresponding research methods (Easterby-Smith et al., 2012). This section first reviews the prevailing and contrasting philosophical paradigms before introducing the critical realist paradigm adopted in this study.

3.2.1 Debates between positivism and interpretivism

Research method textbooks have introduced two prevailing philosophical paradigms: positivism and interpretivism (Bryman, 2016). The positivist paradigm assumes truth to be independent, objective and separate from individual perceptions. This paradigm endorses the application of natural science methods to study social phenomena (i.e. separating facts from subjective perceptions). To positivist researchers, the observed information should be factual information that is external and reflecting the actual world (Easterby-Smith et al., 2012). This requirement is to ensure standard procedures throughout the research project. In practice, this paradigm often involves observing and measuring a social phenomenon by developing and testing hypotheses with large samples to identify general patterns (Blaikie, 2007; Bryman, 2016). These standard procedures could control the contextual noises either to refute or to confirm the relationships among different variables embedded in a social phenomenon (Van de Ven, 2007). Researchers that share the positivist paradigm often adopt a deductive research logic; they begin their research with a theoretical framework or a few hypotheses that interpret a social phenomenon or individual behaviour, and then collect quantitative data to test of the research framework or hypotheses (Collis & Hussey, 2003). However, positivism is criticised because its corresponding research method depends on a deductive logic based on the atomisation of events; this excessive reliance contradicts the fact that social interactions have made it hard to atomise social events and

individual behaviours (Makkonen et al., 2012). In particular, scientific predictions towards social events can be hard, given the challenges of uncertainty, instability and various changes embedded in these events (Kristóf, 2006).

In contrast, the interpretive paradigm assumes that the world is a socially and culturally structured body which is subject to individual perceptions (Creswell & Creswell, 2017). According to this paradigm, researchers live in a society where the 'truth' is defined according to its social members' interpretations of historical and social events (Crotty, 1998). Researchers taking the interpretive paradigm tend to stress the uniqueness of human beings and recognise the importance of historical events and cultural values in shaping an individual's interpretation of facts (Bell et al., 2018). In practice, interpretivism research entails an inductive logic using qualitative methods (Tashakkori et al., 1998). Findings are developed through the interactions between researchers and respondents in a qualitative manner (Ponterotto, 2005). Therefore, the interpretive paradigm regards humans as a source of knowledge, and it combines ideas and themes to understand cultural realities (Creswell & Clark, 2017). However, interpretivism is also vulnerable to complaints about the lack of scientific data in the studies. Silverman (2013) argues that interpretivism generates too many '-isms' (e.g. constructionism & feminism) that can hardly be framed into a broader context, and are thus only suitable for the early-stage exploratory studies which help researchers to familiarise with the research background before the 'rocket-science' research begins. Likewise, the qualitative study findings are often attacked for providing insufficient reliability. Researchers observe and understand social phenomena subjectively, so they may either fail to record some seemingly insignificant but actually important details during the investigation or interpret their findings inconsistently, thus failing to provide

accurate and objective conclusions about a social event (Nudzor, 2009).

3.2.2 Pragmatism

While the debate between positivism and interpretivism goes on, pragmatic scholars such as Peirce, James, Mead and Dewey suggest that researchers should focus on the research question and adopt all the possible methods to understand the related social phenomenon instead of stressing methods (Scheffler, 2013). Researchers are encouraged to adopt available methods (e.g. quantitative and qualitative methods), data collection techniques and analytical procedures that are most effective in addressing the research questions (Creswell & Creswell, 2017; Patton, 1990; Tashakkori & Teddlie, 2010).

Some methodological pragmatism researchers (e.g. Tashakkori et al., 1998; Teddlie & Tashakkori, 2003) suggest that researchers can switch between paradigms. The pragmatist logic is that neither qualitative nor qualitative methods alone could contribute to a complete analysis. As such, qualitative and quantitative methods need to be combined (Creswell et al., 2004). Nevertheless, Johnstone (2004) argues that the pragmatic approach is challenging to apply in practice. In particular, researchers may face the problem of handling dissonant data collected from conflicting philosophical assumptions when trying to integrate the positivist and interpretive approaches into the study (Mcevoy & Richards, 2006). For example, some researchers may find it hard to connect interpretative findings with quantitative analysis results to empirically develop generalisable conclusions (Bryman, 2004).

3.2.3 Paradigm for this study—critical realism

The paradigms discussed above, especially the debate between positivism and interpretivism, provide the alternative philosophical paradigm adopted in this study: critical realism. A critical realist tends to believe that a priori truths about the nature of the world exist independently of a researcher (Zachariadis et al., 2013). Although critical realism is a relatively new philosophical paradigm, it has been adopted by researchers from several disciplines, such as economics (Lawson, 1999), accounting (Modell, 2010), marketing (Easton, 2002) and operations management (Rotaru et al., 2014). According to critical realists, it is nearly impossible for the researcher to fully understand reality since his or her perceptions are influenced by existing theoretical frameworks or research interests (Mcevoy & Richards, 2006). As Sayer (2004) suggests, researchers' knowledge about the world is influenced by the discourses around them, but they can still obtain the accessible aspects of the world through empirical discoveries. The author of this thesis adopts a critical realist approach for three reasons.

First, critical realism appreciates the value of interpretivism methodologies using qualitative data (e.g. discourse and perceptions) (Bhaskar & Varadan, 1989). Critical realists accede that researchers' perceptions may shape reality (Evely et al., 2008) and that the paradigm of critical realism uses causal language with thinking (Easton, 2010). Meanwhile, critical realists warn that the interpretivists fail to relate discourses to the underlying social structures that social actors are embedded (Granovetter, 1985). Potter and López (2001) warn that some qualitative data (discourses) from the interviewees might be partial and even misguided. As such, Mingers (2003) advocates the move from discourses and observations to hypotheses about the underlying

structures or paths to explain the phenomenon under study. The critical realist researcher would study events regarding the possible causes of them, and to identify the explanation with the greatest explanatory power (Mcevoy & Richards, 2006). For instance, this study is trying to identify the most powerful explanation to manufacturers' service offshoring activities. It may reject the traditionally assumed transaction-cost theory and cost reduction motivation in previous offshoring studies to explain the phenomenon under study.

Second, critical realists remind that methodologies based on the positivistic paradigm stress too much about the observable events while ignoring if and how much these observations are influenced by former theoretical frameworks (Mcevoy & Richards, 2006). In particular, positivists may either assume that their investigation shares the same social contexts with the former frameworks they used or ignore the external influences from specific social contexts (Collier, 1994). For instance, manufacturers' upstream network actors in this study are embedded in specific social and historical contexts; and the focus of this study lies in the paths that generate operational capabilities for manufacturers, rather than empirical generalisations (Lawson, 2003).

Third, the critical realist paradigm allows a methodological triangulation for the purpose of confirmation and completeness (Risjord et al., 2001). For one thing, the integration of qualitative and quantitative methods can help researchers to address the potential biases that exist in single-method studies (Denzin, 1989). For instance, quantitative findings can be used to corroborate qualitative findings, thereby generating a more robust conclusion than using only one type of findings (Risjord et al., 2001). For another, qualitative and quantitative data can be triangulated to generate

complementary perspectives and more detail which collectively lead to a complete understanding of the phenomenon and reveal different aspects of the same reality. This study aims to develop complementary results from two different means of investigation about the operational capabilities and the roles of different offshoring modes in the performance of manufacturers' service offshoring contracts in an offshore context. In particular, the author tries to develop a smooth transition from the qualitative stage into the quantitative stage, thereby ensuring a more holistic theoretical framework to present the findings that answer the four research questions. Therefore, a critical realist paradigm serves to facilitate this transition.

3.3 Research design

3.3.1 Mixed methods approach

According to Jackon and Easterby-Smith et al. (2002), philosophical paradigms can guide the research design. Drawing on the critical realist paradigm (Kwan & Tsang, 2001), the author of this thesis believes that truth exists independent of his thinking and that theories developed solely from observations can digress from the truth and thus need testing and revision. Likewise, only empirically establishing correlations and testing the hypothesised underlying causalities are not enough, as researchers need to confirm whether these correlations and causalities are actually involved in the observed phenomenon (Zachariadis et al., 2013). To capture the truth, the author firstly evaluated the logics (i.e. inductive & deductive) that are embedded in the available methods (i.e. qualitative & quantitative) to collect and analyse data related to a specific phenomenon (e.g. manufacturers' service offshoring contracts). The inductive logic involves empirical observations to identify the theoretical patterns or propositions. This logic is often adopted by the qualitative researchers who aim to obtain

respondents' understanding or perspectives about a specific phenomenon. In contrast, the deductive logic involves testing hypotheses about the relationships between dependent and independent variables (Bell et al., 2018). This logic is often adopted by the quantitative researchers who aim to test how the data collected from respondents can fit into theoretical frameworks. The idea of integrating the qualitative and quantitative methods to address research problems have been proposed and practised in the literature (Johnstone, 2004; Modell, 2010; Tashakkori & Teddlie, 2010). This practice can help the researcher to learn about respondents' observations to offshore upstream network actors' contributions to manufacturers (through the qualitative method), develop hypotheses based on observations and then test these hypotheses (through the quantitative method), thereby revising the conceptual framework that better captures the truth.

Moreover, Edmondson and McManus (2007) highlight that the selected research design should be compatible with the research aim and questions to ensure research quality. This study aims to understand 1) how offshore upstream network actors contribute operational capabilities to manufacturers and 2) how these operational capabilities influence manufacturers' service offshoring performance. Drawing on the critical realist paradigm, this study adopts a mixed-methods approach, integrating the qualitative and quantitative research methods to confirm correlations (through the quantitative method) in observed phenomenon (through the qualitative method). A qualitative investigation could allow the author to answer the first two research questions regarding the offshore upstream operational capabilities using qualitative data collected from semi-structured interviews, while the subsequent quantitative investigation could allow the author to answer the last three research questions regarding the impacts of these operational capabilities and the moderating effects of

the offshore outsourcing modes using quantitative data collected from a survey (see Table 1.1 for the research questions). The robustness of the empirical results is maintained from a large sample of offshoring firms in the Yangtze River Delta (YRD) region of China.

In short, the mixed methods approach is appropriate for this study based on the author's philosophical paradigm, the research questions to be addressed, the types of data required and the under-investigated context of manufacturers' service offshoring activities.

3.3.2 Design overview

This study attempts to measure the flow of operational capabilities from offshore upstream network actors to manufacturers and then test whether the hypotheses developed from qualitative semi-structured interviews could be generalisable to a larger sample of firms (N = 360, see 3.5.2 for detailed explanation). To meet this intention, the author adopts an exploratory sequential design suggested by Creswell and Creswell (2017) (see Figure 3.2 for the procedure).

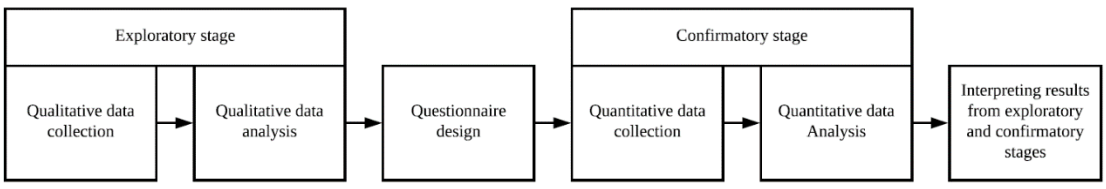

Figure 3. 2: Exploratory sequential design (adapted from Creswell and Creswell, 2017)

An exploratory sequential mixed methods design includes three stages: explorative stage, instrument (questionnaire) design and confirmatory stage. The first stage involves collecting and analysing qualitative data which will be used to develop a questionnaire for the second stage. The second stage involves developing the measurement instruments that allow the theoretical concepts to be quantitatively evaluated. The third stage involves applying the questionnaire to a larger sample of firms (Creswell & Creswell, 2017). The qualitative data is coded into themes which are used to develop scales. The scale development stage follows established procedures for instrument design (e.g. item discrimination, construct validity and reliability) (DeVellis, 2016). This design also allows researchers to integrate qualitative results with the relevant literature to develop the questionnaire. Following the suggestion of Creswell and Creswell (2017), the two stages draw different data samples from the same population. The purposive sampling method is used in the exploratory stage (see 3.4.2) to improve the inferential quality of the study, as well as the confirmatory stage (see 3.5.2) to test the hypotheses using a larger sample. The qualitative data and quantitative data are analysed independently, with the qualitative analysis generating a research framework which is tested in the second stage (Kemper et al., 2003). The three-stage study provides the findings that can be compared with previous studies in the same field to justify the theoretical and managerial implications to the literature.

3.3.3 Validity and reliability

The quality of a social research project can be evaluated by the validity and reliability of the research process. Validity refers to the integrity that a study can generate in the findings; it includes four aspects: internal validity, external validity, ecological validity and measurement validity (Bryman, 2016).

First, internal validity primarily concerns the relationships between variables in a researcher's conclusions (i.e. whether these conclusions about the relationships between/among variables 'hold water') (Bryman, 2016). Internal validity can be ensured by a valid explanation for the relationship between independent variables and dependent variables. In practice, internal validity can be achieved by multiple sources of qualitative data and statistical control of irrelevant variables from a quantitative perspective. This study employed extensive semi-structured interviews and quantitative methods to ensure the validity of this project, with the causal relationships evaluated by senior managers from multiple service offshoring firms.

Second, external validity primarily concerns whether the results of a study can be generalisable to a broader context (Bryman, 2016). In a mixed research method design, external validity can be achieved by using different ways to measure the same construct (Tashakkori & Teddlie, 2010). The qualitative study integrates the initial insights into a conceptual framework (see Figure 5.1), while the quantitative research tests the hypotheses developed from the conceptual framework based on a large sample survey. In this study, external validity is maintained by building a theoretical model about the measurement of and relationship between operational capabilities and performance (exploratory stage) and testing the model with a larger sample of firms (confirmatory stage).

Third, ecological validity addresses the applicability of research findings in people' daily and natural social settings (Bryman, 2016). This aspect of validity raises the alarm to some social research findings that are statistically valid but have limited

relationship to activities in natural social environments. Ecologically invalid research findings are often caused by researchers' interferences in natural situations and mixing of unnatural elements, such as conducting interviews or surveys in a particular environment. Even though the interview or survey may generate results with internal and/or external validity, the artificial interference of the research process may jeopardise the ecological validity of the study (Bryman, 2016; Cicourel, 1982). This study ensures ecological validity through interviews with practitioners whose insights are socially meaningful, as well as the survey, which is built on interview findings and taken by practitioners from a large sample of the firm population.

Fourth, measurement validity (also known as construct validity) concerns the identification of appropriate measures of concepts in social science research (Bryman, 2016). Ideally, a measure has to be developed in a manner that actually reflects the concept it means to denote. To do this, the measurement of a theory has to generate a stable denotation of the underlying concept. In practice, De Vaus (2013) suggests three ways to ensure measurement validity: 1) measure should conform to the conceptual expectations, 2) indicators should measure different aspects of one concept and 3) a new measure should be compared with the extant measure of the same concept. In this study, the semi-structured interviews explore the shared understanding of the same concept among respondents (managers); then this shared understanding will be used to develop and test scales that particularly suit the research context.

Reliability refers to the consistency, accuracy and stability of a measure of a concept (Bryman, 2016). To achieve this, a quantitative measurement instrument in the quantitative study has to be reliable. This instrument should provide consistent results when measuring different items of the same construct, even when viewed from

different time periods and by several researchers (Tashakkori et al., 1998). In practice, DeVellis (2016) suggests that when developing scales, researchers should maintain the homogeneity of the items by ensuring the correlations between items within one scale (internal consistency). Internal consistency can be measured by the Cronbach alpha coefficient, which can be understood as the proportion of a scale's variance that is attributable to a common source (Cortina, 1993). The reliability of this study is maintained by documenting in details each stage of the research through an interview guide, so that other researchers could repeat the sample selection and survey design process, as well as the internal consistency check for the proposed scales.

3.4 The qualitative stage study

This research aims to investigate the impacts of upstream network actors' operational capabilities on the performance of manufacturers' service offshoring contracts. The first two research questions (RQ1 and RQ2) concern how each mode of service offshoring (captive offshoring and offshore outsourcing) provides the operational capabilities to manufacturers. A qualitative research method is particularly appropriate for answering these two questions as the focus of this method is on the 'why' and 'how' of the topic and the better understanding of the processes (Spector, 2006).

Qualitative research method allows the researcher to investigate a phenomenon in natural settings where individuals and their daily experiences can be explored in-depth (Minichiello & Kottler, 2009). This method thus allows the author to purposively study manufacturers' service offshoring activities in a natural setting—manufacturers' upstream networks in offshore locations. Moreover, a qualitative study can provide an insider's view about the complex phenomenon, with managers providing insightful,

rich and holistic qualitative data (Collis & Hussey, 2003; Eisenhardt, 1989). In particular, a qualitative study allows the researcher to investigate manufacturers' upstream network actors and explore their operational capabilities without any controlling or manipulating efforts during the process. Finally, the explorative nature of the qualitative stage study means that the researcher has to maintain frequent and close communications with senior managers of the sample firms to observe and record the random and unsystematic aspects of their behaviours (Jani & Saiyed, 2017).

3.4.1 Unit of analysis

Unit of analysis refers to the focal point of a phenomenon, and it determines the kind of data to be collected and analysed (Collis & Hussey, 2003). The unit of analysis for this thesis is manufacturers' upstream network actors located offshore, including offshore service delivery centres and offshore service specialists. This stage aims to investigate the sources of operational capabilities from these network actors and the performance measures for service offshoring contracts. These performance measures are based on the perceptions of upstream network actors regarding their contribution to manufacturers. It will explore how operational capabilities are contributed by upstream network actors through different service offshoring modes. The key variables include different operational capabilities and offshoring modes. The qualitative data were obtained by interviewing managers who were familiar with the service offshoring businesses of the sample firms.

3.4.2 Sampling population and strategy for qualitative data

In the qualitative stage, the author adopted a purposive sampling approach to identify and select firms for the qualitative data collection. The purposive sampling approach

allows the researcher identify and determine interview respondents who may provide the optimum perspectives or insights on a topic they are interested, and then integrate those perspectives or insights into the qualitative study (Saunders, 2011). This approach is not based on any statistical probability theory in the data collection process (Curtis et al., 2000). Instead, the researcher uses a relatively small number of intentionally selected individuals who have the knowledge and experience about a specific topic and are able to provide the relevant, reliable and plausible descriptions that lead to detailed information about the topic (Huberman & Miles, 2000).

Sample firms in this stage were restricted to the non-Chinese manufacturers' service delivery centres (involved in captive offshoring) and service specialists (involved in offshore outsourcing) in Suzhou, China. The researcher is based at Xi'an Jiaotong-Liverpool University (XJTLU) in Suzhou, so the restriction of sample firms in Suzhou provided easier access to appropriate senior managers, convenience and cost-effectiveness to visit the sample firms and interview their managers within one day. Another reason to select sample firms from Suzhou was that the city serves as the pioneer national service outsourcing demonstration base in China.[4] As such, the central and local governments provided financial and regulatory supports to attract manufacturers' factories and service delivery centres, as well as service specialists that are engaged in service offshoring/outsourcing activities. Suzhou has identified several fields of service offshoring/outsourcing, including software, R&D, finance, animation comic game (ACG) and creative, back office, cloud computing, logistics and supply chain, Internet of things, data service, testing & inspection, service delivery centre and

[4] http://www.sipac.gov.cn/zjyq/sgsfq/200807/t20080720_93300.htm

Table 3. 1: Overview of the sample sector distribution

consulting. Therefore, the author was able to investigate the service offshoring activities among sample firms.

Within the locational restriction of Suzhou, all the non-Chinese manufacturers' service delivery centres (involved in captive offshoring) and service specialists (involved in offshore outsourcing) engaged in service offshoring contracts in the above sectors could meet the sampling criteria. According to the service offshoring company list was obtained from the Suzhou Bureau of Commerce,[5] 652 firms met the above standards, i.e. they were providing services to non-Chinese manufacturers. To further ensure that the sample firms met these standards, the author contacted the business school of Suzhou Industrial Park Institute of Service Outsourcing (SISO) to recommend appropriate firms and help contact firm managers. SISO was established by the local government to attract firms involved in service offshoring/outsourcing activities. It invites professionals from local firms to develop curricula, which cover the technical skills required by these firms. Also, SISO serves as Suzhou service outsourcing talents training base and maintains close relationships with service outsourcing/offshoring firms in the city. As a neighbour from XJTLU, the author of this study frequently visited SISO and developed ties with its faculty members who recommended a list of 100 firms from the 652 firms identified above. Table 3.1 provides an overview of the sector distribution for these 100 firms.

Service sector	**Firm population**	
	Service delivery centres (Captive	Local service specialists

[5] http://www.commerce.gov.cn/

	offshoring)	(Offshore outsourcing)
Software development & testing	13	2
Finance (Financial background support)	9	2
Animation comic game (ACG) & creative	2	0
Back office (Background support)	7	3
Cloud computing	4	1
Logistics & supply chain	14	3
Data service	5	0
Bio-chemical testing & inspection	3	1
Shared service delivery centre	6	0
Consulting (training & coaching)	11	7
R&D	2	5
Total	76	24

Obtaining access to firms was challenging because this study included some competing firms who were sensitive about their information. Moreover, answering the research questions required the inputs from managers (e.g. operations managers, marketing managers and general managers) who had enough knowledge about their firms' operations. Among the 100 firms, SISO faculty members had personal relationships with managers from 70 firms.

Eventually, the author accessed the senior managers of sample firms in three ways: 1) recommendation from SISO (20 firms from the above 652 firm list), 2) supervisors' contacts (15 firms, with 8 firms from the above 652 firm list & 7 firms not from the list but engaged in service offshoring activities), and 3) personal contacts (10 firms from the above 652 firm list). This approach was appropriate for this study because the purpose of qualitative methods is to select respondents who could help the researcher to understand people's experiences (Longhurst, 2009).

After identifying these respondents, the author sent out an interview invitation via emails (see Appendix 1) to introduce the research topic and asked for a face-to-face interview in their firms. As an incentive, the author offered to present the findings of the study to local outsourcing/offshoring firms that were interested in other firms' experience in recruiting, training and retaining employees. Also, local technical colleges such as SISO were interested in firms' expectations for students' technical skills. Two presentations about the research findings were made at SISO in the May and July of 2018 (see Appendix 2 for the photos). 42 respondents agreed to be interviewed at first, but 16 of them were working in other countries or regions at the time and did not have time for interviews. That left 26 firm interviews. Appendix 3 provides an overview of firm information, respondents' job titles, their involvement in service offshoring activities and secondary data files.

3.4.3 Qualitative data collection protocol

The qualitative data collection process followed the suggestion of Yin (2003) and included the repeatable procedures and the general rules that were followed during each semi-structured interview into a protocol (see Table 3.1). A protocol allows researchers to conduct the qualitative stage study in a structured and uniform manner (Eisenhardt, 1989). The qualitative data collection protocol outlines the semi-structured interview guidelines that facilitate the author to answer the first two research questions; it includes six parts: 1) the first two research questions which facilitate the establishment of the theoretical framework and the subsequent quantitative stage study, 2) unit of analysis, 3) time of the qualitative data collection, 4) the interview procedure, 5) location of the firms and 6) the semi-structured interview questions. Table 3.1 presents the details of the qualitative data collection protocol for this thesis.

Table 3.2: Qualitative data collection protocol

Research questions	• RQ1: How do upstream network actors contribute to manufacturers' operational capabilities through captive offshoring service contracts? • RQ2: How do upstream network actors contribute to manufacturers' operational capabilities through offshore outsourcing service contracts?
Unit of analysis	Manufacturer's upstream network actors (offshore service delivery centre/ offshore service specialists)
Time	June of 2016 to June of 2017 (45-60 minutes/interview)
Procedure	Semi-structured interviews
Location	Suzhou, China
Process of the semi-structured interviews	**Introduction** • Self-introduction of the researcher • Introduction to the research project • Permission to take audio record (otherwise take notes) **Background information** • Firm background (firm origin, business scope and non-Chinese manufacturers as customers) **Semi-structured interview questions** • What are the important resources and capabilities that you have for your business success? • What kinds of capabilities can you help your customers to develop? • How do your capabilities function in your customers' business processes? • How do your customers evaluate your performance in service offshoring contracts? **Further questions asked after each main question** • Could you provide more details about what you just said? • Could you give me some examples of what you just said?

The semi-structured interview questions were designed to reflect the four themes identified in the literature (offshore upstream network actors, service offshoring modes, operational capabilities from upstream offshore network actors and performance measures for service offshoring contracts). In particular, the background information questions (location of headquarters, business scope and non-Chinese manufacturers as customers) ensured that the respondent came from non-Chinese manufacturers' upstream network actors in China and assessed the service offshoring modes; operational capabilities assessed upstream network actors' capabilities contributed to manufacturers' service offshoring contracts; and performance measures indicated how each network actor's performance was evaluated in the service offshoring contract.

3.4.4 Semi-structured interview process

To explore the firm-specific capabilities in the offshore upstream networks of a focal manufacturer, the author applied the semi-structured interview method to collect the qualitative data. The semi-structured interview allows the researcher to ask informants a series of predetermined but open-ended questions while maintaining controls over the topics (Given, 2008). Advantages of semi-structured interviews include the potential to improve the low response rates of questionnaires; meet the exploratory research needs for respondents' beliefs and attitudes; validate the respondents' answers by observing non-verbal indicators; and encourage that the respondents answer all the questions (Barriball & While, 1994). Moreover, semi-structured interview grants researchers with the freedom to rephrase questions to encourage relevant information or clarification from the respondents, thus facilitating replicability and flexibility in developing rich data (Irvine et al., 2013; McIntosh & Morse, 2015).

To conduct semi-structured interviews, the author of this thesis visited and interacted with managers of manufacturers' offshore upstream network actors. The visit and interaction helped the researcher to develop in-depth knowledge about the unique business environment and previous experience, inter-organisational relationships with governments and business partners. Semi-structured interviews with several organisations allow the researcher to conduct within-firm and cross-firm analyses (Battistella et al., 2017; Eisenhardt & Graebner, 2007). For instance, some service delivery centres have to maintain cooperating and competing relationships with local service specialists who have benefited from local government support and become more competent.

The main qualitative data was collected through face-to-face interviews with 26 managers between June 2016 and June 2017. All the 26 interviews took place in respondents' offices. Each interview lasted between 45 and 65 minutes. Face-to-face interviews can allow a researcher to develop interactive communications with respondents who might be encouraged to provide more detailed information; it also allows the researcher to capture non-verbal information, better control the questions and thus better understand respondents' answers (Creswell & Creswell, 2017). For instance, what the manager states during the interviews may not denote what they really mean (Hertz & Imber, 1995). This is particularly the case among managers who are knowledgeable about the firm's operations but unable to explain the reasons. Likewise, some senior managers may refuse to admit that two events are related, but they may later give examples showing that these events are related. To overcome situations like these, the author managed to ask additional questions and developed a better understanding of potentially important information where necessary.

The semi-structured interviews were conducted according to the protocol (see Table 3-1). 20 of the 26 respondents agreed to be audio recorded. The audio records were transcribed to keep track of data and ensure a complete description of these managers' responses. For the other six managers who preferred not to be audio recorded, interviews were conducted by the researcher and his supervisor, with one person asking questions and the other taking notes (Yin, 2003).

After transcribing the audio recordings, the author contacted some respondents through telephone or WeChat, asking them to provide some more details. This effort

could help avoid ambiguities during the interviews (Eisenhardt, 1989). The author sent the transcripts to all the interviewed managers for confirmation, although only six respondents replied through WeChat and four through the telephone to confirm the contents in the transcripts.

In addition to the primary data collected from semi-structured interviews, the author also tried to obtain more sources of data through firm visits, after-interview phone calls and secondary data. The secondary data included 51 documents for 26 firms, which came from firms' websites, news reports, industry reports, published papers and senior managers' presentation slides. Such data confirmed some practices that were mentioned by the respondents, with some explaining the motives behind. Some local news allowed the researcher to understand how these firms' relationships with stakeholders in the local business environment helped them to develop capabilities. The additional use of secondary data avoided situations where the respondents might overlook important information and allowed the researcher to integrate background knowledge to better understand the terminologies and words in respondents' presentations (Creswell & Creswell, 2017).

3.4.5 Qualitative data analysis

The author explored emerging themes or patterns to identify repeated expressions, topics and meanings (Taylor & Bogdan, 1984). This exploration process began with the reviews of interview notes and transcripts and was followed by data analysis or data coding for the purpose of condensing data and clarifying the respondents' intended meanings during the interviews (Miles, 1979). The themes and patterns

identified in the coding process could then be used to build theoretical frameworks or models that can be further tested using empirical data (Huberman & Miles, 2000).

Analysis of the qualitative data was conducted during the data collection process. For instance, when semi-structured interviews and secondary data collection for firms M1-2 and M2-2 were going on, preliminary analysis of the already interviewed firms M1-1 and M2-1 had already finished. This method could validate the author's expectations about the roles of upstream network actors. Qualitative data analysis followed the procedure of data coding, within-case analysis, cross-case analysis and a causal relationship model (Huberman & Miles, 2000). The analysis eventually provided a set of operational capabilities in different offshoring modes that contributed to the performance of service offshoring contracts.

The coding process begins with the template analysis method (King, 2004). This method provides a clear and lucid way to structure study findings with themes, each accompanied with illustrative examples (King, 2004). In a template analysis, researchers develop different orders of codes into a template, with each code representing a theme explored in the qualitative data. A template allows researchers to compare the insights from different groups of respondents within one research context (King, 2004). For instance, this study hopes to obtain condensed themes from upstream network actors that are providing the operational capabilities to manufacturers through service offshoring contracts.

- Initial coding

The initial coding was developed from the literature review and four pilot interviews (different from 26 semi-structured interviews), with codes in a hierarchical order. The four pilot interviews were undertaken to help the author better understand the business context, familiarise and improve the interviewing contents and procedures (Yin, 2003). From the four respondents, two came from service delivery centres (one specialised in software R&D and the other in logistics services) and two from service specialists (one specialised in data analysis and the other in bio-engineering services). The interviewees were asked to elucidate 1) their relationships with manufacturers (e.g. the type of services provided) and 2) the reasons why work was offshored to these four firms. The pilot interviews allowed the author to better understand the context (manufacturers' service offshoring activities to upstream network actors) described in the literature (e.g. Eggert et al., 2017), and further explore the components (e.g. resources, capabilities and performance) that can be used to evaluate service offshoring success. The four pilot interviews also allowed the author to modify the qualitative data collection protocol. For instance, the managers stressed the importance of their services to internal customers (i.e. manufacturers), thus reminding the author to include the question 'How do your capabilities function in the business processes of your customers (parent firms of service delivery centres) business processes?' in the protocol. These four interviews were not included in the 26 semi-structured interviews.'

The template included three first-order codes, including upstream network actors' characteristics, factors related to manufacturers' service offshoring contracts and performance measures for these contracts. Each code includes more provisional

second-order codes. Table 3.3 presents the initial coding template, which was used in the within-firm analysis for each firm.

Table 3. 3: Initial coding template

First-order codes	Second-order codes
Upstream network actors' characteristics	Manufacturers as customers
	Service activities
	Captive offshoring
	Offshore outsourcing
Factors related to manufacturers' service offshoring contracts	Resources
	Services
	Relationships
	Operational capabilities to obtain resources
	Operational capabilities to develop services
	Operational capabilities to manage relationships
Performance measures for service offshoring contracts	Sales
	Cost savings
	Quality and response time against the service level agreements service-level agreement

The interview transcripts were analysed using NVivo 11 (QSR International), which allowed the author to identify how the managers of manufacturers' upstream network actors perceived the operational capabilities that contributed to the performance of service offshoring contracts. To achieve thematic saturation, the author firstly classified the qualitative data (nodes) into a priori themes (e.g. relationship with manufacturers and capabilities to develop resources and manage relationships) described in the literature and at the same time explored new themes that were different from the a priori themes. Once all the data fell into the themes (first-order codes and second-order codes) in the template and no new themes could be found, the author decided that thematic saturation was achieved (Saunders et al., 2018). In this way, the initial template was converted into the final template (see Table 3.4).

- Second-stage coding

In the second-stage coding, the identified operational capabilities were divided into second-order codes to provide a more detailed understanding about the operational capabilities that are embedded in different offshoring modes, and how they contribute to the performance of manufacturers' service offshoring contracts. Second-order capabilities were developed by the thematic analysis of the operational capability concepts along with the review of current literature.

This study is about manufacturers' service offshoring activities, i.e. a focal manufacturer's transfer of the ownership of business processes (e.g. information technology, R&D, software, testing, logistics and finance) from its home country to upstream network actors to obtain locational advantages or serve customers from home/host markets (Luo et al., 2013). Therefore, the first code (upstream network actors' characteristics) included more secondary codes:

i. The code 'manufacturers as customers' ensured that the investigated firms were providing services to manufacturers, thus matching the scope of this thesis.
ii. The codes 'service activities' showed the services that focal manufacturers needed to rely on upstream network actors to develop. This concurred with Paiola et al. (2013) about manufacturers' need for complementary capabilities during the transition towards servitization.
iii. In the second-stage coding, 'offshore outsourcing' was further categorised into 'offshore outsourcing' (Mode 2) where an offshore service-specialist directly provided operational capabilities to a focal manufacturer and 'in-country outsourcing' (Mode 3) where an offshore service delivery centre of a manufacturer outsources business processes to service specialists in the same

country.

iv. The codes ‘resources’ and ‘services’ concerned the kinds of resources and services respectively that respondents’ firms could provide to their customers (i.e. focal manufacturers). The code ‘relationships’ was removed as it was a repeat to the offshoring modes that already reflected the upstream network actors’ relationships with manufacturers.

The three codes ‘operational capabilities to obtain resources’, ‘operational capabilities to develop services’ and ‘operational capabilities to manage relationships’ were initially developed to highlight the underlying operational capabilities for firms to obtain resources, develop services, and manage relationships. However, these codes did not specify the operational capabilities that could allow manufacturers to obtain offshore resources. These three codes were further specified in eight codes after the literature review and qualitative data analysis.

- Final template

Through the literature review and qualitative data analysis, the author identified eight operational capabilities: 1) ‘process improvement’, 2) ‘scalable service-enabling technology’, 3) ‘scalable and well-trained talents’, 4) ‘service and process innovation’, 5) ‘product/service customisation’, 6) ‘in-country relationship management’, 7) ‘security and IP protection protocols’ and 8) ‘cultural alignment’. The following are the contents and definitions of these codes (i.e. operational capabilities):

i. ‘Process improvement’: an offshore upstream network actor’s ability to adopt well-established and publicly available or proprietary methodologies to reduce mistakes, redundancies, and wastes and improve the efficiency of customers’

business processes by prioritizing or organising tasks and processes.

ii. ‘Scalable service-enabling technology’: an offshore upstream network actor’s ability to develop technological assets such as laboratories and specialised equipment in order to support customers’ (i.e. manufacturers’) scalable service requirements.

iii. ‘Scalable and well-trained service talents’: an offshore upstream network actor’s ability to develop technological assets such as laboratories and specialised equipment in order to support customers’ (i.e. manufacturers’) scalable service requirements.

iv. ‘Service and process innovation’: an offshore upstream network actor’s ability to help customers (i.e. manufacturers) to commercialise ideas into new services or innovatively deliver existing services through new commercial models.

v. ‘Product/service customisation’: an offshore upstream network actor’s ability to adapt or tailor its products or services to meet differentiated customer needs from the global market.

vi. ‘In-country relationship management’: an offshore upstream network actor’s ability to build and manage relationships with a wide range of local stakeholders, such as business partners, government agencies, academic institutes, and customers for the purpose of obtaining legal permits, reduce risks and find new sources of revenue.

vii. ‘Security and IP protection protocols’: an offshore upstream network actor’s ability to provide security alarm systems and protect trade secrets and IP in daily operations.

viii. ‘Cultural alignment’: an offshore upstream network actor’s ability to help

customers (i.e. manufacturers and/or service delivery centres) to adapt to a foreign culture when operating in an offshore market and to effectively respond to requests from partners that are embedded in one or multiple foreign cultures.

Also, the second-stage coding identified ‘performance measures for service offshoring contracts’, which refers to the offshore network actor’s side of efficiency and effectiveness in fulfilling offshoring contracts. Second-order codes are developed from 1) a priori codes in the literature review by (Gunasekaran et al., 2015) on the performance of service offshoring activities, including sales growth, profits, customer base, customers’ cost savings, improved service deliveries, and customers’ key performance indexes (KPIs) such as customers’ system reliability, quality and response time against the service level agreements, and 2) the semi-structured interviews where respondents were asked how their performance was evaluated as important to customers (i.e. manufacturers). These measures are adapted during the quantitative stage study to demonstrate upstream network actors’ perceptions regarding the influence of their operational capabilities on manufacturers’ service offshoring contracts. Table 3.4 presents the final template that includes the first order and second order codes. These codes were related to the research questions of this study.

Chapter 4 will provide detailed explanations regarding how the above operational capabilities were developed by upstream network actors to help manufacturers achieve transitions towards servitization. All the codes from the interviews were summarised in Table 3.4.

3.5 The quantitative stage study

This section introduces the research design for the second stage of the study, namely, quantitative research. The primary objective of the quantitative stage is to empirically test the impacts of upstream network actors' operational capabilities on the operational performance of manufacturers' service offshoring contracts.

Table 3.4: Final template

First-order codes	Second-order codes
Upstream network actors' characteristics	Manufacturers as customers
	Service activities
	Captive offshoring
	Offshore outsourcing
	Firm age (Year established)
	Firm size
	Firm location
Upstream network actors' operational capabilities	Process improvement (PI)
	Scalable service-enabling technology (SST)
	Scalable and well-trained service talents (SWS)
	Service and process innovation (SPI)
	Product/service customisation (PSC)
	In-country relationship management (IRM)
	Security and IP protection protocols (SIP)
	Cultural alignment (CA)
Performance measures for manufacturers' service offshoring contracts	Sales
	Profits
	Customer base
	Customers' cost savings
	Customers' service deliveries
	Customers' KPIs (e.g. customers' system reliability, quality and response time against service leverl agreements)

The testing took place in an offshore (Chinese) business environment and concerned 14 research hypotheses developed from the literature review and qualitative findings. Testing to these hypotheses could allow the author to validate and generalise the findings from the qualitative stage study.

To serve the above purposes, the author adopted a cross-sectional survey research design, which allows researchers to investigate many subjects (e.g. individuals and firms) at the same point of time to compare their differences (Debaere & Mostashari, 2012). Researchers have accepted the practice of collecting large-sample quantitative data from managers to reflect corporate behaviours (Kirkman & Law, 2005). Cross-sectional survey design (i.e. surveys completed by a single respondent at a single point in time) could facilitate data collection, quantification and analysis (Rindfleisch et al. 2008; Scandura & Williams 2000).

Meanwhile, the survey included a thorough and logical selection of samples to ensure accuracy and representativeness in the findings (Remenyi et al., 1998; Saunders, 2011). In particular, the quantitative stage research design included the methods used for sample identification and selection, as well as the design and administration of the survey. This serves to reduce the potential errors during the survey, including sampling error (i.e. the error caused by failing to survey all elements in the survey population), coverage error (i.e. the error caused by failing to draw samples from a list that includes all elements of the population), measurement error (i.e. the error caused by unsuitable question formats and meaning in the questionnaire) and non-response bias (i.e. the error caused by a large number of respondents irresponsive to a survey) (Dillman et al., 2014). In this stage, the ‘questionnaire design’ section addresses the measurement

errors, the ‘sampling methods’ section addresses the sampling and coverage errors and the ‘initial data analysis’ section addresses the non-response bias.

3.5.1 Questionnaire design

According to De Vaus (2013), a survey design begins with the conversion of abstract concepts into measurable items. This can be achieved by delimiting relevant concepts and developing the corresponding indicators. Indicators are often converted into items that constitute a questionnaire. The questionnaire has to be tested to ensure that it provides all the necessary information and that it is easy for respondents to understand the contents. The steps in the survey design have to be reviewed individually and collectively to minimise measurement errors.

- Clarifying relevant concepts

Concepts that are well defined with well-developed indicators are important for people to communicate effectively (De Vaus, 2013). This study aims to investigate how upstream network actors’ operational capabilities contribute to the performance of service offshoring contracts. The relevant concepts were explained in the literature review and the qualitative study.

- Indicators

Developing indicators involves a reversed order of abstraction, where abstract concepts are further divided into sub-dimensions and then converted into questionnaire items (De Vaus, 2013). To develop suitable indicators, researchers have to consider the number of indicators to involve, how to develop these indicators and how to present items into a questionnaire (De Vaus, 2013). First, researchers are advised to pay

attention to the scope of respondents' attitudes (Netemeyer et al., 2003). The questionnaire length should also be considered as it may affect the number of indicators that can be included (De Vaus, 2013; DeVellis, 2016). The scope of respondents' attitudes means the measurable components associated with an underlying concept or construct (Hair et al., 2010). For instance, 'performance' in this study was further developed into concepts that could be better measured, including sales, profits, customer base, cost savings, service delivery and other KPIs (e.g., customers' system reliability, quality and response time against service level agreements). Second, adapting or adopting well-established indicators has been recommended and practised by several scholars (De Vaus, 2013; Yin et al., 2018). The author relied on an extensive literature review and the in-depth analysis of the qualitative study to develop the indicators for this study. These items will be discussed in the next section.

- Adapting the measurements in the questionnaire

Measurement items should include the underlying meaning of a construct. The validity of a construct relies on well-specified theories (Netemeyer et al., 2003). In this study, the theoretical conceptualisation of the measurements rests on the literature review and the qualitative study. This study evaluates the related constructs and variables from falsifiability and utility. Falsifiability can be achieved through content validity and construct validity (Bacharach, 1989). Content validity means the extent to which a measurement instrument can be related to and representative of a construct (Netemeyer et al., 2003); construct validity includes convergent validity, reliability, discriminant validity, nomological validity and face validity (Hair et al., 2010). In this study, the author set out to evaluate the content validity and then discussed the construct validity

through scales. To ensure content validity, the author employed a priori theoretical codes from the literature review and qualitative study. After the constructs and content scopes were defined within the framework of operational capabilities and operational performance, the initial set of items were developed.

Subsequently, the components of these items (i.e. item contents, formats, scale points and survey instructions) were evaluated for the purpose of content validity (Netemeyer et al., 2003). Content validity is also known as face validity; it refers to the extent to which a measure represents all the aspects of a specific construct (Cooper & Schindler, 2014). The assessment for content validity verifies whether each scale item corresponds to the construct it is expected to measure. This kind of evaluation is not conducted statistically; instead, it involves the theoretical and practical considerations when adapting the scales from existing papers. To achieve the content validity for this study, the following steps were taken:

i. Review of qualitative findings: the seven operational capabilities identified in Mode 1 and Mode 2 were identified in the qualitative study (Chapter 4). The survey items were adapted from existing measurement scales. Using existing scales could help increase the reliability of the survey and facilitate comparisons with other studies (Straub, 1989).

ii. Review by scholars: the adapted measurement scales were reviewed by the author's three supervisors and two other academics, together with four practitioners from service offshoring industry. These scholars and practitioners were invited to provide comments about the developed items. Based on these experts' comments, most of the scales experienced different degrees of modifications to resolve problems such as clarity of meaning, wordiness and

double-barrelled statements.

iii. Pilot test: the scales were pilot tested on 11 respondents, including three academics, four practitioners and four colleague researchers. These respondents' feedbacks were used to refine the scales to ensure that they measured the constructs as proposed. For example, some respondents suggested that 'My company is able to continuously update and develop employees' knowledge and skills' (3c) needed an extension to relate better to customers. This item was later changed into 'My company is able to continuously update and develop employees' knowledge and skills through training to address the needs of our customers'.

- Variable operationalisation

The following presents the items which have been adapted and refined. The survey collected information through respondents' attitude scales, with respondents expressing their degree of agreement or disagreement. Likert scale is a popular attitudinal measure to collect respondents' statements, i.e. variables for data analysis (De Vaus, 2013). This popularity can be explained by the good reliability and easiness to conduct, on condition that each statement or variable is produced carefully (Chisnall, 2004). Regarding the number of response categories, Parasuraman et al. (2007) suggest that when respondents understand the differences between measurement scales, a range of scale from five to nine is likely to ensure a higher degree of precision. De Vaus (2013) further suggest a mid-point where the respondents would neither agree nor disagree in a questionnaire. Therefore, the dependent and independent variables were operationalised by measuring the corresponding constructs, with measurements adapted from the established literature. Following these suggestions, this study

adopted a seven Likert-scale format, using 1 to denote ‘strongly disagree’, 4 to denote ‘neither agree nor disagree’ and 7 to denote ‘strongly agree’. The subsequent paragraphs present these items and their theoretical sources.

- Dependent and independent variables

As the dependent variable, ‘performance’ (coded as ‘OP’) in this study refers to the direct result achieved from the execution of the services offshored (Caniato et al., 2015). It includes offshore upstream network actor’s side of efficiency and effectiveness in fulfilling manufacturers’ service offshoring contracts. This construct was operationalised by adapting items from ‘supplier performance’ in Wu et al. (2010) and ‘firm performance’ in Liu et al. (2018) (offshoring service suppliers' performance). The scale captures the sales, profits, market share, service delivery and other KPIs that upstream network actors contribute to manufacturers’ service offshoring contracts. An example of the operational performance item is ‘We are helping our customers to deliver improved services to end-users.’

The independent variables included seven operational capabilities whose measurement are discussed below:

The independent variables included seven operational capabilities identified from captive offshoring (Mode 1) and offshore outsourcing (Mode 2) whose measurement are discussed below:

i. The capability of ‘*process improvement*’ (coded as ‘PI’) in this study refers to an offshore upstream network actor’s ability to adopt well-established and publicly available or proprietary methodologies to reduce mistakes, redundancies, and wastes and improve the efficiency of customers’ business processes by

prioritizing or organising tasks and processes. It was measured using a six-item scale, which was adapted from ‘quality improvement tool or methodology’ in (Tomic et al., 2017); and ‘continuous achievement’ in Koval et al. (2018). The scale was designed to capture the extent to which offshore upstream network actors are capable of removing non-value-added activities, using proven methodologies, and understanding the business process of customers (manufacturers).

ii. The capability of ‘*scalable service-enabling technology*’ (coded as ‘SST’) in this study refers to an offshore upstream network actor’s ability to develop technological assets such as laboratories and specialised equipment in order to support customers’ (i.e. manufacturers’) scalable service requirements. It was measured using a four-item scale an offshore upstream network actor’s ability to develop technological assets such as laboratories and specialised equipment in order to support customers’ (i.e. manufacturers’) scalable service requirements. It was adapted from ‘IT-systems’ from Zhang and Hartley (2018). This scale captures the extent to which upstream network actors are capable of developing technological infrastructure and/or systems that are scalable and compatible with the systems and/or business environments of customers (manufacturers).

iii. The capability of ‘*scalable and well-trained service talents*’ (coded as ‘SWS’) in this study refers to an offshore upstream network actor’s ability to develop technological assets such as laboratories and specialised equipment in order to support customers’ (i.e. manufacturers’) scalable service requirements. It was measured using a five-item scale adapted from ‘human capital’ in Sharabati et al. (2010). The scale captures the extent to which upstream network actors are able to recruit experienced employees, upgrade employee skills, retain employees and

provide scalable employees according to the needs of customers (manufacturers).

iv. The capability of '*service and process innovation*' (coded as 'SPI') in this study refers to an offshore upstream network actor's ability to help customers (i.e. manufacturers) to commercialise ideas into new services or innovatively deliver existing services through new commercial models. It was measured using a six-item scale adapted from 'firm innovation capability' in Lin (2007). This scale captures the extent to which upstream network actors are able to develop new ideas, explore new opportunities, share visions, turn ideas into innovations and encourage employee innovations for the sake of customers (manufacturers).

v. The capability of '*product/service customisation*' (coded as 'PSC') in this study refers to an offshore upstream network actor's ability to adapt or tailor its products or services to meet differentiated customer needs from the global market. It was measured using a five-item scale adapted from 'mass customisation' in Liu and Deitz (2011). This scale captures the extent to which upstream network actors are able to develop tailored products and services to customers (manufacturers) without compromising lead time, quality and costs.

vi. The capability of '*in-country relationship management*' (coded as 'IRM') in this study refers to an offshore upstream network actor's ability to build and manage relationships with a wide range of local stakeholders, such as business partners, government agencies, academic institutes, and customers for the purpose of obtaining legal permits, reduce risks and find new sources of revenue. It was measured using a five-item scale, which was adapted from 'relational capability' in Pham et al. (2017). This scale captures the extent to which upstream network actors are able to manage relationships and develop trust with local business

partners, government agencies and universities.

vii. The capability of '*security and IP protection protocols*' (coded as 'SIP') in this study refers to an offshore upstream network actor's ability to provide security alarm systems and protect trade secrets and IP in daily operations. It was measured using a four-item scale adapted from 'knowledge protections capabilities' in Zaied (2012). This scale captures the extent to which upstream network actors are able to develop clear and detailed procedures to ensure that the business secrets from themselves and those from customers (manufacturers) are safely kept and accessed by authorised employees.

The measurement items discussed above are presented in Appendix 4.

- Control variables and moderating variables

Studies have identified some common variables that could affect performance. For instance, Bridoux et al. (2013), He et al. (2013) and Whitaker et al. (2011) posit that firms with longer business experience and larger size could achieve higher value and performance. As such, the author examined two control variables: firm age and organisation size (in terms of employee number) (Li et al., 2008). The coding for theses control variables is presented in Table 3.5. The moderating variable of offshoring modes is operationalised as a dummy variable, where 0 = service delivery centres (Mode 1); 1 = local service specialists (Mode 2).

Table 3.5: Codes of control variables

Item/question	Code
Age of firms	1=Before 2000; 2= 2001-2005; 3= 2006-2010; 4= 2011-2015; 5= 2016-present
Organisation size (measured in the current employee number)	1= 51 - 100; 2= 101-500; 3= 501 - 1000; 4= 1001 - 5000; 5= 5001 - 10000; 6>=10001

- Other factors

In order to keep non-sample individuals from taking the questionnaire, the author included three filtering questions. First, respondents were asked to specify whether their firms have operations in the five cities of the YRD region. YRD is one of the most developed areas in China, which consists of 16 cities in Shanghai, southern Jiangsu province and northern Zhejiang province.[6] In this region, five cities (Shanghai, Nanjing, Hangzhou, Suzhou and Wuxi) were selected to be part of the national services outsourcing pilot program.[7] 'These five cities have a large number of firms that are engaged in service offshoring activities and could help identify suitable firms for the survey.' Second, the respondents were asked to specify their job titles to indicate their job functions. The question was asked in order to exclude the respondents who might not have knowledge, experience or authority to provide information about their firms' service offshoring activities. Third, the respondents were asked to specify the service offshoring activities that their firms undertook. As this study focuses on the upstream network actors from whom manufacturers engaged in service offshoring activities, the survey excluded respondents whose firms were not providing services to non-Chinese manufacturers.

[6] http://www.ndrc.gov.cn/zcfb/zcfbghwb/201006/W020140221367550405937.pdf
[7] http://www.gov.cn/jrzg/2009-02/03/content_1220550.htm

- Editing questionnaire

After the items and questions were developed, the author moved on to edit the questionnaire to ensure that the instructions were clear for respondents to understand. Survey design textbooks suggest that questionnaires should have proper lengths and layouts (De Vaus, 2013) since the layout format could affect the readability and cooperation for respondents (Parasuraman et al., 2007). The survey for this study was edited into a website link which can be easily read through the computer screen or mobile phone screen. Survey textbooks suggest that scholars should conduct pre-test surveys before sending them out (Aaker, 2011; Iacobucci & Churchill, 2009). The pre-test of a survey often includes an assessment of the question flow, skip designs (to exclude unsuitable respondents) and respondents' attention span (Aaker, 2011). Iacobucci and Churchill (2009) suggest that the pre-test could help researchers to increase the chance of success for the survey being completed by recipients. In this study, the questionnaire was critiqued by the author's three supervisors, two other scholars and then tested on four managers. These four managers were interviewed during the qualitative study, and their responses were not included in the final survey. These managers provided comments on the readability of survey questions and suggestions on the layout of the online questionnaire. Appendix 5 provides the final version of the questionnaire used for this study.

3.5.2 Sampling methods

When selecting the sampling method for the quantitative stage study, the author tried to ensure that the selected sampling method was compatible with the aim of this research project. According to Chapter 1, this study aims to investigate upstream network actors' operational capabilities and their impacts on the performance of

manufacturers' service offshoring contracts. To serve this purpose, the author referred to the six-stage sampling process suggested by Iacobucci and Churchill (2009) (see Figure 3.3).

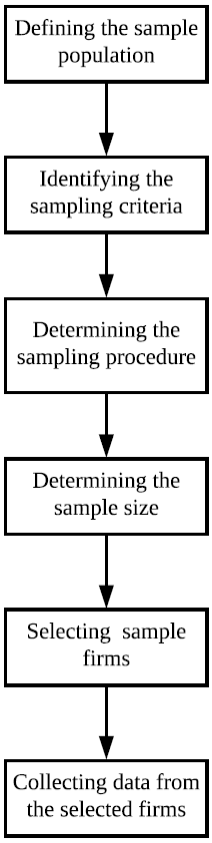

Figure 3.3: Sampling method for quantitative stage study

Note: This figure is adopted from Iacobucci and Churchill (2009)

- Defining the sample population

The target sample of this study included non-Chinese manufacturers' service delivery centres and service specialists that operated in China. These firms constituted manufacturers' upstream networks that provided the operational capabilities for manufacturers to develop and deliver service offerings to downstream customers. As this study aims to study the operational capabilities embedded in upstream network actors, focal manufacturers and their downstream customers were not included.

- Identifying the sampling criteria

The quantitative data collection followed five sampling criteria suggested by Chisnall (2004). These criteria include 1) an adequate number of samples, 2) a complete list of the sample population, 3) freedom from repeated elements in the population, 4) accuracy of the sample information and 5) convenience to access the sample list. However, a perfect sampling frame that matches all these five criteria may not exist, although the author tried to identify the database from China Business Database[8] which included detailed information about the firm address, industry sector, email, telephone, annual revenue, and employee number. The author chose the upstream network actors that operated in Hangzhou, Nanjing, Shanghai, Suzhou, and Wuxi. The author only selected firms that had more than 50 employees, since firms with fewer than 50 people may not be able to answer the questions related to firm capabilities and performance (Galbreath & Galvin, 2006). The author ensured the sample representativeness was ensured by following a clear definition of the firm population for generalisation. Specifically, the author applied the following criteria to select sample firms:

i. These firms must have at least 50 employees (firm size).

ii. These firms must have operations in the five YRD cities mentioned above (location).

iii. These firms must have at least three years' experience in the sector (age).

iv. These firms must operate in one of the following industries: B2B services and service export/import (i.e. engaged in service offshoring).

v. The potential respondents (e.g. marketing manager and operations manager)

[8] http://www.china-business-database.com/

must be familiar with their firms' service offshoring businesses.

This led to 20,169 firms in the data frame purchased from China Business Database, which contributed to the representativeness as well.

- Determining the sampling procedure

It is challenging and unrealistic to persuade managers from a large number of firms located in the above-mentioned five cities to take the survey, so author took the following steps to determine the samples, which is recommended as cost and time-effective (Khan et al., 2019). The author firstly obtained statistical data about the numbers of service delivery centres (Hangzhou: 720, Nanjing: 1065, Shanghai: 3897, Suzhou: 1007, Wuxi: 773) and service specialists in these cities from the dataset (Hangzhou: 3009, Nanjing: 3861, Shanghai: 1230, Suzhou: 2680, Wuxi: 1927). Then the author drew on the five criteria and selected the firms in each city to be involved in the survey but include both non-Chinese service delivery centres and Chinese service specialists. Non-Chinese service delivery centres were included to represent captive offshoring mode (Mode 1) while Chinese service specialists to represent offshore outsourcing (Mode 2). It possible that non-Chinese service delivery centres are likely to provide services to other manufacturers (through Mode 1), but these centres were established in the first place to provide services to their headquarters (i.e. focal manufacturers) or customers on behalf of headquarters. To avoid misunderstanding, the author provided the definition of 'captive offshoring' and 'service offshoring' at the beginning of the questionnaire (see Appendix 5).

- Determining the sample size and selecting sample firms

This study aims to use a purposive sampling method to obtain more than 300 responses. Since the samples are B2B firms, obtaining a response rate of more than 20% could be

challenging. The author thus needed to send out at least 1500 invitations to ensure the expected number of responses.

The sample information for this study was purchased from a firm data provider named China Business Database. The database provider constantly upgrades information, including the name, job title, mobile phone numbers, office number, and email of each firm's contact (legal representative). This may help the author to reduce the error of coverage in the database. After the above sampling criteria were applied, there were 1734 firms left, including 794 non-Chinese service delivery centres (63 from Hangzhou, 103 from Nanjing, 385 from Shanghai, 96 from Suzhou, and 67 from Wuxi) and 1020 Chinese service specialists (239 from Hangzhou, 292 from Nanjing, 111 from Shanghai, 214 from Suzhou, and 164 from Wuxi).

3.5.3 Collecting data from selected firms

This section explains the process where all the firms invited to take the survey (sample elements) were converted into firms that eventually took the survey (actual samples). One of the problems at this stage is non-response bias, which happens when respondents differ from non-respondents in the sample (Saunders, 2011). To address this issue, this section introduces the process which was developed to maximise the response rates to the survey.

- Media of survey

This study followed the suggestion of Brace (2018) to administer Internet-based questionnaires. A high-quality online survey is suitable for sample populations with high computer and digital device usage, such as managers of service offshoring firms

that need to rely on the Internet to maintain communications with offshore customers. An Internet-based survey could allow the author to access firms from five cities, which cover a wide geographical area.

In this study, the author administered the Internet-based survey through 'wenjuanxing',[9] a Chinese online survey platform that allows researchers to design and send out questionnaires for free. In particular, the author paid attention to the layout of questions on computer screens and mobile phone screens to ensure easy understanding and readability across different screens. Finally, wenjuanxing generated a link of the questionnaire survey, which can be shared easily through emails. The Internet-based questionnaire on Wenjuanxing has a unique function: each respondent could not submit his or her response until all the survey questions were answered. This practice avoided missing values in submitted responses.

- Improving the response rate

The author followed the suggestions of previous studies and textbooks to motivate respondents to improve the response rates and completeness in Internet-based surveys (Dillman et al., 2014; Groves et al., 1992; Iacobucci & Churchill, 2009). Researchers are advised to provide information about the survey, including the objective of the study and the benefits it will provide to the respondents and their industry (Groves et al., 1992). The researcher of this study prepared a cover letter (see Appendix 6) to explain the aim and the potential benefits of the study. The cover letter also assures the respondents of the confidentiality and free of risk for taking this survey (Iacobucci

[9] https://www.wjx.cn/

& Churchill, 2009). It also includes the researcher and his supervisors' contacts for respondents to respondents to verify their identities.

Dillman et al. (2014) also suggest that material or financial incentives could improve response rates in Intenet-based surveys. In this study, respondents were offered a lucky draw to win a portable charger power bank for mobile phones (worth £ 8.7), a ¥ 10 (£ 1.1) top-up fee for their mobile phones, or 1000 Megabytes of mobile data (worth £ 1.1), after they submitted their answers.

- Survey administration

The survey was conducted between the 15th of January and the 22nd of February 2019. When implementing the Internet-based survey, the author followed the suggested procedure by Dillman et al. (2014):

i. Personalisation*:* personalising correspondence is important as it could help establish a tie between the researcher and the respondents, thus improving the Internet-based survey response rates (Heerwegh et al., 2005). In this study, all respondents first received an email with their job titles, names and firm names.
ii. Initial email invitation*:* the cover letter of for this study was emailed to the correspondents. As appendix 5 demonstrates, the cover letter included the uniform resource locator (URL) link of the online questionnaire. All cover letters were sent from the researcher's official university email account.
iii. Follow-up emails: sending reminding emails to respondents who have not taken the survey is believed to help improve response rates (Cook et al., 2000).

A total of 1734 questionnaires were sent to the respondents on 15th, January 2019. The author followed the suggestion of Kaczmirek (2008) to monitor the responding process in order to identify possible problems in the responses. Three weeks after the covering letters sent out, 306 responses were received. Among the 306 responses, 14 respondents made additional comments in the questionnaire that 1) their firms were also serving foreign firms in China (i.e. serving service delivery centres as Mode 3), or 2) their firm's business scope did not match the definitions of Mode 1 and Mode 2 at the beginning of the questionnaire. This left 292 useable questionnaires. After three weeks, the author sent out follow-up emails to non-respondents, with 68 more responses received. In total, the author obtained 360 useable questionnaires (involved in Mode 1 and Mode 2), achieving a response rate of 20.1%. This rate was comparable to the response rate of previous offshoring studies such as Barua and Mani (2014), who achieved a response rate of 24%. Although Podsakoff and Organ (1986) recommend a higher response rate (e.g. 40%), most respondents did not take part in this study probably because they had little interest and motivation, or because the email did not reach the right person. However, obtaining a high response rate for surveys conducted for businesses and organisations is hard (Dillman et al., 2014). The following subsection presents the sample characteristics.

3.5.4 Initial data analysis

This subsection includes the details in the initial statistical tests suggested in statistical textbooks (Field, 2013; Pallant, 2007). These tests included sample characteristics, missing data and outliers, data normality test, non-response bias, multicollinearity and common method bias.

- Sample Characteristics

The characteristics of the sample are summarised in Table 3.6. 360 upstream network actors provided useable answers to the survey, with 133 from service delivery centres representing captive offshoring (Mode 1) and 227 from local service specialists representing offshore outsourcing (Mode 2). Although the qualitative stage study identified in-country outsourcing (Mode 3), this mode primarily involved offshore service specialists providing services to service delivery centres, with operational capabilities exchanged between these actors. As such, the quantitative stage study did not include firms in Mode 3 into the analysis. This was operationalised through the instructions in the questionnaire:

> *'For a manufacturer's offshore service delivery centre, the term 'customer' refers to the onshore focal manufacturer (captive offshoring). For an offshore outsourcing specialist, the term 'customer' refers to the onshore focal manufacturer (offshore outsourcing).'*

88.9% of these respondents were at managerial positions (e.g. general manager, marketing manager and HR manager), and they were capable of providing relatively accurate information about their firms' service offshoring activities and operational performance of offshoring contracts.

Regarding firm age, about half (46.1%) of the surveyed firms were established in 2005 and earlier, and thus had more than 13 years' experience in service offshoring activities. The 360 upstream network actors were widely distributed in five cities led by Shanghai and Nanjing. Firm size was reflected in the number of employees. According to Table 3-5, 45.5% of firms had more than 500 employees. The sample also covered a wide range of service sectors, including cloud computing, software R&D and testing,

integrated circuit and electronic circuit design, logistics and supply chain management, E-commerce platform, big data analysis, industrial design, engineering technology and management consulting.

Table 3. 6: Sample characteristics

Sample Characteristics	Service delivery centres (Mode 1)		Local service specialists (Mode 2)		Cumulative	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Respondent's job title						
General manager/CEO	11	8.3	20	8.8	31	8.6
Marketing manager/director	10	7.5	26	11.5	36	10.1
Operations manager/director	28	21.1	33	14.5	61	16.9
Technical manager/director	27	20.3	54	23.8	81	22.5
HR manager/director	37	27.8	74	32.6	111	30.8
Others	20	15	20	8.8	40	11.1
Total	133	100	227	100	360	100
Firm age (Year established)						
Before 2000	31	23.3	33	14.5	64	17.8
2001-2005	41	30.8	61	26.9	102	28.3
2006-2010	34	25.6	74	32.6	108	30
2011-2015	19	14.3	44	19.4	63	17.5
2016 later	8	6	15	6.6	23	6.4
Total	133	100	227	100	360	100
Firm location						
Hangzhou	11	8.3	52	22.9	63	17.5
Nanjing	19	14.3	69	30.4	88	24.4
Shanghai	73	54.9	22	9.7	95	26.4
Suzhou	18	13.5	48	21.1	66	18.3
Wuxi	12	9	36	15.9	48	13.4
Total	133	100	227	100	360	100
Firm size (Number of employees)						
<100	6	4.5	67	29.5	73	20.3
101-500	46	34.6	77	33.9	123	34.2
501-1000	54	40.5	45	19.8	99	27.5
1001-5000	15	11.3	29	12.8	44	12.2
5001-10000	9	6.8	7	3.1	16	4.4
>10001	3	2.3	2	0.9	5	1.4
Total	133	100	227	100	360	100
Business sector						
Cloud computing	18	13.5	23	10.1	41	11.4
Software R&D & testing	20	15	21	9.3	41	11.4
Integrated circuit & Electronic circuit design	13	9.8	18	7.9	31	8.7
Logistics & supply chain management	11	8.2	14	6.2	25	6.9
E-commerce platform	16	12	27	11.9	43	11.9

Big data analysis	11	8.3	17	7.5	28	7.9
Industrial design	17	12.8	22	9.7	39	10.8
Engineering technology	9	6.8	21	9.3	30	8.3
Management consulting	12	9	27	11.9	39	10.8
Others	6	4.6	37	16.2	43	11.9
Total	**133**	**100**	**227**	**100**	**360**	**100**

- Missing data and outliers

The author tried to prevent the issue of missing value during the questionnaire design stage. First, the questions were carefully designed to ensure clarity and specificity in order to encourage complete responses. In order to collect a complete set of data that would guarantee the accuracy for statistical analysis, the author designed the Internet-based questionnaire in a way that would only accept fully completely questionnaires. Moreover, the author checked additional information typed by each respondent and removed six responses from the data set. Therefore, the approach of only accepting fully completed questionnaire could reduce the issue of missing data.

According to Tabachnick et al. (2007), outliers are observations with extreme values which can affect the empirical analysis and result in misleading conclusions. The author designed the questionnaire using a 7-point Likert scale that restricts respondents' answers within the range between 1 to 7. This design could reduce the possible outliers in the data sets. After the data was imported into SPSS 25, the author applied an explorative analysis to detect missing value and outliers. No missing value and outliers were found in the analysis.

- Data normality test

The author followed Pallant (2007) to conduct a normality test which describes the

shape of the distribution of scores compared to the normal distribution. In particular, the author checked the histograms and the Kolmogorov-Smirnov (K-S) statistics and found that all items in this study were significant ($p < .05$), suggesting a violation of the assumption of normality (see Appendix 7).

The non-normality of distribution identified in the data set of this study was not surprising, as several researchers (Hair et al., 2014; Pek et al., 2018) acknowledge that social science research data often fails to follow a multivariate normal distribution. For instance, the review paper by Hair et al. (2014) finds that 50% of the 204 journal articles in marketing (1981-2010); 59% of the 37 journal articles in strategic management (1981-2010), 37% of the 65 journal articles in management information systems (1992-2011) and 33% of the 42 journal articles in production and operations management (2000-2011) used non-normal data for structural equation modelling and multivariate analyses. Pek et al. (2018) reviewed 61 newly published textbooks on the treatment of non-normality; these options of treatment were summarised as 1) leaving the data within the model, 2) changing the data and 3) treating normality only as informative. These authors suggest a relaxation of the normality assumption when the sample size n is large enough ($N \geq 50$). With a large enough sample, the sampling distribution will be approximately normal because of the Central Limit Theorem (CLT), which suggests that given a large sample size from a population with a finite level of variance, the mean of all samples from the same population will be approximately equal to the mean of the population (Barbour et al., 1989). Now that the sample size of this study ($N = 360$) is large enough, the author decided the keep all the data.

- Non-response bias

Non-response bias refers to the significantly different opinions between respondents and non-respondents. In order to assess potential non-response bias, the author compared the early and late respondents (Armstrong & Overton, 1977). In this study, early respondents were those who provided useable questionnaire between 15th, January 2019 and 3rd, February 2019 (N = 292). Late respondents were those who filled out the questionnaire after the follow-up email was sent out, between the 11th and 19th of February 2019 (N = 68). To test for the presence of a significant difference between these two groups of responses, the author followed the suggestions of Nachar(2008) and Teng (2014) to conduct the Mann-Whitney U test and The Kolmogorov-Smirnov Z test.

The Mann-Whitney U test tells whether two groups of data belong to the same distribution. The null hypothesis for this test is that there is no difference between the two early and late groups of data and that the two groups have an equal probability distribution. The test result includes a significant value of U ($p < .05$) which will reject the null hypothesis. The Kolmogorov-Smirnov Z test tells whether two groups of data are collected from the same population. The null hypothesis for this test is that the two groups are drawn from the same distribution. The test result includes a significant value of Z ($p < .05$) which rejects the null hypothesis.

Table 3. 7: Results of Mann-Whitney U & Kolmogorov-Smirnov Z tests

	PI	SST	SWS	SPI	PSC	IRM	SIP	OP
Mann-Whitney U	**8550.5**	**9573.5**	**8805**	**9102**	**9578**	**9889**	**9173.5**	**9229**
Asymp. Sig. (2-tailed)	.074	.644	.145	.284	.648	.960	.326	.365
Kolmogorov-Smirnov Z	1.056	.569	.770	.712	.664	.443	.760	.634
Asymp. Sig. (2-tailed)	.215	.903	.593	.691	.770	.990	.610	.816

Table 3.7 presents the results of these two tests. The significance values of *U* and *Z* for dependent (OP) and independent variables (PI, SST, SWS, SPI, PSC, IRM and SIP) exceed .05, thus supporting the null hypothesis. In other words, data from the early and late responses in this study come from the same population, so the non-response bias is minimal.

- Common Method Bias

The data (independent variables and dependent variables) for this study were collected from one respondent at a single time. This may lead to common method variance which leads to a false internal consistency; i.e. an apparent correlation among variables generated by their common source (Chang et al., 2010).

The author has made several efforts to design and test the questionnaire to reduce the potential issue of common method bias. First, the author provided the contacts of himself and his supervisors and sent the cover letter through his university email to obtain the trust of the respondents. In addition, the cover letter assured the respondents of the confidentiality of the study. The author reminded the respondents not to disclose their names in the questionnaire, thus ensuring anonymity. In the questionnaire survey, the respondents were reminded that there were no right or wrong answers for each question and that they should answer each question with honesty. These efforts to

ensure anonymity and confidentiality are suggested by Chang et al. (2010) as a remedy for common method bias.

Second, the author pre-tested the questionnaire among researchers and managers to ensure that each question could be easily understood, less ambiguous, vague and strange and that the questionnaire as a whole had a concise layout. These efforts are recommended (Harrison et al., 1996; Podsakoff et al., 2003) as remedies to common method bias. Third, the author followed the suggestion of Podsakoff and Organ (1986) to run Harman's one-factor analysis to detect whether the data variance can be ascribed to a single factor. As Table 3.8 demonstrates, none of the factors accounted for the majority of the variance (larger than 50%). The un-rotated factor analysis also showed that the eight factors with eigenvalues exceeding 1, consistent with the findings in the exploratory factor analysis. Therefore, the data set for this study does not suffer from common method bias (Podsakoff et al., 2003; Teng, 2014).

Table 3.8: Single-factor test for common method bias

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1 (PI)	3.512	43.898	43.898	3.512	43.898	43.898
2 (SST)	0.759	9.489	53.386			
3 (SWS)	0.704	8.800	62.186			
4 (SPI)	0.684	8.555	70.742			
5 (PSC)	0.670	8.370	79.112			
6 (IRM)	0.653	8.168	87.280			
7 (SIP)	0.637	7.962	95.242			
8 (OP)	0.381	4.758	100.000			

Note: **Extraction method** is **Principal Axis Factoring.**

3.6 Ethical concerns

Both research design textbooks (De Vaus, 2013) and the University of Liverpool have emphasised the importance of ethical concerns when conducting research. Ethical issues may happen during the process of inviting, interviewing and surveying respondents and the process of analysing and interpreting data. These concerns are related to respondents and the researcher and will be discussed separately.

3.6.1 For respondents

When collecting data from respondents, researchers are subject to five ethical codes, including informed consent, anonymousness, confidentiality, privacy, harmlessness and voluntariness (De Vaus, 2013). In a business study, the data collection may have little harm to the respondents' safety, nor could the researcher force managers to participate. Therefore, these two codes appear to be less relevant to this study and will not be discussed.

- Informed consent

Before an interview or a survey, the researcher has to make sure that the respondent understands the project contents and the kind of information that will be discussed and included in the research project. During this study, potential respondents all received a cover letter which introduced the researcher's identity (e.g. name, affiliated university and supervisor contacts) and purpose of the study. In addition, the author clarified the usage of the data and the incentives to the respondents. Before the interview, the author asked the respondents' permission to audio record the conversation, and most of the respondents (20 out of 26) agreed to be recorded. For the rest six respondents, the author took detailed notes while his primary supervisor asked interview questions. The author later sent an interview transcript to each

respondent, thereby assuring the respondents with the accuracy of the transcript and giving them an opportunity to withdraw from the participation. Before the survey, the author explained to the respondents that participation was voluntary and that they could withdraw if they found themselves uncomfortable with any questions. Moreover, the author promised to present the findings of the study to local outsourcing firms and colleges. Two presentations about the research findings were made at a local service outsourcing college in the May and July of 2018, and another one would happen in the summer of 2020.

- Anonymousness and confidentiality

As some respondents came from firms that were competitors, the author assured them about anonymity and confidentiality. As De Vaus (2013) suggested, assuring confidentiality could encourage respondents to answer questions honestly and thus improve the quality of their answers. For instance, some managers stressed during the interview that some of their remarks should not be linked to their company names. In response, the author showed them the findings in which no individual or firm names were identified.

- Privacy

Privacy in business research means that the researcher should not disturb the respondents' life and work. For instance, the researcher should not contact the respondents without their permission (De Vaus, 2013). In this study, the author contacted respondents to the interviews through email and WeChat during their office hours. The meetings all happened in the offices of the respondents who decided the time for each interview.

3.6.2 For the researcher

Social science researchers are obliged to conduct data analysis and reports properly and fairly (De Vaus, 2013). De Vaus (2013) warned off taking quotes partially from the interviews to support a position or manipulating survey data to support desirable results; he suggested that both positive and negative results should be reported and that researchers should modify theories to explain the negative results in a complex social phenomenon. The author followed these suggestions during this study.

3.7 Summary of Chapter 3

This study has been conducted from a philosophical paradigm of critical realism. It adopted a mixed-method approach that integrated the qualitative and quantitative stage study. The qualitative stage study adopted a purposive sampling approach, with the data obtained from semi-structured interviews and processed with template analysis. In total 26 managers from 26 service offshoring firms were interviewed. Results from the qualitative data analysis were combined with relevant literature to develop the measurement instrument for the quantitative stage study. The quantitative stage study adopted a simple random sampling method to obtain representative samples. Then an Internet-based survey was developed to collect quantitative data to test 16 hypotheses. In total, 360 respondents representing 360 firms took the survey.

The final part of this chapter discusses the ethical concerns during this study. The qualitative study results, hypotheses and quantitative study results will be presented in Chapter 4 and Chapter 5, respectively.

Chapter 4: A qualitative investigation of upstream network actors' contribution to manufacturers' operational capabilities

4.1 Introduction

This chapter aims to explore how the upstream network actors contribute to the manufacturers' operational capabilities, with the first two research questions:

RQ1: How do upstream network actors contribute to manufacturers' operational capabilities through captive offshoring service contracts?

RQ2: How do upstream network actors contribute to manufacturers' operational capabilities through offshore outsourcing service contracts?

To address these two research questions, the author conducted a qualitative study involving semi-structured interviews with managers in 26 service offshoring firms located in Suzhou, with the support of 51 documents (news reports, published papers and manager's presentation slides) as secondary data. This chapter presents the thematic analysis findings from the qualitative study. The qualitative study identified eight operational capabilities (i.e. process improvement, scalable service-enabling technology, human capital, service and process innovation, product/service customisation, in-country relationship management, security and IP protection protocols and cultural alignment) by comparing the thematic codes with the priori themes (operational capabilities) from the servitization and service offshoring literature.

The qualitative study also identified in-country outsourcing (Mode 3), which is a new mode of service offshoring. This mode was identified when the author of this thesis followed the 'qualitative data collection protocol' to explore the background information of service delivery centres (assumed to be involved in captive offshoring, i.e. Mode 1) and local service specialists (assumed to be involved in offshore outsourcing, i.e. Mode 2). The manager of M1-7, a French vehicle tyre manufacturer's service delivery centre, introduced their capabilities to design the car operating system required by their parent firm to provide a package of services where customers could monitor their tyre pressure, road conditions, and accurately locate their vehicles for emergency calls. She further explained that while M1-7 was expert in monitoring car tyres and providing rescues, its operating system required precise data about weather and road conditions in different Chinese cities; such data was provided by their 'upstream' service specialist (M3-7). The author thus adopted a snowballing strategy to interview M3-7 through the introduction of M1-7. The chief-technology-manager (CTO) of M3-7 was responsible for the data services to M1-7, and he provided further explanations about the interactions between the two firms. The literature review of Oshri and van Uhm (2012) briefly mentions about an offshore service delivery centre's need to further outsource some business processes to local business partners; drawing on that, the author decided to further explore this outsourcing mode by 1) calling the service delivery centre managers I have interviewed and asked whether they could introduce me to their 'upstream' service providers, and 2) asking each Chinese service specialists whether they provided services to foreign service delivery centres in China. This process found that there were more Chinese service specialists (10 firms) directly providing service components to foreign service delivery centres in China (i.e. mode3) than those (6 firms) directly providing service components to foreign manufacturers.

The author defined this mode as ‘in-country outsourcing’ (Mode 3), as the outsourcing contracts were reached between a service delivery centre and a service specialist operating in the same offshore location.

The eight operational capabilities are categorised according to the characteristics of the 26 firms (the operational capabilities found in the interview transcripts and the offshoring mode each firm was involved in). In particular, the author firstly checked the interview transcripts of managers from different firms. The operational capabilities were aligned to each mode according to the characteristic of the firm. For instance, ‘scalable and well-trained service talents’ was only found in local service specialists involved in interview transcripts of managers from Mode 2 (M2-1 to M2-6) and Mode 3 (M3-1 to M3-10). Table 4.1 provides a summary of the operational capabilities identified in each of the three offshoring modes, together with their origins.’ Table 4.1 provides a summary of the operational capabilities identified in each of the three offshoring modes, together with their origins.

Table 4.1: Summary of qualitative findings

Operational capabilities (Origins)	Mode 1 (10 firms; M1-1 to M1-10) (Captive offshoring)	Mode 2 (6 firms; M2-1 to M2-6) (Offshore outsourcing)	Mode 3 (10 firms; M3-1 to M3-10) (In-country outsourcing)
Process improvement (Lahiri & Kedia, 2009; Koval et al., 2018)		• Improve process efficiency. • Develop traceable & transparent procedures. • Design platforms to facilitate information exchange and intimacies to customers. • Improve service responsiveness. • Ensure standardization across different locations.	• Improve efficiency and optimise non-core business processes. • Reduce errors in cross-functional business processes.
Scalable service-enabling technology (Cenamor et al., 2017; Porter & Heppelmann, 2014)	• Make full use of facilities and resources by providing services to a broader scope of customers. • Keep geographical proximity to parent firms' customers in host markets. • Maintain a specific scale of services.	• Develop technological assets and other infrastructure to support scalability and flexibility in service delivery. • Communicating with a larger customer base.	
Scalable and well-trained service talents (Brax, 2005; Kanninen et al., 2017; Neely, 2008; Ostrom et al., 2010)		• Hire and training scalable employees with proper skills and experience. • Ensure productivity for labour-intensive services. • Reduce labour costs from demand fluctuations.	• Hire & train scalable and qualified human capital. • Provide training on cross-functional and complex processes. • Reduce labour costs from seasonal fluctuations.

Operational capabilities (Origins)	Mode 1 (10 firms; M1-1 to M1-10) (Captive offshoring)	Mode 2 (6 firms; M2-1 to M2-6) (Offshore outsourcing)	Mode 3 (10 firms; M3-1 to M3-10) (In-country outsourcing)
Service and process innovation (Story et al., 2017; Zhang et al., 2016)	• Commercialise ideas into new customer services. • Identify new technologies, new services, or new business models in host countries. • Work with local universities and customers to identify new ways of delivering existing services or improving existing services. • Benefit from new chances or possibilities in new markets.		• Explore valuable opportunities that could innovate existing services or change the deliveries of existing services. • Learn from local service specialists and using their assets to turn innovative ideas into marketable services.
Product/service customisation (Story et al., 2017; Valtakoski & Witell, 2018)		• Tailor and redesign products/services to meet localised needs. • Identify and predict market-specific preferences and needs. • Tailor products and services according to local laws, regulations and industry standards.	• Learn about end-user needs and develop customised products and services for such needs. • Work with specialists with prior knowledge about parent firms' business processes. • Meet local industrial regulations/standards.
In-country relationship management (Angelis et al., 2012; Kamp & Parry, 2017; Kreye et al., 2015)	• Build and manage new business relationships with local stakeholders. • Obtain legitimacy/eligibility to local opportunities which are unavailable to outsiders. • Improve corporate image. • Reduce regulatory barriers. • Promote industrial practices and standards through local industrial associations.		• Overcome legal and regulative restrictions through local service specialists. • Access favourable resources. • Develop trust with end-users through local service specialists.
Security and IP protection protocols (GunaSekaran et al., 2015)	• Establish a monitoring system and protecting trade secrets and IP. • Reducing reliance on 3rd-party facilities. • Preventing opportunistic behaviours of business partners.		• Monitor the business processes and develop protection protocols with local service specialists for outsourced processes; • Develop trust with local service specialists.

Operational capabilities (Origins)	Mode 1 (10 firms; M1-1 to M1-10) (Captive offshoring)	Mode 2 (6 firms; M2-1 to M2-6) (Offshore outsourcing)	Mode 3 (10 firms; M3-1 to M3-10) (In-country outsourcing)
Cultural alignment (Hahn & Bunyaratavej, 2010; Jarvenpaa & Mao, 2008)			• Address challenges in the local cultural context. • Train local employees via a Western managerial system. • Ameliorate human resource management practices by considering the impacts of cultural factors.

This chapter is organised as follows. Section 4.2 presents the findings on the operational capabilities developed through captive offshoring (Mode 1), followed by those on the operational capabilities developed through offshore outsourcing (Mode 2) in Section 4.3. Section 4.4 presents the operational capabilities developed through Mode 3. Section 4.5 provides a summary of this chapter.

4.2 Operational capabilities developed through captive offshoring (Mode 1)

This qualitative study involved ten service delivery centres (coded as M1-1 to M1-10) that engage in focal manufacturers' captive offshoring contracts (Mode 1). Through full ownership of these offshore service delivery centres, focal manufacturers were able to develop and deliver services globally. Through Mode 1, the qualitative study finds that service delivery centres could contribute four operational capabilities for focal manufacturers, which are 'scalable service-enabling technology', 'service and process innovation', 'in-country relationship management' and 'security and IP protection protocols'.

4.2.1 ‘Scalable service-enabling technology’

The first operational capability that service delivery centres can provide for focal manufacturers is ‘scalable service-enabling technology’, which in this study refers to an upstream network actor’s ability to develop technological assets such as laboratories and specialised equipment in order to support customers’ (i.e. manufacturers’) scalable service requirements. While Cenamor et al. (2017) recognise the importance of technology for manufacturers to leverage the value of digitalisation during servitization, Raddats et al. (2017) remind of the risk of over-dependence on service specialists who may decide to ‘make more money’ out of the manufacturers. As such, manufacturers may have to develop the service-enabling technology in-house, through captive offshoring. However, technological infrastructure can be very expensive (Porter & Heppelmann, 2014). To overcome the symptom of ‘service paradox’ and reduce costs, service delivery centres would have to increase the scalability of technological assets. Some firms (e.g. M1-1 and M1-5) only provided services to the headquarters at the beginning, but they later experienced a reduced number of orders from the headquarters during the global financial crisis. Meanwhile, these service delivery centres have to bear operation costs from rents, staff salaries, facilities and so on. In order to offset these costs, these service delivery centres have to ensure that their facilities and human resource work at full capacity. As such, they begin to develop the capability to deliver scalable services that could serve not only the home market but also the global market. For instance, managers from M1-1 and M1-3 noted:

> M1-1 Manager: ‘*We have cutting-edge laboratory facilities that allow our research team to test and scan thousands of animal feed samples every year. The extensive data we have created can help our global branches to ensure nutrient*

composition and product quality.'

M1-3 Manager*: '…our technological assets allow us to deliver services in China, Japan and the USA, so we can keep a large capacity and maintain responsiveness to customers' urgent service needs.'*

In addition, as manufacturers' customers relocate their business activities to offshore markets such as China, some service delivery centres serve to maintain geographical proximity to these customers. The manager of M1-4 explained:

'Some leading manufacturers from South Korea and the US have put their business processes in Suzhou. Our firm was established to provide them with a range of services, such as warehouse layout design and warehouse management.'

To provide quality and timely services to these customers, service delivery centres need to maintain certain levels of productivity. In short, unlike previous (Coreynen et al., 2017; Gago & Rubalcaba, 2007) studies that only recognise the importance of technology adoption for manufacturers to develop and deliver services, the 'scalable service-enabling technology' identified in this study explains how this operational capability helps focal manufacturers to achieve the economies of scale.

4.2.2 'Service and process innovation'

'Service and process innovation' refers to an upstream network actor's ability to help customers (i.e. manufacturers) to commercialise ideas into new services or innovatively deliver existing services through new commercial models. This capability helps firms to deliver services in new ways to better meet customer needs, which is

different from ‘process improvement’ which improves efficiency and ‘scalable service-enabling technology’ which improve service scales. The importance of innovation as a capability has been recognised in the servitization (e.g. Story et al., 2017; Zhang et al., 2016) literature to improve focal firm value chain agility and service development. However, these studies primarily looked at the innovation capabilities developed from interactions with customers. In contrast, the qualitative data of this study finds two unique paths for service delivery centres this operational capability, one through the collaboration with local research institutes, and the other through the interactions with manufacturers’ offshore customers.

First, service delivery centres could develop service and process innovations through joint R&D projects with higher education institutes (e.g. Nanjing University, Southeast University, National University Singapore and XJTLU in Suzhou Industrial Park) which have established campuses to support local firms’ innovative activities. Service delivery centres are able to identify the new technologies that enable the delivery of better customer services. The manager of M1-8 acknowledged the innovative ideas from these universities:

> ‘*We have been working with Suzhou Research Institute of University of Science and Technology of China for some joint projects. Their expertise in electrics and electronics can help us to develop some innovative functions during our automobile R&D projects.’*

Second, some service delivery centres work closely with customers to explore heir needs and then provide innovative versions of services and business models. After M1-1 analysed the market data, it then worked with its ‘*energy, transport and metallic*

departments to identify, finance and explore service opportunities and provide various new supply chain management solutions to customers.' Service delivery centres are able to develop service and process innovation capability not only because of focal firms' investments but also because of these centres' interactions with local business partners. These interactions allowed service delivery centres to learn about local customer needs as well as the techniques to provide new value or functions to existing services. This capability explains service delivery centres' continuous search for new and innovative manners to deliver customer services and provide solutions by maintaining close relationships with customers. The manager from M1-2 gave an example:

> *'Almost all of our communications (with customers) are conducted face-to-face. That is because most of the hospital doctors do not have enough knowledge in our services, so we have to meet them in person so that we can understand their problems and provide some explanations and training. It is like a learning process that inspired our innovations.'*

4.2.3 'In-country relationship management'

A manufacturer's relational capability is recognised as key to developing service provisions (Baines et al., 2013; Brown et al., 2011; Raddats et al., 2017). Unlike the previous focal-firm perspective studies (Angelis et al., 2012; Kamp & Parry, 2017; Kreye et al., 2015) that investigate how this capability facilitates manufacturers' timely communications with customers, 'in-country relationship management' in this study refers to an offshore upstream network actor's ability to build and manage relationships with a wide range of local stakeholders, such as business partners, government agencies, academic institutes, and customers for the purpose of obtaining

legal permits, reduce risks and find new sources of revenue. The service delivery centres in this study are embedded in an industrial park where they can develop new business relationships with local stakeholders for a long time (as early as 1994). In-country relationship management capability allows service delivery centres to obtain the legitimacy and/or eligibility to obtain business opportunities and take activities that are unavailable to outsiders. Several firms in this category (e.g. M1-7, M1-8 and M1-9) have joined the related industrial associations or clubs which provide access to market information, as the manager from M1-8 acknowledged:

> *'We have memberships in automobile industry committees in China, and these memberships can inform us of the local market needs and the latest technologies.'*

Memberships in well-known industrial associations could also help service delivery centres to improve the corporate image on behalf of their parent firms. The manager of M1-8 stressed the importance of local presence through industrial associations:

> *'Here in Suzhou, there are several international automobile manufacturers' branches. After we got into the automobile associations with these firms, we successfully convinced them of our industry experience and reputation. Then we successfully attracted them to us instead of suppliers from other locations.'*

Likewise, service delivery centres could communicate with government agencies to solve problems or reduce barriers during their operations in the host market. For instance, the CEO of M1-3 met with the Minister of Agriculture of China in high-level meetings and expressed his concerns and problems for the country's industrial regulations. In response, the Ministry of Agriculture increased food safety requirement, and that helped the company to increase its competitive advantage, because

'The higher the food safety requirements, the better our business will develop since our technologies represent the highest level in the food industry, and we can lock out other competitors.'

Moreover, several managers mentioned the importance to develop close personal relationships with managers from supplier or customer firms and government officials in the same area. These personal relationships could help service delivery centres to capture new business opportunities. As M1-9 manager noted:

'I think the manager's personal relationship is very important. If you are a customer, and you have two service suppliers to choose, then your choice would be based on service quality, price and then personal relationship. When we find that two suppliers with similar quality and price, then let's take a look at the personal relationship.'

In-country relationship management thus allows service delivery centres to obtain valuable business information, maintain close ties with business partners and governments, promote industrial practices and standards through local industrial associations, promote corporate image, and thereby reduce operational risks and explore business opportunities. These benefits are embedded in local service networks and may not be directly accessible for the parent firms of service delivery centres.

4.2.4 'Security and IP protection protocols'

'Security and IP protection protocols' in this study refers to a service delivery centre's ability to provide security alarm systems and protect trade secrets and IP in daily operations. The literature has reminded of the risks that manufacturers could face when

interacting with downstream customers, such as maximising manufacturers' service requirements with no additional payment and breaking the equipment owned by manufacturers (Reim et al., 2016); those from upstream network actors, such as information insecurity and loss of management control, and poor service quality from service specialists (GunaSekaran et al., 2015). Several managers of service delivery centres stressed the protocols that their firms developed to monitor and manage local business partners and protect trade secrets and IP in local markets. For instance, M1-1 was able to collect and analyse samples through its laboratories and market information through its own data centres. This capability reduced service delivery centres' reliance on third-party laboratories and enhanced its technological confidentiality. Similarly, although there are several laboratories and data centres around the firm, M1-8 manager insisted:

> *'…we do not rely on public facilities too much because most of our prospective product R&D projects are kept as secrets within us. Before our new products are officially announced, we will have to keep everything confidential.'*

With this capability, service delivery centres can reduce the possible opportunistic behaviours from local business partners, such as selling or using these centres' proprietary process information to benefit themselves (Dibbern et al., 2017).

4.3 Operational capabilities developed through offshore outsourcing (Mode 2)

This qualitative study included six service specialists (coded as M2-1 to M2-6), who are engaged in focal manufacturers' offshore outsourcing contracts (Mode 2). This shift of process ownership from focal manufacturers to local service specialists allows

focal manufacturers (customers of offshore outsourcing contracts) to develop and deliver services beyond home markets. The qualitative study identifies four operational capabilities embedded in this mode, which are 'process improvement', 'scalable service-enabling technology', 'scalable and well-trained service talents' and 'product/service customisation'.

4.3.1 'Process improvement'

Manufacturers find it challenging and unprofitable to develop and deliver services owing to capability restraints to address the ever-changing customer needs (Baines et al., 2009). When the required capabilities depart too far from a manufacturers' existing capabilities, it may consider developing such capabilities from service network actors. Previous studies (Lahiri & Kedia, 2009; Koval et al., 2018) have identified the 'process ability' from service specialists. However, these studies fail to mention how offshore service specialists perceive their 'process ability' could contribute to customers' offshoring performance. To address this gap, 'process improvement' capability in this study refers to an offshore service specialist's ability to adopt well-established and publicly available or proprietary methodologies to reduce mistakes, redundancies, and wastes and improve the efficiency of customers' business processes by prioritizing or organising tasks and processes.

The service specialists involved in this study are hired to help focal manufacturers to improve process efficiency and maintain certain levels of service standards to end-users (manufacturers' downstream customers) in different geographic locations. Local service specialists in this study developed proprietary techniques in utilising publicly available quality management/control methodologies (e.g. six sigma and Kaizen).

According to the managers from M2-2, M2-4 and M2-6, their firms' process improvement methodologies helped manufacturers to develop traceable and transparent service procedures. This is achieved by service specialists' capability to develop standardisation systems that can synchronise information and coordinate businesses processes during manufacturers' operations. For instance, M2-1 and M2-5 can help electronic product manufacturers to design one-stop portal application centres. These centres develop the information system that allows manufacturers' global subunits to have unified access to end-user information, work collaboratively and provide standard answers to similar user questions. Equally, local service specialists help manufacturers to achieve real-time transaction information sharing and better procedural efficiencies. M2-2 designs integrated systems that allow food manufacturers to '*monitor production, inventory and transaction data, accurately forecast end-user needs and thereby timely control inventory and avoid food spoilage*'. Its manager gave an example:

> '*…customers…want to reduce their operational costs…but they are not able to accurately anticipate the amount of fresh food and beverage they need to deploy in each store. That can cause lots of problems during traditional festivals. Some stores are storing so much food that they cannot sell, while other stores aren't storing enough, so they keep visitors waiting. That wasted food together with operational costs and labour costs can be reduced by our information synchronising methods.*'

Manufacturers often find it challenging to timely dispatch service teams at customer calls. Local service specialists such as M2-1 and M2-6 work with manufacturers to diagnose their service process and improve responsiveness. This is achieved through

M2-1's capability to help manufacturers to automatically prioritise customer relationship management (CRM) systems through multiple criteria (i.e. customer level, service level agreement and urgencies) to analyse customer call patterns and optimise the service list. With automated systems in place, manufacturers no longer need to '*export data to spreadsheets and manually sort and prioritise cases*' (M2-1 manager).

In summary, service specialists' capability in process improvement could enable manufacturers to share information across geographical locations for standardised service offerings, ensure a service-oriented culture and improve service procedures through automated systems, thereby enhancing customer intimacy.

4.3.2 'Scalable service-enabling technology'

According to Gebauer et al. (2005), some manufacturers fail in servitization, not because of inability to cater for customer needs, but because of the substantial investments in service business units to increase the types of service provisions, which result in increased costs without proportional financial returns. Porter and Heppelmann (2014) remind that technology-enabled service systems require investments in technological infrastructures, such as modified facilities, software, research laboratories and operating systems. This problem is particularly serious when customers service requirements are fluctuating, based on seasonal needs. Local service specialists develop technological assets that could ensure scalable services to address the fluctuating market needs on behalf of manufacturers. The high-quality and large-scale technological assets of these service specialists could help manufacturers to develop services flexibly. Manufacturers served by M2-1 '*have been providing services that require innovative and sometimes unpredictable engineering expertise*

on a large scale'. In response, service specialists (M2-1 to M2-6) can use their ICT and digitalisation technologies, and digital platforms that can work with a manufacturer's existing infrastructure to provide more services. For instance, M2-5 possesses a large IT solution team to help manufacturers develop and operate the collaborative supply chain management system, warehouse planning and air traffic control system which lead to efficiency, security and reliability of their service development and delivery processes.

In addition, some service specialists (e.g. M2-3, M2-4 and M2-6) use their technology platforms to help manufacturers to exchange information with a larger number of customers. For instance, an animation comic game (ACG) service specialist (M2-3) possesses a large technical and managerial capacity to provide advertising design projects. M2-3's CEO stressed the importance of scalable service-enabling technology:

> *'…smaller companies often don't have large scale facilities and designing crews as we do, and customers are worried about their productivity and quality and on-time delivery. Because of our service scale, we can process orders easily; also, compared to outsourcing to multiple contractors, we are able to provide a package of service solution and help our customers reduce their costs.'*

As service specialists are from specific service sectors, they could help manufacturers to access the communication channels and keep intimacies with a large number of end-users (i.e. manufacturers' customers). For instance, M2-3 possesses the mass media channels where manufacturers could broadcast advertisements it designed. The CEO of M2-3 noted:

> *'Our cartoons and commercials are broadcast in domestic channels such as*

China Central Television (CCTV) and Tencent, a leading online platform in China. We also have access to around 300 TV stations in tier-2 and tier-3 cities where we are free to play our own cartoons or advertisements for around 20 to 25 minutes each day…we could help our customers get more publicity.'

4.3.3 'Scalable and well-trained service talents'

A manufacturer's capability to manage human resource or human capital has been recognised as critical for it to develop a service-focused firm culture and mindset (Brax, 2005; Kanninen et al., 2017; Neely, 2008; Ostrom et al., 2010). Given the seasonal service demands mentioned in 4.3.2, manufacturers would need scalable service talents who can address these demands. Manufacturers can source the scalable service talents from offshore outsourcing contracts to service specialists who possess the 'scalable and well-trained service talents' capability; this capability adapts a priori code ('human capital/resource') from Jarvenpaa and Mao (2008) and Lahiri and Kedia (2009) about local service specialists' ability to hire and train scalable labour forces. In particular, 'scalable and well-trained service talents' in this study refers to a local service specialist's ability to hire and train a large number of service talents with proper education, skills and experience.

For instance, M2-6 owns '*500 employees with specialised skills and knowledge to manage manufacturers' customer support system during peak periods*'. Through offshore outsourcing (Mode 2), manufacturers could reduce cost fluctuations in labours caused by seasonal service demands. The manager of M2-6 stressed the unique pool of Japanese-speakers in China. China is the only country in Asia that supplies a large number of Japanese language speakers (almost all universities and colleges in

China provide Japanese majors). M2-6 is capable of identifying candidate information, organising recruitment fairs and screening job candidates for Japanese manufacturers. This capability from local service specialists can help manufacturers to recruit scalable service agents at lower costs and with higher flexibility.

4.3.4 'Product/service customisation'

Valtakoski and Witell (2018) have recognised that manufacturers need capabilities to develop customised services according to a certain standard. Story et al. (2017) suggest that downstream actors (i.e. intermediaries) might have more experience in servicing customers, and such service experience can allow them to better customise services. However, this study finds that manufacturers might not possess all the operational capabilities required to meet the customising needs identified by downstream network actors in an economical manner. Therefore, 'product/service customisation' in this study refers to an offshore service specialist's ability to help a customer (i.e. a manufacturer) to adapt or tailor its products or services to meet differentiated customer needs from the global market. The local service specialists involved in Mode 2 are hired by global manufacturers that produce automobiles, textiles and digital devices. These service specialists could help manufacturers to tailor and sometimes even redesign their products or services for localised needs. Despite their global reputation as industry leaders, some manufacturers still find it difficult to achieve localisation. With knowledge and experience in local markets, local service specialists can help manufacturers to better identify the preferences and predict the needs of end-users and generate ideas for tailored products and services. For example, when a leading video-game machine manufacturer launched its products in China, it overestimated the market demand and received an unexpectedly low sales in the market. The

manufacturer's service specialist in China (M2-1) helped it to tailor products and financial plans to recover the sales; M2-1 manager reflected:

> *'…sometimes our customer (manufacturer) thought that because they are a famous brand, their products and services must be very welcome in China. But their market performance told them they were wrong. We actually collected lots of feedback and complaints from end-users, and sometimes we knew where they went wrong. So we worked with our customer to adapt the products and services for this specific market. Later the sales proved that we were right.'*

In addition to customer preferences, managers of service specialists also stressed the need to tailor products and services according to local laws, regulations, and industry standards. For instance, M2-5 helps manufacturers of telecommunication facilities to comply with the Chinese industry and legal requirements by adapting their systems, applications and data accesses.

4.4 Operational capabilities developed through in-country outsourcing (Mode 3)

In addition to captive offshoring (Mode 1) and offshore outsourcing (Mode 2), the qualitative study also identified in-country outsourcing (Mode 3) as a separate service offshoring mode. Ten in-country outsourcing firms involved in Mode 3 (coded as M3-1 to M3-10) demonstrated seven different operational capabilities, which are 'process improvement', 'scalable and well-trained service talents', 'service and process innovation', 'product/service customisation', 'in-country relationship management', 'security and IP protection protocols' and 'cultural alignment'.

4.4.1 ‘Process improvement’

The qualitative study finds that the capability and resource restraints may drive some service delivery centres to outsource some of their local service specialists, which helps service delivery centres improve efficiencies and optimise business processes in cross-functional operations. Service delivery centres in this study were specialised in some narrow scope of activities when they were first established. However, as their scope and scale of service expand, service delivery centres needed to optimise non-core and cross-functional business processes. For instance, service delivery centres specialised in bioengineering and pharmaceutical R&D outsourced to the medical printing service specialist M3-6, which provided medical printing integration services, corporate office and file management services to help service delivery centres ‘*establish intelligent, efficient, safe and environmentally friendly office systems’*. Mode 3 improved the efficiency at these service delivery centres and thus contributed to the overall process efficiency of their parent firms. In other words, the capability to improve overall business processes could be outsourced to the local service specialists. As they expanded their services to financial solutions, service delivery centres that were previously responsible for product-related services now need to outsource financial software development processes to local service specialists (e.g. M3-2 and M3-4) to improve the functionality and user-interface friendliness in financial service systems. Likewise, some service delivery centres are not efficient in the non-core printing and cross-functional information system-related processes. Frequent errors and low efficiency in fixing errors could hamper the performance of these service delivery centres. M3-6 takes over these service delivery centres’ processes within the same industrial park and helps those centres to improve their operational efficiencies and reduce errors. For instance, M3-6 could fix service delivery centres’ system

problems within 10 minutes after receiving service calls. The manager of M3-2 explained:

> *'We have a customer-escalation system at our customers' service requests. If a serious error happens to our customer's system, our help desk will acknowledge it in 30 minutes, solve it within one to three working days and improve the program within five working days. I don't think our customers' employees can fix these problems as fast as we do.'*

4.4.2 'Scalable and well-trained service talents'

Some service delivery centres face competitions from local service specialists in the same sector. These service delivery centres are under pressure to build high-performing service teams, expand service scopes and meet complex service needs. To address these challenges, service delivery centres may outsource to professional service specialists who could help recruit and train scalable and qualified service talents. The manager of M3-8 noted:

> *'Some foreign firms (service delivery centres) need to simplify, standardise and streamline their business processes to be more efficient (in the local context); they need a flat managerial structure where each employee has to take cross-functional responsibilities. However, many local employees are not capable of leading the change, so we help those firms to train and explore their employees' potentials.'*

Local service specialists are capable of developing various types of professional training courses for the employees of service delivery centres. For instance, M3-3, M3-4, M3-5 and M3-9 are able to improve employee proficiency in biomedical testing,

accounting, cloud computing and software development which are required in service delivery centres' services. M3-2 recruits and trains fresh graduates to take rudimentary software development jobs, and then sends these employees to work in their customers (local service delivery centres) where these employees could develop more job proficiency until they meet the job requirements from customers. The manager of M3-2 introduced this unique manner of training:

> *'…many freshly graduated students…may not be skilful enough to take jobs from Microsoft, but…our training…they could work together with Microsoft teams and learn from their teams. The opportunities that we provide to our employees have attracted lots of job candidates.'*

4.4.3 'Service and process innovation'

Previous studies (Cantwell & Mudambi, 2005; Dunning & Narula, 1995) on captive offshoring have explained how service delivery centres use parent firms' technological resources to develop location-specific innovations and boost competitiveness in the host market. These studies take the home-country exploitation perspective to explain how capabilities from focal firms could be transferred to service delivery centres for innovations in host markets. This study finds that service delivery centres could explore the opportunities for service innovation by further outsourcing to local service specialists. As M3-2 manager explained, many service delivery centres only focus on the services that could meet direct needs and often miss the valuable opportunities of innovating the existing services or changing the deliveries of existing services. The ten service specialists involved in Mode 3 provide the required technological assets and resources for service delivery centres to find new sources of revenue. As M3-5 manager noted,

'…plenty of innovations have happened between firms of different industries…I think it's a clever way to borrow brains and expertise beyond the borders of your own industry. We have complementary technologies and workforce for our customers (local service delivery centres) to rethink their services, processes and business models.'

The co-location of service delivery centres and local service specialists in business clusters such as Suzhou Industrial Park[10] (SIP) is an important source of service innovation. SIP includes a large number of service specialists in ICT, software, outsourcing services, biopharmaceutical and nanotech sectors. These service specialists provide the learning environment for service delivery centres to explore the technologies and turn their innovative ideas into marketable services. The manager of M3-1 illustrated this close interaction:

'…we could have frequent meetings with our customers (service delivery centres), because they are either upstairs or downstairs of this building, or in the neighbouring buildings…we can visit their laboratories which are also located within BioBay, SIP. These meetings could spark innovative ideas.'

4.4.4 'Product/service customisation'

Service delivery centres can also achieve product/service customisation through interactions with local service specialists. This is normally called 'interactive customisation' by the managers from the firms in Mode 3, where local service specialists interact with service delivery centres and/or end-users to develop the customised products and services that could meet needs of end-users. For example,

[10] http://www.sipac.gov.cn/english/

data service specialists (e.g. M3-5 and M3-7) can legally access a large amount of market data and have big data processing capability to help service delivery centres identify various market needs. For instance, M3-7 provides climate and road condition data for a French service delivery centre (M1-7) to design customised bus tires for customers operating in Northern and Southern China.

Compared to service delivery centres, service specialists have more knowledge about their domestic market. In addition, some managers initially worked at manufacturers' headquarters and later founded the service specialists to support these manufacturers' service delivery centres in China. These local service specialists thus have enough knowledge about manufacturers' services. The general manager of M3-10 introduced his experience and firm capability:

> *'My partners and I have worked in the electrical and electronics manufacturers in the US for decades. We hoped to convert our previous knowledge and experience into products and technologies that are applicable to the Chinese market. Most of our customers are multinational companies' service delivery centres. We can start conversations easily with their managers and understand their needs.'*

The customisation capability of local service specialists could also help service delivery centres to meet the industrial regulations or standards in the Chinese context. For instance, M3-10 worked with M1-8 to develop automation technologies and products in China. M1-8 manager explained the need to work with Chinese service specialists:

> *'…our R&D is based in Europe; product innovation is in Germany, because*

of long experience. We have very good product knowledge that can be transferred to China. But some of our products and solutions have to be integrated with the products and services in China. For example, the size of the machine here is smaller, to save space. From an engineering point of view, this is customisation, and an easy example is bird…you need to make smaller birds that can fly.'

4.4.5 'In-country relationship management'

As foreign entities, service delivery centres may sometimes face legal and regulative restrictions during local operations. One service delivery centre manager mentioned the occasional difficulty to obtain visas for some end-users to visit her company. Equally, some service delivery centres could not access critical business information for security reasons. These service delivery centres have to resort to local service specialists to overcome these restrictions. For example, M3-5, a state-owned data centre, could provide suggestions for service delivery centres to solve some regulative problems and apply for financial benefits (e.g. discounted rents for infrastructure and public facilities and tax reductions). Another data centre (M3-7) could legally access end-users' transaction data and financial credit information. With such information, service delivery centres could accurately predict market fluctuations, verify end-user credits and avoid financial frauds. The manager of a service delivery centre gave an example of such risks:

'… we granted loans to a famous clothing manufacturing company, and one day it suddenly went bankrupt and relocated to Vietnam. We've relied on local law professionals with many years' experience in the banking industry to help us deal with this issue and improve our contracts.'

M3-7's links to worldwide patents and IP information could help service delivery centres to obtain inventions or patents legally. Moreover, M3-1's research and registration services helped the service delivery centres of biotechnology manufacturers to apply for the requisite licenses to *'overcome legal or business obstacles as foreign firms'*.

Furthermore, in-country outsourcing to local service specialists could also help service delivery centres to develop trust with end-users in the same market. Some young service delivery centres were not sufficiently integrated into local networks, so their communications and information exchange with local actors were not effective. In this case, these service delivery centres have to rely on authoritative and reputable service specialists to obtain the trust of customers. For instance, M3-5 is a public data centre established to attract investments. Its government-endorsement allows M3-5 to enjoy a good reputation in the local business environment. Some service delivery centres decide to outsource business processes to this firm to increase their credibility and improve their reputation. M3-5 manager provided an example:

> *'Since we have a government background and credibility, we could introduce our customers (service delivery centres) to the end-users. For instance, some customers found it hard to market their newly developed software and IT equipment. We can help advertise these products and services, because the end-users are more likely to listen to us, to experts.'*

Likewise, M3-9 provides software testing and certification services to service delivery centres. Service delivery centres that are certified by M3-9 are more likely to be accepted by local market.

4.4.6 ‘Security and IP protection protocols’

Project security is a major concern in service offshoring activities, especially for knowledge-intensive activities aimed to serve manufacturers’ advanced services. The risk of ‘supplier opportunism’ may jeopardise manufacturers’ interests and increase transactional costs (Xie et al., 2016). Service offshoring studies (Dibbern et al., 2017; Pagano, 2009) suggest that focal firms could keep businesses in-house (i.e. through captive offshoring) to protect information security. However, Mode 3 suggests that when outsourcing important business processes (e.g. R&D and data analysis) to local service specialists, service delivery centres could develop protocols with these specialists to protect trade secrets. In other words, the capability to develop security and IP protection protocols can be developed from service delivery centres through in-country outsourcing. Such protocols serve as enforcing norms between both parties during their interactions. In the long run, such cooperation could lead to trust that suggests more security for the outsourced processes. The manager of M3-2 gave an example. Her firm has been a service specialist for Microsoft for 15 years.

> *‘Our service teams are divided into two groups. One group is working in our own office. As you can see, it is heavily guarded and monitored according to the suggestions of our customer’s service delivery centre. The other group works with our customer’s team in their office building. You can see the new Microsoft building out there. They plan to leave a whole floor for our engineers’*.

4.4.7 ‘Cultural alignment’

A few service offshoring studies have recognised the impact of cultural differences on the location choices (Hahn & Bunyaratavej, 2010) and partnership qualities (Clampit

et al., 2015) between the supply side and the demand side. Jarvenpaa and Mao (2008) suggest that service specialists could provide 'client-specific capability' to hire employees with overseas work experience and are familiar with the culture of the customers. Drawing on Jarvenpaa and Mao (2008), this study identified 'cultural alignment', which means an offshore upstream network actor's ability to help customers (i.e. manufacturers and/or service delivery centres) to adapt to a foreign culture when operating in an offshore market and to effectively respond to requests from partners that are embedded in one or multiple foreign cultures.

Through in-country outsourcing, local service specialists can help service delivery centres to address the challenges embedded in the local cultural context. These challenges include managing Chinese employees via a Western managerial style (Pheng & Leong, 2001) and dealing with manufacturers' downstream customers from one or multiple cultural backgrounds. The managers from service delivery centres (e.g. M1-2 and M1-5) mentioned the importance of cultural awareness for several times, conceding that socio-cultural expectations, practices and values played a significant role in employee behaviours. M3-8 served Japanese service delivery centres whose management teams were troubled by the individualistic culture of younger Chinese employees who were more aware of their self-interest than their employers'. Longer commuting hours, poor office facilities and lack of social communication could cause turnovers among young Chinese employees. Likewise, managers found it hard to enforce '*respectful and obedient*' attitudes among young Chinese employees who were '*unwilling to spend off-work hours dining with customers' employees and sending them back to hotels*', the professional norm in many Japanese firms. Local service specialists such as M3-8 are capable of developing training courses to Chinese managers and

employees of these Japanese firms, helping them to understand and adjust values, mindsets and behaviours to meet job requirements.

Moreover, outsourcing to local service specialists could help service delivery centres to adapt their operations according to the diverse cultural features of end-users. For instance, the manager of M3-6 introduced the different meanings of 'emergent situations' from different cultural contexts:

> '*Customers from the Middle East…when they face a system problem, they wouldn't urge us, no matter how serious the problem is. We ask customers to rank their service demand urgency according to a scale from one to four, with one being the most urgent and four being the least urgent. When a customer from the Middle East tells you that their service demand urgency is level four, you have to verify, because sometimes the problem could be much more urgent than the customer says.*
>
> *In contrast, customers from Singapore are more concerned about details, and they may raise a level one or two urgency demand when a tiny problem arises in the system. In that case, we also need to tell if their service demand is really urgent. In Thailand, customers rarely call for our services, because they are quite familiar with our systems; they prefer to handle the problems themselves. However, when they do contact you, the problem could be severe. In China, customers may demand service for trivial problems*'.

In short, local service specialists' knowledge in one or more foreign cultures could help service delivery centres to ameliorate human resource management practices by considering the impacts of cultural factors on employee motivation, job satisfaction,

and organisational commitment and adequately address problems caused by cultural differences during operations.

4.5 Summary and analysis

This chapter presents the analysis results of the qualitative study that involves 26 semi-structured interviews on managers from service offshoring firms in Suzhou with the support of secondary data. As summarised in Table 4.1, the findings present a clear picture and better understanding of the sources of operational capabilities in manufacturers' service offshoring contracts with their upstream network actors and thus answer the first two research questions.

The qualitative analysis suggested that upstream network actors were not homogeneous in their contribution of operational capabilities. For instance, service delivery centres seem to be more capable of enabling manufacturers to fully utilise facilities and resources and serve a larger scale of customers, to identify and access cross-functional technologies and business models that lead to manufacturers' innovation and to monitor parent firms' business processes to protect IP and prevent opportunistic behaviours of local business partners. However, service delivery centres were originally established to support the operations of headquarters, with capabilities predetermined by headquarters and were thus less capable of cross-functional activities such as hiring and training employees and developing a service-oriented attitude, tailoring and redesigning products to meet changing customer needs and aligning and reshaping their employee values to the organisational culture. This suggests the path dependence of service delivery centres' capabilities; that is, their current capabilities depend on the previous investments and resources endowed by

their parent firms (i.e. manufacturers). This explains why some operational capabilities, such as ‘process improvement’, ‘scalable and well-trained service talents’ and ‘product/service customisation’ are not developed from service delivery centres. These capabilities include new business processes which service delivery centres have limited experience and expertise. As such, service delivery centres had to outsource some activities to local service (Mode 3) for complementary capabilities. In contrast, some local service specialists are industry leaders and more capable of cross-functional activities, such as improving the efficiencies in the daily operations and information exchange of manufacturers and their service delivery centres, providing support related to training and managing employees from offshore locations and serving as bridges for service delivery centres to build relationships and trust with offshore partners.

The cross-actor comparison of the operational capabilities also demonstrated how each operational capability manifests in different offshoring modes. ‘Process improvement’ developed through Mode 2 primarily involves the important digital platforms and management methodologies that enable manufacturers to achieve information exchange and efficient coordination to better serve customers; in contrast, ‘process improvement’ developed through Mode 3 primarily helps service delivery centres to optimise the non-core activities such as infrastructure management to improve back-office efficiency. ‘Scalable service-enabling technologies’ in Mode 1 involved service delivery centres making better use of their existing facilities and human resource to serve a broader scope of customers, not only those in manufacturers’ home countries but also those in offshore locations, in order to achieve the scale of economy. This capability is endowed from focal manufacturer’ investment in offshore service

delivery centres which keep geographic proximity to their customers worldwide. In contrast, ‘scalable service-enabling technologies’ in Mode 2 involved utilising the technological assets and infrastructure of offshore service specialists to support a certain scale of service demands, maintain flexibility during seasonal service demands and communicate with a larger customer base. In both Mode 2 and Mode 3, ‘scalable and well-trained service talents’ involved hiring and training a large number of employees with proper skills and experience related to manufacturers and their offshore service delivery centres’ business scope and help these firms to address seasonal fluctuations in labour demand. This capability was developed from local service specialists in Mode 2 and Mode 3. ‘Service and process innovation’ in Mode 1 and Mode 3 both involved exploring and commercialising new ideas into new services or new service delivery modes, as well as identifying the technologies or business models that could help realise those new ideas. This capability was developed through interactions between offshore service delivery centres and local universities and customers in Mode 1, while the same capability primarily involved learning from local service specialists and utilising their assets to commercialise innovative ideas into marketable services. ‘Product/service customisation’ in both Mode 2 and Mode 3 involved tailoring products and services according to specific customer needs and specific legal or industrial standards. It came from the experience and knowledge of local service specialists about certain markets. ‘In-country relationship management’ developed from Mode 1 primarily helped manufacturers to manage relationships and develop trust with offshore business partners and promote corporate image; in contrast, this capability in Mode 3 allowed service delivery centres to overcome ‘foreignness’ within the offshore markets and thus overcome legal and regulative restrictions. ‘Security and IP protection protocols’ involved establishing measures to protect trade

secrets. In mode 1, this capability was developed by offshore service delivery centres monitoring the offshore business processes and keeping each process in house. The purpose was to prevent opportunism from offshore business partners; In Mode 3, this capability was co-developed by offshore service delivery centres and service specialists in the same location. The purpose was to develop and maintain a long-term trust relationship with local service specialists.

'Cultural alignment' was only manifest in Mode 3. Although the physical presence of service delivery centres in offshore locations could allow manufacturers to maintain proximity to their customers operating in offshore locations, service delivery centres could still have problems maintaining quality service to these customers. The reason probably lies in the manufacturers' Western organisational culture and managerial style and the offshore employees' shared values. As such, some service delivery centres failed to keep a well-aligned organisational culture and suffered unstable management teams and falling market share. As such, local service specialists could help service delivery centres to reduce the impacts of cultural differences and ensure the service-oriented attitude required for employees from service delivery centres to provide quality services. In Mode 3, local service specialists serve as the 'upstream actor' of service delivery centres; these specialists are less likely to comment on their contribution to manufacturers' service offshoring contracts. Therefore, firms that were only involved in Mode 3 (i.e. only serving service delivery centres) and the uniquely identified operational capability (i.e. cultural alignment) in Mode 3 were not included in the quantitative stage analysis. The author admits the need for future research to test the significance of the operational capabilities developed in Mode 3.

Chapter 5: A quantitative investigation in the effects of upstream network actors' operational capabilities on the performance of manufacturers' service offshoring contracts

5.1 Introduction

This chapter conducts a quantitative analysis to investigate the association between upstream network actors' operational capabilities and the performance of manufacturers' service offshoring contracts. Therefore, this chapter aims to address the following research questions:

- RQ3: How do upstream network actors' operational capabilities influence the performance of manufacturers' captive offshoring service contracts?
- RQ4: How do upstream network actors' operational capabilities influence the performance of manufacturers' offshore outsourcing service contracts?
- RQ5: How does offshoring modes (i.e. Mode 1 and Mode 2) moderate the relationship between upstream network actors' operational capabilities and the performance of offshore outsourcing service contracts?

The chapter begins with developing research hypotheses based on the qualitative findings and the relevant literature. The proposed hypotheses are presented in a conceptual framework (Section 5.2). Section 5.3 explains the assessment of construct reliability and validity. Then a hierarchical multiple regression analysis is conducted to empirically test the hypotheses in Section 5.4. The final section (5.5) provides a summary of this chapter.

5.2 Hypothesis Development

From the findings of the qualitative study and the relevant literature, this section first proposes the research hypotheses related to the relationships between offshore upstream network actors' operational capabilities and the performance of manufacturers' service offshoring contracts, as well as the moderating effects of service offshoring mode (Mode 1 and Mode 2). Mode 3 only reflects the operational capabilities of local service specialists to offshore service delivery centres and does not measure how these operational capabilities contribute to focal manufacturers. Therefore, Mode 3 and the unique 'cultural alignment' in this mode were not included in the quantitative stage. The questionnaire design instructed the respondents to consider their firms involved in 1) Mode 1 when they were providing service components to their non-Chinese parent firms (i.e. captive offshoring; denoted as '0' in the questionnaire) and 2) Mode 2 when they were providing service components to non-Chinese manufacturers (i.e. offshore outsourcing; denoted as '1' in the questionnaire). After the data was collected (374), 14 respondents made additional comments in the questionnaire that 1) their firms were also serving foreign firms in China (i.e. serving service delivery centres as Mode 3), or 2) their firm's business scope did not match the definitions of Mode 1 and Mode 2 at the beginning of the questionnaire. These responses were removed, leaving 360 usable responses. Specifically, seven of the eight operational capabilities ('cultural alignment' from Mode 3 was not included in the analysis) from upstream network actors are examined for their respective impact on the performance of manufacturers' service offshoring contracts. Then these relationships are further hypothesised to be moderated by different offshoring modes, where the captive offshoring and offshore outsourcing are

two types of offshoring modes that respectively represent the hierarchical and contractual governance (Hutzschenreuter et al., 2011).

5.2.1 Performance of manufacturers' service offshoring contracts

As the dependent variable, 'performance' in this study refers to the direct result achieved from the execution of the services offshored (Caniato et al., 2015). It includes offshore upstream network actor's side of efficiency and effectiveness in fulfilling manufacturers' service offshoring contracts. This construct was operationalised by adapting items from 'supplier performance' in Wu et al. (2010). The scale captures the sales, profits, market share, service delivery and other KPIs (e.g. customers' system reliability, quality and response time against the service level agreements) that upstream network actors contribute to manufacturers' service offshoring contracts. An example of the operational performance item is 'We are helping our customers to deliver improved services to end-users.'

5.2.2 'Process improvement' and performance

'Process improvement' capability in this study refers to an offshore upstream network actor's ability to use well-established methodologies to reduce mistakes, redundancies and wastes and improve efficiency by better organising tasks and processes. The literature on service quality has stressed that reducing complexity in business processes could help improve firm performance on customer satisfaction and financial benefits (Koval et al., 2018). Business process improvement can be achieved by quality management methodologies and tools such as six sigma methods and lean practices, which help eliminate the wastes and redundancies in a firm's business processes (Bhuiyan & Baghel, 2005; Tomic et al., 2017). In addition, some firms in this study developed proprietary quality improvement methodologies through industry

experience or proprietary resources. These methodologies are believed to improve service delivery reliability, reduce processing time and conform with quality (Treville & Antonakis, 2006).

While manufacturers might be familiar with the application of methodologies related to production activities, they may not possess the methodologies related to developing a service-oriented culture to design, sell and deliver services for expected performance improvement (Paiola et al., 2013). Therefore, manufacturers may rely on upstream network actors that possess the necessary methodologies to reduce mistakes, redundancies and improve efficiency in service processes to improve the performance with regard to profits and customer satisfaction in service offshoring contracts. Therefore, the following hypothesis is proposed:

H1a: *An upstream network actor's 'process improvement' has a positive effect on the performance of a service offshoring contract.*

5.2.3 'Scalable service-enabling technology' and performance

A firm's ability to apply relevant technological assets to fulfil different functions or scalable activities are found to be positively linked to its performance (Fernhaber & Patel, 2012). 'Scalable service-enabling technology' in this study refers to an offshore upstream network actor's ability to use technological systems and other infrastructure to provide scalable services (e.g. developing web servers that can support scalable users and solutions). This capability is particularly important for manufacturers that hope to provide services in large scales to meet heterogeneous customer needs and ensure profitability. Processes related to service development (e.g. R&D and patenting

and technical inventions) require manufacturers to invest in technological facilities (García-Sánchez et al., 2018; Tumelero et al., 2018).

However, developing technological assets and infrastructure can be expensive for manufacturers. Managers in the qualitative study stressed that it was uneconomical for manufacturers to purchase laboratory facilities which were used at low frequency. The qualitative study finds that upstream network actors are able to develop complementary technologies and infrastructure at lower prices, as they could maintain profitability by supporting scalable services in their specialised areas. Therefore, upstream network actors' capability to develop technology could help focal manufacturers to manage fluctuating unit cost and provide scalable services in the local markets. In addition, upstream network actors have accumulated experience and knowledge in applying the latest technologies to support manufacturers' services. For instance, the technological systems of upstream network actors could help manufacturers overcome the geographical distance to global customers and provide scalable services at lower costs. Therefore, the following hypothesis is proposed:

H2a: *An upstream network actor's 'scalable service-enabling technology' has a positive effect on the performance of a service offshoring contract.*

5.2.4 'Scalable and well-trained service talents' and performance

The impact of human resources on firms' business performance is well recognised in the literature (Butler & Callahan, 2014; Prajogo & Oke, 2016). 'Scalable and well-trained service talents' in this study refers to an offshore upstream network actor's ability to recruit and train scalable numbers of employees and managers to understand customers' business problems and propose solutions with their technical knowhow. It

includes the firm's ability to improve employees and managers' knowledge, skills and experience, attitude and social relationships and commitment (Hsu & Fang, 2008; Huo et al., 2016; Park & Ghauri, 2011). However, developing human capital in cross-functional or non-core areas can be difficult for many firms (Huo et al., 2016). For manufacturers that hope to develop advanced services, this capability involves employee knowledge and experience in services, together with relation-specific processes to solve specific customer-service problems. It could be difficult for a manufacturer to convert employees into service-oriented individuals who possess service-oriented attitudes, acquire new knowledge and skills for service provisions and perform services efficiently (Raddats & Easingwood, 2010).

Upstream network actors that are specialised in human resource management can hire and train a scalable number of service-oriented employees to handle customer needs in a responsive manner and provide proficient services to customers (Mayer et al., 2012). Manufacturers providing global services may rely on upstream network actors who can help identify, employ and train scalable numbers of local employees (Lewin et al., 2009). Through proper training and motivation, local employees can maintain smooth communications with customers and thus improve customer satisfaction and loyalty. Employees who are capable of undertaking multiple tasks can handle service requests more efficiently (Choi et al., 2001; Huo et al., 2016). Upstream network actors' capability to manage human capital can thus help manufacturers to achieve better performance such as reduced accidents, fewer disruptions and increased service quality (Mani et al., 2018; Pagell et al., 2010; Yuan & Woodman, 2010). Therefore, the following hypothesis is proposed:

H3a: *An upstream network actor's 'scalable and well-trained service talents' has a positive effect on the performance of a service offshoring contract.*

5.2.5 'Service and process innovation' and performance

'Service and process innovation' refers to an offshore upstream network actors ability to develop new services or to transform the ways of delivering existing services. Previous studies find a positive relationship between firms' innovation capability and performance (Kirchner, 2016; Sulistyo & Siyamtinah, 2016; Zhang & Hartley, 2018). For instance, Ngo and O'Cass (2012) find that process innovation has a positive influence on firm productivity, product and service quality and customer satisfaction. Some studies highlight the importance of a firm to adopt external knowledge in creating unique skills and systems to develop new services (Archibugi & Coco, 2005; Zhang & Hartley, 2018). The qualitative stage of this study also finds that focal manufacturers need upstream network actors to develop advanced information management systems to access and analyse market information and design innovative services that can better meet customer needs (e.g. human-computer interaction solutions for hospitals). Upstream network actors' expertise in applying the latest systems and organisational structures may help manufacturers to develop new services and benefit as first movers or to upgrade the existing services to fill a performance gap in the market (Damanpour & Evan, 1984; Pino et al., 2016). Therefore, the following hypothesis is proposed:

H4a: *An upstream network actor's 'service and process innovation' has a positive effect on the performance of a service offshoring contract.*

5.2.6 ‘Product/service customisation’ and performance

Customisation concerns a firm’s ability to explore and address customer needs by adapting or tailoring products or services (Liu & Deitz, 2011; Wu et al., 2010). ‘Product/service customisation’ in this study refers to an offshore upstream network actor’s ability to adapt or tailor its products or services to meet differentiated customer needs from the global market.

Previous studies (Leffakis & Dwyer, 2014; Liu et al., 2012; Westbrook & Williamson, 1993) find the positive influence of firms’ customisation capability on performance. However, Hegde et al. (2005) argue that when the level of customisation exceeds a firm’s capacity to understand and undertake the tasks, firm performance could be adversely affected. For some manufacturers, it can be challenging to understand customer needs in terms of aesthetic design and product functionality (Lau et al., 2010; Zhang et al., 2015).

To overcome these challenges, manufacturers need to maintain a certain level of proximity to the market (Levesque & Boeck, 2017). According to the qualitative stage of this study, some upstream network actors are embedded in offshore markets and have a better understanding to manufacturers’ offshore customers, so their knowledge about these customers’ preferences could support manufacturers’ service design. Some upstream network actors can help manufacturers to develop digital platforms to facilitate information exchange with customers through electronic means (Holmström & Partanen, 2014). Upstream network actors’ market knowledge and digital systems could help manufacturers to tailor the service processes according to customers’ choices, thereby reducing the operational costs and lead time (Zhang et al., 2014). In

addition, service specialists such as call centres, R&D centres and testing centres often receive aggregate service demands and operate in large scales; their capability for mass customisation could help manufacturers to save costs when developing customised products and/or services (Brews & Tucci, 2004). Therefore, the following hypothesis can be proposed:

H5a: *An upstream network actor's 'product/service innovation' has a positive effect on the performance of a service offshoring contract.*

5.2.7 'In-country relationship management' and performance

Relational capability refers to a firm's capability to '*create, develop and manage business relationships*' (Pham et al., 2017, p. 607). The impact of relationship management capability on firm performance has been documented in empirical studies (Ling-Yee & Ogunmokun, 2001; Raman et al., 2013). For MNCs, this relationship may exceed national borders. 'In-country relationship management' in this study concerns an offshore upstream network actor's ability to manage the relationships with business partners, government agencies, universities and customers to be able to provide cross-functional services, obtain legal permits and find new sources of revenues.

This capability may help multinational manufacturers to narrow the institutional distance, i.e. the differences between the regulatory environments of the firm's home country and host country (Shirodkar & Konara, 2017). Previous studies (Xu & Shenkar, 2002; Zaheer, 1995) have recognised the negative impacts of institutional distance (liability of 'foreignness') on MNCs' operational costs when complying with the 'rules of the game'. In order to address such disadvantages, manufacturers have to rely on

upstream network actors that are often located within business clusters and are familiar with the approaches to reduce the regulatory differences (Wu et al., 2010). For instance, upstream network actors could help manufacturers develop trust with local stakeholders that are involved in service development and delivery (Rajesh, 2017); and provide local market information to help manufacturers to better address customers' needs (Vendrell-Herrero et al., 2018). Moreover, well-managed relationships in the host country could help reduce the costs associated with coordination and integration. In addition, upstream network actors' relationships with local government agencies may help manufacturers to obtain legitimacy and eligibility for economic resources (e.g. public infrastructure at discounted prices) (Jayaram & Tan, 2010). Therefore, the following hypothesis can be proposed:

H6a: *An upstream network actor's 'in-country relationship management' has a positive effect on the performance of a service offshoring contract.*

5.2.8 'Security and IP protection protocols' and performance

'Security and IP protection protocols' in this study refers to an offshore upstream network actor's ability to protect proprietary knowledge such as business secrets and IP in an offshore location. This capability is very important for the performance of manufacturers that provide services through service network actors. According to the qualitative stage study, this capability is important to service firms whose former employees could take critical trade secrets such as customer information to competitor firms that hire them. As manufacturers' services are collaboratively designed and delivered, the performance of offshoring contracts could depend on upstream network actors' ability to ensure that manufacturers' trade secrets and IP are actively protected and accessed only by authorised employees (Rao et al., 2017; Zaied, 2012). Therefore,

upstream network actors' protocols to protect business security can help manufacturers to prevent and reduce risks hidden in service offshoring contracts, thereby improving the performance of these contracts. Therefore, the following hypothesis can be proposed:

H7a: *An upstream network actor's capability on 'security and IP protection protocols' has a positive effect on the performance of a service offshoring contract.*

5.2.9 Moderating effects of offshoring modes

Captive offshoring and offshore outsourcing represent two governance structures (i.e. hierarchical mode and contractual mode) when a firm chooses to outsource business processes to an offshore location (Hutzschenreuter et al., 2011). The service offshoring literature has recognised the impacts of a firm's governance choice on 1) the level of control it has on its offshore operations, 2) the number of resources required to undertake offshored activities, 3) the level of risks associated with offshored activities and 4) the number of resources that it can access. However, few empirical studies have employed a capability's perspective to investigate manufacturers' governance mode choices when outsourcing business processes to upstream network actors in offshore markets. Based on the different operational capabilities found in each offshoring mode during the qualitative stage study, the author developed hypotheses about the moderating effects of offshoring modes on the relationships between upstream network actors' operational capabilities and the performance of service offshoring contracts.

Manufacturers may possess proprietary methodologies that can improve efficiency in manufacturing activities or basic service activities such as repair, inspection and

maintenance (Neu & Brown, 2005). However, as service offerings grow more advanced and complex, manufacturers may need to rely on local service specialists for complementary capabilities to improve service processes. According to the qualitative stage of this study, local service specialists possess more experience in supporting a wider scope of services than service delivery centres that are often specialised in specific service functions. For instance, professional service specialists might be more capable of developing quality and performance evaluation systems that can help service delivery centres to evaluate their service goals and performance. Therefore, the following moderating effect can be hypothesised:

H1b. *The positive relationship between 'process improvement' and the performance of a service offshoring contract is stronger for* ***offshore outsourcing mode*** *than for captive offshoring mode.*

Verbeke (2003) suggests that an MNC's offshoring mode decisions should be based not only on transaction cost reduction but also on value creation. For instance, outsourcing business processes to service network actors can help manufacturers to create higher values to customers (Paiola et al., 2013). Compared to local service specialists, service delivery centres are more likely to turn technological assets and other infrastructure into value-adding services. This is because service delivery centres are dually embedded in offshore business environments and parent firms' networks and are more knowledgeable about parent firms' business processes (Ciabuschi et al., 2014; Demeter et al., 2016). Therefore, service delivery centres are thus more capable of turning existing resources into high-quality services. In addition, a hierarchical structure (captive offshoring) could facilitate a firm's ownership advantages (O) in a specific location (L), and reduce the dependence on local service specialists (Davis &

Cobb, 2010; Dunning, 2000; Ulrich & Barney, 1984). These advantages are thus more apparent and conducive to performance in manufacturers' captive offshoring contracts. Therefore, the following moderating effect can be hypothesised:

H2b. *The positive relationship between 'scalable service-enabling technology' and the performance of a service offshoring contract is stronger for* ***captive offshoring*** *mode than for offshore outsourcing mode.*

With regard to scalable and well-trained service talents, some service delivery centres were established in low-wage countries to tap into the large number of labours that could bring various benefits (Dibbern et al., 2017; Mayer et al., 2012), but some respondents from the qualitative stage of this study stressed that employee proficiency and productivity are more important than employee population. In some business clusters, service delivery centres compete for the limited number of skilled labours, causing higher average labour costs. Local service specialists in human resource management are more capable of training and supplying a scalable number of labours from local colleges. For instance, international mobile phone and video game machine manufacturers experienced a shortage of call centre agents two months before and after the launch of a new product. During the peak seasons, service delivery centres often could not hire enough call agents to meet the service demands. Moreover, it was uneconomical for these service delivery centres to keep a large scale of technological facilities and service agents during low seasons. In this case, the service delivery centres are less capable of providing scalable human capital than local service specialists. Therefore, the following moderating effect can be hypothesised:

H3b. *The positive relationship between 'scalable and well-trained service talents' and the performance of a service offshoring contract is stronger for* ***offshore outsourcing*** *mode than for captive offshoring mode.*

The qualitative study found that both local service specialists and service delivery centres were able to help manufacturers to develop new services or develop new service delivery methods. Previous studies seem to suggest that the relationship between innovation and performance is stronger when manufacturers develop the capability in house, through captive offshoring (Frost et al., 2002; Lin, 2014). Compared with local service specialists, service delivery centres are dually embedded, not only in offshore business environments but also in parent firm's networks in home countries, with the two environments providing resources and opportunities for new capabilities (Ferraris et al., 2017). Such dual embeddedness could allow service delivery centres to better develop and convert new ideas into innovative services. For instance, service delivery centres could utilise the innovations that are available in the headquarters to upgrade or renew existing operational capabilities (Hamel et al., 1989). Additionally, service delivery centres are often more willing to invest in new technological assets or business models to develop new services (Cohen & Levinthal, 1990). In contrast, local service specialists are often less willing to invest in innovations (Hakansson & Eriksson, 1993), nor are they as knowledgeable about manufacturers' core business processes as service delivery centres. Therefore, the following moderating effect can be hypothesised:

H4b. *The positive relationship between 'service and process innovation' and the performance of a service offshoring contract is stronger for* ***captive offshoring*** *mode than for offshore outsourcing mode.*

To develop customised products and services in an offshore market, manufacturers need sufficient knowledge about downstream customers (Lampel & Mintzberg, 1996). According to the qualitative stage findings, local service specialists are often more knowledgeable than service delivery centres about local customers. Local service specialists may also possess the technological assets and facilities that allow focal manufacturers and their service delivery centres to achieve economies of scale through the mass customisation of products and/or services locally. The qualitative stage study also identified local service specialists' capability to help manufacturers tailor products and/or service according to the standards prescribed in local regulations or preferred in the local markets. Therefore, the following moderating effect can be hypothesised:

H5b. *The positive relationship between 'product/service customisation' and the performance of a service offshoring contract is stronger for* ***offshore outsourcing*** *mode than for captive offshoring mode.*

For multinational manufacturers, the capability to manage relationships with external actors in offshore locations is often developed through service delivery centres. According to the qualitative study, service delivery centres were less familiar with the local business environment and were subject to more local regulatory restrictions than local service specialists. In this case, service delivery centres' capability to manage relationships with local stakeholders (e.g. local service specialists, intermediaries, competitors, government agents and customers) can be converted into advantages, such as promoting parent firms' corporate image, reducing regulatory barriers and developing mutual trust. Despite local service specialists' close relationships with

local stakeholders, the attached advantages may not be directly transferrable to manufacturers and their service delivery centres. Service delivery centres' in-country relationship management capability can thus impose stronger impacts on the performance of service offshoring contracts. Therefore, the following moderating effect can be hypothesised:

H6b. *The positive relationship between 'in-country relationship management' and the performance of a service offshoring contract is stronger for* ***captive offshoring*** *mode than for offshore outsourcing mode.*

Risks in service offshoring contracts often include local service specialists' opportunistic behaviours, such as neglecting duties and responsibilities, hiding or selling customers' critical business information and discounting service quality (Lioliou & Zimmermann, 2015). The qualitative stage study observed that manufacturers were more likely to rely on their service delivery centres to undertake business processes that involve business secrets or IP. For instance, service delivery centres could act on manufacturers' behalf to select and monitor the outsourced business processes. Service delivery centres were more capable of keeping local business partners aligned with the security and IP protection protocols and thus more important to the related performance of manufacturers' service offshoring contracts. Therefore, the following moderating effect can be hypothesised:

H7b. *The positive relationship between 'security and IP protection' and the performance of a service offshoring contract is stronger for* ***captive offshoring*** *mode than for offshore outsourcing mode.*

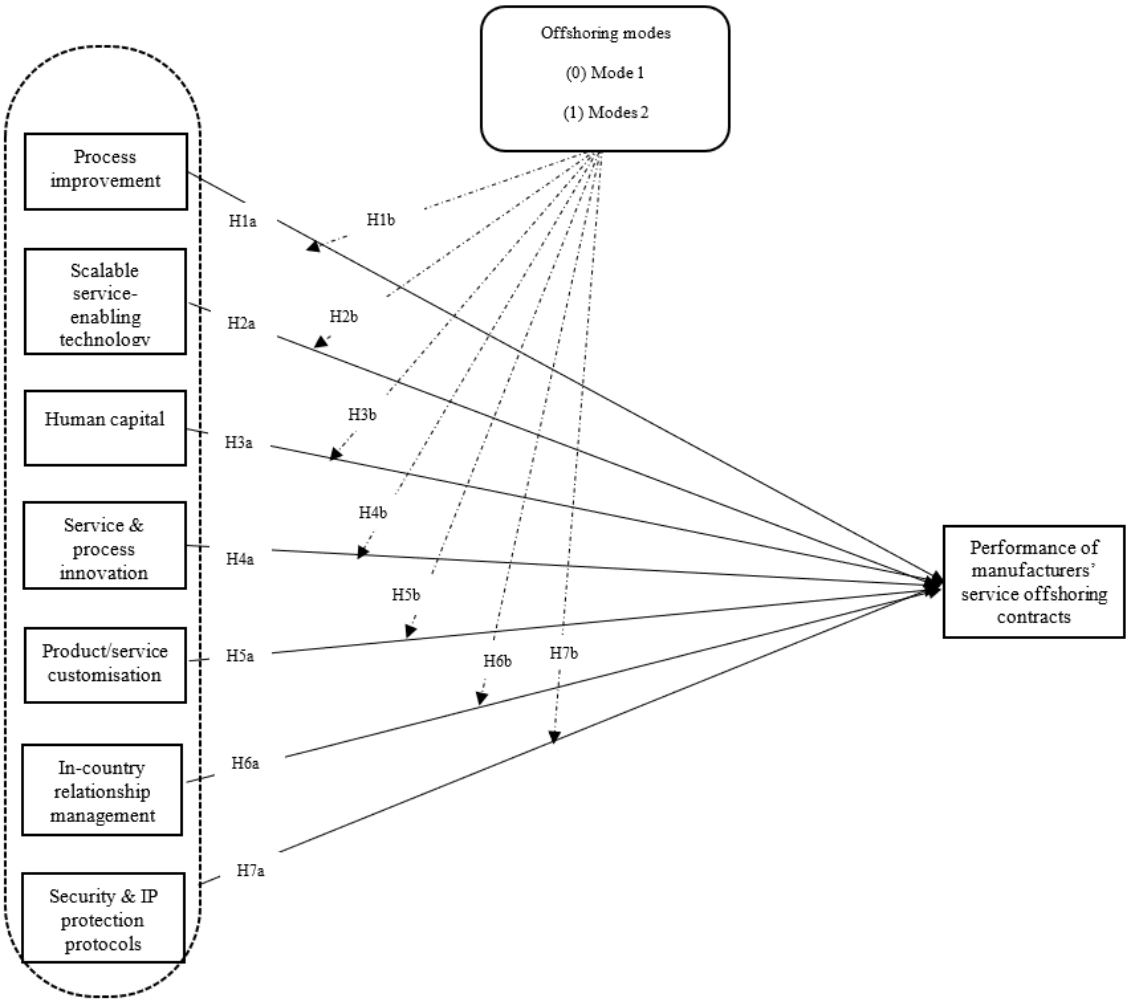

Figure 5. 2: Conceptual framework

Figure 5.1 presents the conceptual framework that summarises the above research hypotheses.

5.3 Quantitative data analysis

This study collected 360 valid responses using a survey from service offshoring firms in China. Chapter 3 has presented the initial analysis of this survey data, including sample characteristics, missing data and outliers, normality, non-response bias, multicollinearity and common method bias. This section presents the statistical

analysis of the quantitative data, starting from testing the reliability and validity of the constructs included in this thesis. Furthermore, the quantitative analysis involves the hypotheses testing on the influences of upstream network actors' operational capabilities on the performance of manufacturers' service offshoring contracts, as well as the moderating effects of service offshoring modes. This process aims to generate results that are complementary to the exploratory findings in the qualitative stage.

5.3.1 Assessment of construct reliability and validity

To assess the constructs included in this study, the author conducted the tests for reliability and validity. Moreover, correlations between variables were examined to detect the issue of multicollinearity. All the construct measures were adapted from the existing studies, so the author directly applied the confirmatory factor analysis (CFA) using AMOS 25 to examine the reliability and validity of the measures (Yin et al., 2018).

- Reliability tests

Construct reliability tests the extent to which the items used in a construct are consistent (Fornell & Larcker, 1981; Nunnally & Bernstein, 1994). Construct reliability can be assessed by Cronbach's alpha coefficients (Cronbach, 1951), which refer to the proportion of a scale's total variance that is attributed to the true score of the latent construct being measured (Netemeyer et al., 2003). Cronbach alpha with values above .70 can respectively indicate adequate reliability (Kline, 2015). Field (2009) adds that Cronbach's alpha values above .8 are good and that the values should be at least .70. As can be seen in Table 5.1, the Cronbach's alpha coefficients for the constructs of this study range from .784 to .814, indicating good reliability.

In addition, some scholars (e.g. Fornell & Larcker, 1981; Hair et al., 2010) recommend composite reliability (CR) as a more precise assessment of internal consistency. Composite reliability coefficients greater than .70 often indicate that the items consistently measure the same latent construct (Hair et al., 2010; Nunnally & Bernstein, 1994). As Table 5.1 exhibits, all the constructs have composite reliability values that exceed the threshold of .70, suggesting good reliability.

Table 5.1: Reliability tests

Constructs	**Cronbach's Alpha**	**Composite Reliability**
Performance	.784	.924
Process improvement	.813	.872
Scalable service-enabling technology	.813	.851
Scalable and well-trained service talents	.811	.864
Service & process innovation	.811	.894
Product/service customization	.810	.859
In-country relationship management	.813	.884
Security and IP protection protocols	.814	.835

- Validity tests

Construct validation can be assessed in two steps: convergent validity and discriminant validity (Hair et al., 2010). Convergent validity refers to the degree to which items representing a construct converge or are highly varied (Hair et al., 2010). Convergent validity can be assessed through 1) CFA which tells whether an item appropriately loads on its predicted construct (Diamantopoulos & Siguaw, 2000) and 2) average variance extracted (AVE) (Hair et al., 2010).

Table 5.2: Convergent validity

Constructs	Item codes	Mean	Standardized Loadings	AVE
Process improvement (PI)	PI1	4.74	0.727	0.577
	PI3	4.85	0.855	
	PI4	5.41	0.723	
	PI5	4.88	0.761	
	PI6	4.96	0.723	
Scalable service-enabling technology (SST)	SST1	5.41	0.761	0.59
	SST2	5.55	0.855	
	SST3	5.49	0.724	
	SST4	5.75	0.725	
Scalable and well-trained service talents (SWS)	SWS1	4.65	0.743	0.56
	SWS2	5.01	0.732	
	SWS3	4.61	0.835	
	SWS4	4.9	0.738	
	SWS5	5.04	0.685	
Service and process innovation (SPI)	SPI1	5.08	0.683	0.587
	SPI2	4.95	0.861	
	SPI3	5.09	0.707	
	SPI4	5.06	0.838	
	SPI5	4.93	0.693	
	SPI6	4.91	0.795	
Product/service customization (PSC)	PSC1	4.82	0.787	0.55
	PSC2	4.9	0.673	
	PSC3	5.01	0.789	
	PSC4	5.05	0.771	
	PSC5	5.1	0.68	
In-country relationship management (IRM)	IRM1	5.13	0.785	0.605
	IRM2	4.53	0.761	
	IRM3	5.03	0.738	
	IRM4	5.04	0.765	
	IRM5	5.1	0.838	
Security and IP protection protocols (SIP)	SIP1	4.82	0.747	0.559
	SIP2	5.13	0.762	
	SIP3	5.04	0.748	
	SIP4	5.12	0.732	
Performance (OP)	OP1	4.73	0.78	0.671
	OP2	4.53	0.838	

OP3	4.72	0.833
OP4	4.84	0.889
OP5	4.72	0.793
OP6	4.49	0.775

In CFA**,** standardised factor loadings are expected to be statistically significant, with a minimum value of .70 (Hair et al., 2010). CFA shows that most standardised factor loadings were greater than .70, except item 2 (PI2) under 'process improvement' (.643). item 5 (SWS5) under 'Scalable and well-trained service talents' (.685), item 1 (SPI1) and item 5 (SPI5) under 'service and process innovation' (.683 & .693), item 3 (PSC3) and item 5 (PSC5) under 'product/service customisation' (.673 & .680). Following the practices of Feng et al., (2014) and Yin et al. (2018), only the item (PI2) under 'process improvement' was dropped, since the factor loadings of other five items were higher than .65 and empirically close to .70. The standard factor loadings of all remaining items are presented in Table 5.2. Furthermore, AVE is also used to measure the degree of convergence among the items that represent a construct, with a suggested threshold of .50 (Fornell & Larcker, 1981; Hair et al., 2010). As is displayed in Table 5.2, the AVE values for all the constructs exceeded the threshold value, suggesting good convergent validity.

Table 5.3: Discriminate validity & correlation analysis

	1	2	3	4	5	6	7	8
1. Process improvement (PI)	**.760**							
2. Scalable service-enabling technology (SST)	.312**	**.786**						
3. Scalable and well-trained service talents (SWS)	.332**	.307**	**.748**					
4. Service & process innovation (SPI)	.318**	.315**	.333**	**.766**				
5. Product/service customization (PSC)	.336**	.331**	.329**	.354**	**.742**			
6. In-country relationship management (IRM)	.293**	.296**	.322**	.326**	.333**	**.778**		
7. Security and IP protection protocols (SIP)	.280**	.285**	.272**	.317**	.324**	.332**	**.748**	
8. Performance (OP)	.469**	.441**	.481**	.483**	.472**	.441**	.489**	**.819**
Mean	4.801	5.550	4.840	5.001	4.977	4.966	5.026	4.671
Std. Deviation	1.055	0.851	0.915	1.204	1.151	1.300	1.261	1.591

Note: ****. Correlation is significant at the 0.01 level (2-tailed)**; the square root value of AVE is displayed in bold on diagonals; *N* = 360

As a part of construct validity, discriminant validity refers to the degree of distinctness between one construct and other constructs. It can be established when the items of one construct are not perfectly correlated with those of other constructs (Hair et al., 2010). It can be tested by comparing the square root of each construct AVE to the construct's correlations with other constructs. Discriminant validity is established when the square root AVE value of a construct is larger than its correlation values with other constructs (Gefen et al., 2000; Nunkoo et al., 2013). In Table 5.3, the square root value of AVE is displayed **in bold** on diagonals, with the correlation values of constructs displayed off diagonals. The results show that the square root AVE values of all the constructs are greater than the corresponding correlation values. This indicates that the discriminant validity is established.

Table 5.4: Goodness-of-Fit of the measurement model

Statistics	**Results**
χ^2	1167.554
df	712
P-value	.000
χ^2/df	1.640
RMSEA	.042
SRMR	.045
CFI	.944
TLI	.938

- Goodness-of-fit of the measurement model

The goodness-of-fit statistics based on maximum likelihood estimation methods are provided in Table 5.4. The analysis results show that the hypothesised model has a good fit. The construct yields a significant χ^2 value of 1167.554 with 712 degrees-of-freedom resulting in normed χ^2 index of 1.640, which is smaller than the threshold value of 3.0 (Yin et al., 2018). The statistical significance of χ^2 is expected, given the

model complexity and sample size ($N > 250$) (Hair et al., 2010). The root mean square of approximation (RMSEA) value equals .042, and the standardized root mean squared residual (SRMR) was .045, both smaller than the threshold (.05) suggested by Iacobucci (2010). Finally, CFI and TLI value equal to .944 and .938, respectively, indicating excellent goodness-of-fit (Iacobucci, 2010).

5.3.2 Correlation analysis (multicollinearity)

Several scholars (Hair et al., 2010; Park & Ghauri, 2011; Tabachnick & Fidell, 1996) have stressed the importance to keep predictor (independent) variables independent from each other during statistical analysis because overly correlated independent variables can lead to the problem of multicollinearity and affect the accuracy of the regression analysis. Tabachnick and Fidell (1996) suggest that independent variables with a correlation of .70 or more as the threshold for serious correlation, while Neter et al. (1985) suggest .80 as the threshold. Table 5.3 presents the means, standard deviations and correlation values of all the variables used in the hypothesis testing. The maximum value of the correlation coefficients among seven independent variables (from 'PI' to 'SIP') was .354, indicating that there were no outstanding issues with multicollinearity. Moreover, this degree of inter-correlations can indicate the distinct nature of each variable and suggests its unique contribution to the overall model (Hair et al., 2010).

The author also ran a variance inflation factors (VIFs) test for multicollinearity when running the regression analysis. All VIFs ranged between 1.271 and 1.359, with no VIF coefficients greater than 10. Therefore, it is reasonable to conclude that the data set was not affected by the issue of multicollinearity (Pallant, 2011).

5.4 Hypothesis Testing

In order to test the research hypotheses with regard to the impacts of upstream network actors' operational capabilities on the performance of manufacturers' service offshoring contracts, and the moderating effects of offshoring modes, hierarchical multiple regression analysis was employed in SPSS 25 (Sheng et al., 2011). This method is used to control the effects of potentially moderating variables (firm age and firm size). It allows the predictor variables to be regressed with control variables, with these two types of variables put in different blocks within the SPSS analysis. Therefore, hierarchical multiple regression analysis was a suitable choice to test the hypotheses in a conceptual framework.

Following the practice of Hult et al. (2007), the author first put the control variables (firm age and firm size) in the first block of independent variables of multiple regression analysis; subsequently, the author put the variables that measure eight operational capabilities (coded as PI, SST, SWS, SPI, PSC, IRM, and SIP) in the second block; finally, the interaction terms between offshoring modes (Mode = 0 for captive offshoring and 1 for offshore outsourcing) and operational capabilities (Mode*PI, Mode*SST, Mode*SWS, Mode*SPI, Mode*PSC, Mode*IRM, and Mode*SIP) were put in the last block of regression analysis. The estimation results in the corresponding Model 1 to Model 3 are presented in Table 5.5. Model 1 only accounts for 0.2% of the variance in performance of a manufacturer's service offshoring contracts and none of the controlled variables are significant at 5% level. In Model 2, adding eight independent variables of operational capabilities increases R-square by .533 ($p < .001$) and 53.3% of the variance in performance can be explained by Model 2. Model 3 with moderating variables and additional interaction terms

further enhances the model performance compared with Model 2 ($\Delta R^2 = .029$; $p < .01$), and it can explain 54.2% of the variance of performance, which establishes the superior performance of Model 3 against Model 2 (as well as Model 1).

Table 5.5: Results of the hypothesis testing

	Model 1			Model 2			Model 3		
Variables	**Coefficients**	**S.E.**	**t-ratio**	**Coefficients**	**S.E.**	**t-ratio**	**Coefficients**	**S.E.**	**t-ratio**
Constant	4.866	.283	17.174	< .001	.510	-7.144	<.001	.623	-6.294
Operational Capabilities									
PI				.175 ***	.063	4.178	.217 ***	.076	4.318
SST				.137 ***	.078	3.295	.236 ***	.098	4.511
SWS				.187 ***	.073	4.458	.107 *	.087	2.135
SPI				.171 ***	.056	4.035	.118 *	.072	2.155
PSC				.139 ***	.059	3.265	.114 *	.076	2.075
IRM				.120 ***	.051	2.852	.124 *	.065	2.334
SIP				.210 ***	.052	5.071	.245 ***	.067	4.648
Moderating effects of offshoring modes									
PI*Offshore outsourcing							-.074	.131	-1.399
SST*Offshore outsourcing							-.170 **	.156	-3.103
SWS*Offshore outsourcing							.157 **	.153	3.079
SPI*Offshore outsourcing							.097 *	.112	1.799
PSC*Offshore outsourcing							.046	.118	.849
IRM*Offshore outsourcing							-.014	.103	-.247
SIP*Offshore outsourcing							-.054	.104	-1.049
Control variables									
Firm age	-.0036	.073	-.685	-.022	.051	-.592	-.022	.036	.050
Firm size	-.018	.073	-.332	-.013	.052	-.347	-.022	.036	.051
Offshoring mode				.032	.129	.812	.042	.127	1.081
N	360			360			360		
df	2			8			7		
R^2	.002			.535			.564		
Adjusted R^2	-.004			.521			.542		
F	.284			49.974			3.269		
ΔR^2 against the preceding model				.533 ***			.029 **		

Note: * $p < .05$; ** $p < .01$; *** $p < .001$ (based on one-side test)

Regarding the estimated results of main effects, Model 2 shows that all the seven operational capabilities possessed by upstream network actors are significantly associated with the performance of service offshoring contracts with the positive signs. Importantly the main effects remain robust in Model 3 when accounting for the moderation effects. Therefore, research hypotheses H1a to H7a are supported, which means that upstream network actors' operational capabilities have a positive influence on the performance in service offshoring contracts.

With regard to the moderating effects of offshoring modes, Model 3 shows that offshoring mode negatively moderates the association between 'scalable service-enabling technology' (SST) and performance (β = -.170, p < .01). This result supports H2b that the positive relationship between the scalable service-enabling technology of upstream network actors and the performance of service offshoring contracts is stronger for captive offshoring contracts than for offshore outsourcing contracts. Model 3 also finds the positive moderating effect of offshoring modes on the association between 'scalable and well-trained service talents' (SWS) and performance (β = .157, p < .01). This result supports H3b that the positive relationship between the human capital of upstream network actors and the performance of service offshoring contracts is stronger for offshore outsourcing contracts than for captive offshoring contracts. In addition, Model 3 finds the positive moderating effect of offshoring modes on the association between 'service and process innovation' (SPI) and performance (β = .097, p < .1). This result rejects H4b that the positive relationship between the service and process innovation of upstream network actors and the performance of service offshoring contracts is stronger for captive offshoring contracts than for offshore outsourcing contracts.

Given that the direct relationship between offshoring modes and performance is insignificant (β = .42, p > 0.1), the results suggest that offshoring mode serves as a pure moderator in the relationships between SST/SWS/SPI capabilities and performance (Hult et al., 2007; Sharma et al., 1981). Furthermore, the interaction terms of offshoring modes and other five operational capabilities have insignificant coefficients, which imply that positive associations between these capabilities and performance do not differ significantly between offshoring outsourcing and captive offshoring modes. Thus, the moderating effects of offshoring mode on the relationships between PI and OP (H1b), PSC and OP (H5b), IRM and OP (H6b), and SIP and OP (H7b) are not supported. While previous studies either argue for an internal (Rahman et al., 2018) or an external (Lau et al., 2010; Paiola et al., 2013) mode for focal firm's service offshoring choice, the results of this study suggest an evolutionary perspective to evaluate upstream network actors' capability contribution. In particular, service delivery centres gradually develop localised capabilities to improve process efficiency, provide customised products and services, manage relationships with offshore business partners, and achieve cultural alignment. Such evolution of service delivery centres has been documented in some studies (Marukawa, 2013) where these centres develop into 'centre of excellence'.

5.5 Summary of Chapter 5

This chapter develops and tests research hypotheses about the relationships between upstream network actors' operational capabilities and the performance of manufacturers' service offshoring contracts, as well as the moderating effect of offshoring modes on these relationships. Table 5.6 provides a summary of the hypothesis testing results.

Table 5.6: Analysis results

Hypotheses	Results
H1a: An upstream network actor's 'process improvement' has a positive effect on the performance of a service offshoring contract.	Supported
H2a: An upstream network actor's 'scalable service-enabling technology' has a positive effect on the performance of a service offshoring contract.	Supported
H3a: An upstream network actor's 'scalable and well-trained service talents' has a positive effect on the performance of a service offshoring contract.	Supported
H4a: An upstream network actor's 'service and process innovation' has a positive effect on the performance of a service offshoring contract.	Supported
H5a: An upstream network actor's 'product/service innovation' has a positive effect on the performance of a service offshoring contract.	Supported
H6a: An upstream network actor's 'in-country relationship management' has a positive effect on the performance of a service offshoring contract.	Supported
H7a: An upstream network actor's capability on 'security and IP protection protocols' has a positive effect on the performance of a service offshoring contract.	Supported
H1b: The positive relationship between 'process improvement' and the performance of a service offshoring contract is stronger for **offshore outsourcing mode** than for captive offshoring mode.	Not supported
H2b: The positive relationship between 'scalable service-enabling technology' and the performance of a service offshoring contract is stronger for **captive offshoring mode** than for offshore outsourcing mode.	Supported
H3b: The positive relationship between 'scalable and well-trained service talents' and the performance of a service offshoring contract is stronger for **offshore outsourcing mode** than for captive offshoring mode.	Supported
H4b: The positive relationship between 'service and process innovation' and the performance of a service offshoring contract is stronger for **captive offshoring mode** than for offshore outsourcing mode.	Not supported
H5b: The positive relationship between 'product/service customisation' and the performance of a service offshoring contract is stronger for **offshore outsourcing mode** than for captive offshoring mode.	Not supported
H6b: The positive relationship between 'in-country relationship management' and the performance of a service offshoring contract is stronger for **captive offshoring mode** than for offshore outsourcing mode.	Not supported
H7b: The positive relationship between 'security and IP protection' and the performance of a service offshoring contract is stronger for **captive offshoring mode** than for offshore outsourcing mode.	Not supported

The hierarchical regression analysis shows that the seven operational capabilities are significantly associated with the performance of service offshoring contracts with positive signs. Hence, H1a, H2a, H3a, H4a, H5a, H6a, and H7a are fully supported. Specifically, the relative contribution of each operational capability is evaluated based

on the corresponding effect sizes (β) in the multiple regression analysis (Fritz et al., 2012). Effect size refers to a quantitative reflection of the importance of some construct (e.g. capabilities) that is used for the purpose of addressing a question of interest (Kelley & Preacher, 2012). The size effect of each operational capability leads to a hierarchy that can demonstrate the relative importance of each operational capability. Note that all the main effects of the eight operational capabilities are significant at 5% level with positive signs (see Table 5.5). 'Security and IP protection protocols' (β = .210) is the operational capability that contributed most to performance. As manufacturers outsource components services to offshore upstream network actors, the protection of IP and trade secrets become more important. Several service offshoring studies (Parida et al., 2016; Rilla & Squicciarini, 2011) warn that offshore business partners may behave opportunistically and grab the benefits. For manufacturers, offshore business partners' opportunistic behaviours (e.g. infringement of business secrets and competitors' imitation) may jeopardise the performance of service offshoring contracts (Buss & Peukert, 2015; Xie et al., 2016). As such, 'security and IP protection protocols' could be the most important operational capability for the performance of manufacturers' service offshoring contracts.

The effect size for 'scalable and well-trained service talents' (β = .187), 'process improvement' (β = .175), and 'service and process innovation' (β = .171) suggest that these three operational capabilities are also important for manufacturers' service offshoring performance. 'Scalable and well-trained service talents' becomes an important contributor to manufacturers' service offshoring performance possibly because of offshore upstream network actors' expertise in training scalable offshore employees with service-oriented attitudes and the required skills to deliver services.

‘Process improvement’ becomes an important contributor to manufacturers’ service offshoring performance, possibly because offshore upstream network actors are more capable of improving the service-related processes that are important to profit and customer satisfaction. ‘Service and process innovation’ becomes an important contributor to manufacturers’ service offshoring performance possibly because the technological systems and engineering expertise of offshore can help manufacturers to develop new services and benefit as first movers or to upgrade the existing services to meet market needs.

In contrast, the contribution of ‘product/service customisation’ (β = .139), ‘scalable service-enabling technology’ (β = .137), and ‘in-country relationship management’ (β = .120) on the performance of manufacturers’ service offshoring contracts are smaller despite their significant effects. This means manufacturers could have a lower degree of dependence on upstream network actors for these capabilities. For instance, the capability to develop intimacies with downstream actors, understand customer needs and tailor products and services (product/service customisation) could also be developed through the interactions between manufacturers and their downstream customers (Raddats et al., 2017). Alternatively, some capable manufacturers might decide to reduce the reliance on upstream network actors, with headquarters developing relationships with network actors (Ennis & Barnett, 2019) and scalable technology (De Felice et al., 2019). That might be particularly true for manufacturers that aim to transition from product-centric firms into purely service-centric firms.

Moreover, the moderating analysis identifies the negative moderating effect of offshoring mode on the relationship between ‘scalable service-enabling technology’

and performance (H2b) and the positive moderating effects of offshoring mode on the relationship between 'scalable and well-trained service talents' and performance (H3b). In other words, captive offshoring (Mode 1) is more likely to enhance the influence of 'scalable service-enabling technology' on the performance of manufacturers' service offshoring contracts; in contrast, offshore outsourcing is more likely to enhance the influence of 'scalable and well-trained service talents' on the performance of manufacturers' service offshoring contracts compared to captive offshoring. The non-significant moderating effects are displayed in Table 5.6.

The quantitative analysis results suggest that internalisation (through service delivery centres) could help focal manufacturers to extend operational capabilities to support wider scopes and larger scales of services, thus developing new sources of revenue. Counter-intuitively, 'in-country relationship management' and 'security and IP protection protocols' were found to have a positive impact on the performance of both captive offshoring and offshore outsourcing contracts. Although the qualitative study observed that these two capabilities were developed through captive offshoring, the large-scale quantitative study seems to suggest that manufacturers could also develop these capabilities through offshore outsourcing to local service specialists. This difference might be explained by the open and functional characteristics of the inter-organisational relationships between manufacturers and local service specialists. Openness originally means that a new relationship could be established between strangers through a shared friend (Horak & Taube, 2016). At an organisational level, openness means that local service specialists could serve as bridges for manufacturers to develop relationships with other network actors (e.g. government agencies, academic institutes and customers) in the local business environments. The qualitative study also observed that some manufacturers worked with local service specialists to

bid for local public projects that required trust and endorsement from local government agencies. In this case, manufacturers relied on local service specialists to obtain the trust and endorsement from local government agencies.

Chapter 6: Discussion of results and conclusion

6.1 Introduction

This chapter provides a conclusion to this thesis; in particular, it discusses the theoretical contributions of the work as well as the relevant managerial implications. This thesis addresses four research questions (RQs), derived from the literature, which motivated the study:

RQ1: How do upstream network actors contribute to manufacturers' operational capabilities through captive offshoring service contracts (Mode 1)?

RQ2: How do upstream network actors contribute to manufacturers' operational capabilities through offshore outsourcing service contracts (Mode 2)?

RQ3: How do upstream network actors' operational capabilities influence the performance of captive offshoring service contracts (Mode 1)?

RQ4: How do upstream network actors' operational capabilities influence the performance of offshore outsourcing service contracts (Mode 2)?

RQ5: How does offshoring modes (i.e. captive offshoring and offshore outsourcing) moderate the relationship between upstream network actors' operational capabilities and the performance of offshore outsourcing service contracts?

This study draws on the operational capabilities perspective, which complements focal-firm assumption taken by the dynamic capabilities perspective (Li & Liu, 2014; Teece, 2007) and the transaction-based logic frequently used in the service offshoring literature (e.g. Smite & van Solingen, 2016; Termeer & Dewulf, 2014; Weigel &

Hadwich, 2018), to explain manufacturers' service offshoring mode choices (i.e. captive offshoring and offshore outsourcing). The operational capabilities perspective allows the author to 1) investigate the contribution of manufacturers' service networks (Gebauer et al., 2013), specifically offshore upstream networks, in manufacturers' servitization activities, and 2) explore the interactions between service delivery centres and local stakholders in the qualitative stage study. Moreover, the operational capabilities perspective may explain the evolution of service offshoring from cost-reducing (e.g. manufacturing) and non-core activities (e.g. data entry) to more value-adding activities (e.g. R&D and engineering) (Bernard & Fort, 2015; Kamal, 2018). Some service offshoring studies (e.g. Jarvenpaa & Mao, 2008; Lahiri & Kedia, 2009) recognise the importance of a capabilities perspective, yet focus on only one offshoring mode (offshore outsourcing) and fail to consider captive offshoring as an alternative mode of capability development. In addition, these studies fail to address how these capabilities could affect the performance of service offshoring contracts. This study considers the operational capabilities contributed by both captive offshoring and offshore outsourcing and confirms their effects on service offshoring performance.

This study suggests that an area that has received limited attention in the servitization literature is the role of upstream network actors in manufacturers' development of operational capabilities to support the design, development and delivery of advanced services in an offshore context. The offshore context is important for servitizing manufacturers that rely on offshore service networks to develop service portfolios to meet different customer needs (Hakanen et al., 2017). The literature has recognised the positive impact of operational capabilities on performance (e.g. cost, quality, delivery and flexibility) related to service provisions (Coltman & Devinney, 2013; Liu

et al., 2015; Yook et al., 2018). This study investigates upstream network actors' operational capabilities that support manufacturers' service offerings and improve the economic viability of their service portfolios. In particular, the qualitative stage of this study explains how service offshoring to upstream network actors could allow manufacturers to develop the requisite operational capabilities to achieve differentiation and find new sources of revenue from advanced services. In the quantitative stage, the relationship between upstream network actors' operational capabilities (except 'cultural alignment' developed from Mode 3) and the performance of service offshoring contracts was empirically confirmed through large-scale quantitative testing.

The remainder of this chapter is set out as follows. Section 6.2 discusses the four theoretical contributions of this study: 1) identifying eight operational capabilities contributed by manufacturers' offshore upstream network actors in the qualitative stage study and comparing them with the literature for originality and uniqueness; 2) evaluating the relative importance of the seven operational capabilities (except 'cultural alignment' from Mode 3) in the quantitative stage study, through a hierarchy of operational capabilities (discussed in Section 5.5) regarding their statistical contribution (i.e. effect size) to manufacturers' service offshoring performance; 3) distinguishing manufacturers' choice between captive offshoring (Mode 1) and offshore outsourcing (Mode 2) according to the operational capabilities developed through each mode; and 4) identifying in-country outsourcing as a new mode of service offshoring (Mode 3) in the qualitative stage study, which suggests further empirical study to understand manufacturers' service offshoring arrangements.

Managerial implications are set out in Section 6.3, followed by limitations and future research directions in Section 6.4.

6.2 Theoretical contributions

This thesis aims to investigate the operational capabilities of offshore upstream network actors that manufacturers require as part of servitization. Previous studies (Cui et al., 2019; Story et al., 2017; Weigel & Hadwich, 2018) in servitization primarily include the focal firm perspective and manufacturer-downstream interaction perspective. This section discusses how this thesis contributes to a significantly under-explored area in servitization research, that is, the manufacturer-offshore upstream network interaction. This justification for contextualised theoretical contribution has been recognised by Jia et al. (2012) and Whetten (1989) and who argue that a context (e.g. who, when, or where) can contribute theoretically by considering how (i.e. relationships among construction elements) and why (i.e. the logic underlying the relationships). In the specific context of the offshore upstream network of manufacturers, this thesis makes theoretical contributions by explaining how operational capabilities are developed from manufacturers' offshore upstream network actors, and operationalising the operational capabilities developed from manufacturers' service offshoring contracts and empirically testing the impacts of these operational capabilities on the performance of service offshoring contracts. In doing so, this study proves the importance of offshore upstream networks for manufacturers' servitization activities. In addition, this thesis extends the servitization studies (Raddats et al., 2017; Story et al., 2017) that explore the dynamic capabilities and operational capabilities developed from servitizing manufacturers and their downstream networks. For one thing, several scholars (Helfat & Winter, 2011; Spring

& Araijo, 2014) argue that dynamic capabilities are embedded in firms' strategies and can only indirectly influence firm performance. For another, servitization studies are dominantly exploratory (qualitative) at the moment (Raddats et al., 2019), with limited confirmation about the impacts of capabilities on performance. This thesis investigates manufacturers' strategies to develop complementary operational capabilities through service offshoring to offshore upstream network actors. In particular, it explores and verifies the indirect contribution of such strategies by identifying the operational capabilities embedded in captive offshoring and offshore outsourcing, as well as the corresponding impacts on performance. The following part presents the four theoretical contributions to the servitization literature.

First, this study identifies seven operational capabilities ('process improvement', 'scalable service-enabling technology', 'scalable and well-trained service talents', 'service and process innovation', 'product/service customisation', 'in-country relationship management', 'security and IP protection protocols') that which are the preceding capabilities for manufacturers to achieve economical viability and develop capabilities for servitization (see Table 6.1 for the unique value contributed by each operational capability). In doing so, these upstream operational capabilities 1) extend the prevailing servitization literature (Sjödin et al., 2016; Raddats et al., 2017) that primarily focus on the operational capabilities developed from focal manufacturers and downstream networks, and 2) extend the focal firm theories (e.g. TCE, OLI, RBV, RDT, and dynamic capabilities perspective) that primarily explain the cost savings, resource and/or capability access achieved from the demand side.

Table 6. 1:Offshore upstream operational capabilities and their unique contribution

Offshore upstream operational capability	Unique value to manufacturers
Process improvement	• Extends (Jarvenpaa & Mao, 2008; Lahiri & Kedia, 2009) by explaining how offshore upstream network actor's process abilities are perceived as useful in the processes of customers (i.e. manufacturers).
Scalable service-enabling technology	• Preceding capability for 'service-enablement' (Raddats et al., 2017). • Addresses the economical viability and scalability of the service-enabling technological assets, rather than the functions and services suggested in previous studies (Cenamor et al., 2017; Raddats et al., 2017)
Scalable and well-trained service talents	• Preceding capability for 'service-focused culture' (Kanninen et al., 2017) • Highlights offshore upstream network actors' capability to provide a scalable number of service talents for manufacturers to achieve flexibility and economical viability in customer services.
Service and process innovation	• Preceding capability for manufacturers to operationalise and convert innovative opportunities and ideas (Raddats et al., 2017) outside of their core business areas into marketable service offerings.
Product/service customisation	• Preceding capability for manufacturers to achieve 'customised insights' (Story et al., 2017) in an economical manner. • Helps tailor products/services according to local industry standards and regulations.
In-country relationship management	• Preceding capability for manufacturers' 'risk management capability' (Baines & Lightfoot, 2013; Erkoyuncu et al., 2013).
Security and IP protection protocols	• Preceding capability for manufacturers' risk management capability (Baines & Lightfoot, 2013; Erkoyuncu et al., 2013).

Among the seven operational capabilities, 'security and IP protection protocols' and 'scalable and well-trained service talents', 'in-country relationship management' are the important capabilities that may only exist from upstream networks. Specifically, 'Security and IP protection protocols' allows offshore upstream network actors to monitor and control outsourced processes and protect IP on behalf of focal manufacturers and selectively learn service specialists' techniques and capabilities and co-develop the service-level agreements that specify performance measures, as well as

risk- or profit-sharing terms. This operational capability could be the preceding operational capability for manufacturers to develop 'risk management' (Baines & Lightfoot, 2013; Erkoyuncu et al., 2013) and prevent the supplier opportunism (Delgado et al., 2013; Ibrahim & Hanafi, 2013; Parida et al., 2016), loss of control over externalised business processes, and focal firms taking the blame for the misconduct or mistakes of service specialists (Strange & Humphrey, 2019). Previous studies have stressed the importance for servitizing manufacturers to develop a service-focused firm culture and mindset (Brax, 2005; Kanninen et al., 2017; Neely, 2008; Ostrom et al., 2010). However, this study suggests that when servitizing in a global market, a manufacturer may find it challenging to hire a scalable number of capable service talents to meet the large amount of service demands, especially during peak seasons and maintain economical viability by keeping these talents during low seasons. Therefore, 'scalable and well-trained service talents' in this study could be the preceding capability for manufacturers' capability to develop 'service-focused culture' (Kanninen et al., 2017). It highlights upstream network actors' abilities to identify, train, and provide scalable service employees with proper education, skills and experience to meet manufacturers' flexible needs. 'In-country relationship management' could be the preceding capability for manufacturers' to develop 'risk management' (Baines & Lightfoot, 2013). It allows focal manufacturers to develop relationships and trust with local business partners, thereby minimising the possible supply side opportunism issue. This capability is different from the relationship management identified in the focal-firm perspective literature (Angelis et al., 2012; Kamp & Parry, 2017; Kreye et al., 2015), which primarily investigate how the relationship can facilitate manufacturers' timely communications with downstream customers. Instead, 'in-country relationship management' explains how a mutual

relationship can be maintained with a wide range of local stakeholders for operational purposes (obtaining legal permits, reduce risks and find new sources of revenue) in the host country.

'Process improvement' becomes important for manufacturers to address the constantly changing customer needs (Baines et al., 2009). Although previous studies (Jarvenpaa & Mao, 2008; Lahiri & Kedia, 2009; Taylor, 2004) recognise service specialists' 'process ability' to develop quality management certifications and standardised operational procedures, 'process improvement' in this study further answers how these service specialists perceive their 'process ability' as useful and conducive to customers' offshoring performance. The lack of consideration about the usefulness of capabilities to customers (i.e. manufacturers) occurred to a few respondents of this study: these managers tended to stress their own strengths and capabilities yet were unable to answer how much improvement (e.g. cost savings or legal problems) they could bring to manufacturers' service offshoring performance. Drawing on this knowledge gap, the 'process improvement' capability in this study answers how offshore service specialists could use their expertise and methodologies to help their customers reduce mistakes, redundancies, and wastes and improve the efficiency of customers' business processes by prioritizing or organising tasks and processes. This is different from the previous studies that investigate how much efficiency improvement can a firm's capabilities bring to itself.

While technological capabilities/platforms are mentioned in previous studies (Cenamor et al., 2017; Raddats et al., 2017), these studies primarily focus on the functions and services that technological capability can achieve. However, this study

recognises the problem of ‘service paradox’ (Gebauer et al., 2005) in servitization efforts, suggesting that ‘scalable service-enabling technology’ could the preceding capability for manufacturers’ ‘service-enablement’ capability. In particular, it allows manufacturers and their service delivery centres to increase the scalability and usage of the technological assets for economical concerns. This is particularly true for the technological assets that are not used frequently and could be provided by local service specialists.

‘Service and process innovation’ in this study originates from the servitization literature (Story et al., 2017; Zhang et al., 2016) in terms of manufacturers’ capability to integrate the requisite tools to learn about and meet customers’ service requirements. However, when service offerings become too complex, manufacturers may need to learn from offshore upstream network actors whose innovative capability in specific areas can enable the development and delivery of new services. Therefore, ‘Service and process innovation’ in manufacturers’ non-core areas could be the preceding capability for manufacturers to operationalise and convert innovative opportunities and ideas (Raddats et al., 2017) into marketable service offerings. ‘Product/service customisation’ originates from Valtakoski and Witell (2018) and Story et al. (2017) who suggest that manufacturers need to understand how customers use manufacturers’ products and suggesting customising value-added services. However, achieving customisation in an economical manner can be challenging. In a global market, local upstream network actors are more familiar with local customer needs than a manufacturer does, so their ‘product/service customisation’ capability may not only help the manufacturer to better identify the preferences and predict the needs of end-users and generate ideas for tailored products and services but also tailor products and

services to meet local industrial and regulatory requirements. As such, ‘product/service customisation’ could be the preceding capability for manufacturers to achieve ‘customised insights’ (Story et al., 2017) in an economical manner.

Second, this study evaluates the relative importance of offshore upstream network actors’ operational capabilities on the performance of manufacturers’ service offshoring activities. More importantly, it develops a hierarchy of the seven operational capabilities identified in captive offshoring (Mode 1) and offshore outsourcing (Mode 2) regarding their statistical contribution to manufacturers’ service offshoring contracts (explained in Section 5.5). This hierarchy of operational capabilities may be the first among servitization studies to evaluate the relative importance of upstream operational capabilities on service offshoring performance. The hierarchy extends the limited number of studies that either highlight the importance of interactions between manufacturers and upstream network actors without specifying the operational capabilities developed from such interactions (Finne & Holmström, 2013; Zhou et al., 2020) or fail to clarify which operational capability is the most important for manufacturers to achieve servitization. According to the analysis, ‘security and IP protection protocols’ is the operational capability that contributes the most to service offshoring performance of manufacturers’ service offshoring contracts. This finding is in line with the warning in some service offshoring studies (Parida et al., 2016; Rilla & Squicciarini, 2011; Xie et al., 2016) that offshore business partners may behave opportunistically and jeopardise the performance of service offshoring contracts. The importance of ‘security and IP protection protocols’ also suggests that manufacturers’ service offshoring contracts involve advanced service components that could generate high value-added. This complements the

suggestion of Lewin and Peeters (2006) that firms should not offshore activities related to their core competencies. This thesis suggests that manufacturers are still offshoring critical business processes (e.g. R&D) to upstream network actors and that manufacturers need the capability to protect their trade secrets and IP in offshore locations.

Following 'security and IP protection protocols', the next most important, in order, are 'scalable and well-trained service talents', 'process improvement', 'service and process innovation', 'product/service customisation', 'scalable service-enabling technology', and 'in-country relationship management'. This hierarchy may explain the level of dependence of manufacturers on offshore upstream network actors for complementary operational capabilities. For instance, manufacturers may have a high level of dependence on offshore upstream network actors for 'scalable and well-trained service talents', to provide scalable yet fluctuating service demands in an economical manner. In contrast, manufacturers may have a low degree of dependence on upstream network actors for 'in-country relationship management', which could also be developed through interactions between manufacturers and their downstream customers (Raddats et al., 2017). The hierarchy provides an alternative to the transactional perspectives (e.g. TCE & OLI) that service offshoring literature (Demirbag & Glaister, 2010; Hutzschenreuter et al., 2011; Roza et al., 2011) suggests for manufacturers to make service offshoring decisions. In particular, this hierarchy allows manufacturers to quantitatively assess the importance of each operational capability, reduce their dependence on offshore service specialists for critical capabilities, select operational capabilities according to their needs, and avoid the risks of service paradox.

Third, this study distinguishes the operational capabilities that can develop from captive offshoring (Mode 1) and offshore outsourcing (Mode 2). This allows the author to compare focal manufacturers' choice of service offshoring strategies. The comparison contributes to the service offshoring literature (Hutzschenreuter et al., 2011; Roza et al., 2011) that primarily employ a transaction-based logic to explain firms' service offshoring choices. However, manufacturers' service offshoring activities are more capability-based and relational than transactional, so this study may provide another perspective to explain how manufacturers could achieve strategic targets through interactions with offshore upstream network actors. According to the qualitative stage study, manufacturers may develop 'scalable service-enabling technology', 'service and process innovation', 'in-country relationship management' and 'security and IP protection protocols' from Mode 1, and 'process improvement', 'scalable service-enabling technology', 'scalable and well-trained service talents' and 'product/service customisation' from Mode 2. However, the quantitative stage study only confirmed three differences (i.e. three operational capabilities) between Mode 1 and Mode 2. In particular, the hierarchical multiple regression analysis results suggest that 'scalable service-enabling technology' is more important for Mode 1, while 'scalable and well-trained service talents' and 'service and process innovation' are more important for Mode 2.

Although 'scalable service-enabling technology' was found in both Mode 1 and Mode 2 in the qualitative stage study, the quantitative analysis suggests that this operational capability positively influences the performance of manufacturers' captive offshoring contracts (Mode 1) ($p < .01$), with reference to that of offshore outsourcing contracts

(Mode 2). This difference probably exists because service delivery centres are dually embedded in their parent firms' service networks and offshore business environments, and hence, more informed of parent firms' business processes (Ciabuschi et al., 2014; Demeter et al., 2016; Ferraris et al., 2017). The difference may also be explained by the evolving role of service delivery centres, from passively delivering services to actively developing capabilities to enhance the performance of parent firms. Thus, service delivery centres are now more likely to develop technological assets and infrastructure to support manufacturers' scalable services needs. This finding further justifies the need to explore the capability contribution from the supply side.

In addition, 'scalable and well-trained service talents' is more likely to be developed from offshore outsourcing contracts, as this operational capability positively influences the performance of manufacturers' offshore outsourcing contracts (Mode 2) ($p < .01$), with reference to their captive offshoring contracts. While service delivery centres can access a large number of skilled workers (Mayer et al., 2012), these workers' skills are restricted to specific industries, serving a narrow scope of particular functions or business processes. Advanced services may require employees to be knowledgeable on a more comprehensive set of business processes. According to Mayer et al. (2012), knowledge-intensive services often require focal firms (e.g. manufacturers) to understand the industry environment where the services are delivered. As manufacturers depart from products in favour of services, they and their service delivery centres may not possess the scalable human capital to achieve efficiency in designing and delivering services across various industry sectors. Therefore, focal firms may need to rely on local service specialists to develop the industry-specific human capital to understand the customers' environment and ensure

the compatibility of services. Likewise, operations in offshore business environments need professional services for legal, accounting and IT functions, which are more likely to be delivered by local service specialists.

Surprisingly, the quantitative analysis indicates that ‘service and process innovation’ is more likely to be developed from Mode 2, rather than the hypothesised Mode 1. This surprising finding contradicts previous arguments that service delivery centres 1) may possess more innovation capabilities as they have access to resources from parent firms and offshore business environments (Ferraris et al., 2017) and 2) are more motivated to invest in new technological assets (Cohen & Levinthal, 1990). This contradiction may be attributable to the growing complexity in manufacturers’ service development, such that innovations in services or processes are contingent on external knowledge and capabilities (Archibugi & Coco, 2005; Zhang & Hartley, 2018). The operational capabilities perspective employed in this study provides direct evidence of how each offshoring mode (Mode 1 and Mode 2) affects manufacturers’ service offshoring performance. This complements the strategic-level capabilities (dynamic capabilities) perspective to explain how focal firms change their operational routines to address environmental changes (Helfat & Winter, 2011), rather than how to directly improve performance (Eisenhardt & Martin, 2000).

Fourth, the qualitative stage study identifies in-country outsourcing as a new mode of offshoring (Mode 3), which needs further empirical confirmation. In Mode 3, an offshore service delivery centre that provides service components to its parent firm (a focal manufacturer) outsources some business processes to local service specialists.

Although Mode 3 is briefly mentioned in the literature (Oshri & van Uhm, 2012), little is known about its contribution from that of Mode 2. In Mode 3, local service specialists can be understood as the 'upstream network actor' of offshore service delivery centres. In particular, service delivery centres responsible for new, localised and up-to-date services may proactively seek external capabilities from offshore service specialists, which are often located in specific offshore locations (e.g. business clusters and industrial parks). Through Mode 3, a service delivery centre may develop the capabilities for process improvement, service and process innovation, customisation, and cultural alignment, which could help it to improve efficiencies in offshore operations. Mode 3 also may provide the solution for manufacturers and their service delivery centres to address the issues of supplier opportunism (Xie et al., 2016) and supplier over-dependence issue (Raddats et al., 2017). This study contributes to the importance for service delivery centres and local service specialists to work together to avoid partner opportunism. For instance, 'security and IP protection protocols' can be jointly developed by service delivery centres and local service specialists to enforce specific security protection measures and service levels. 'In-country relationship management' allows both parties to develop trust, which allows timely adaptations and flexibility in the event of emergent situations.

6.3 Managerial contributions

This study explores and tests eight operational capabilities from manufacturers' offshore upstream network actors and provides some insights into how these capabilities might be developed to support manufacturers' service development. The study also confirms the influence of these capabilities on the performance of manufacturers' service offshoring contracts. The results have far-reaching managerial

implications for servitizing manufacturers and their service delivery centres, local service specialists and authorities of offshore business environments. Table 6.2 provides an overview of these implications.

Table 6.2: Overview of managerial implications

Actors	Recommendations
Servitizing manufacturers and service delivery centres	• Consider offshore experience when choosing service offshoring modes. • Consider the transferability of specific operational capabilities when choosing service offshoring modes. • (Service delivery centres) reduce over-dependence on headquarters for operational capabilities development. • (Service delivery centres) develop new capabilities by managing relationships with local service specialists in the form of in-country outsourcing (Mode 3).
Local service specialists	• Work closely with service delivery centres to understand the required capabilities for the service components they are co-developing. • Work closely with local colleges and technical institutes to design and develop customised courses to train and supply scalable technical talents. • Obtain trust from foreign customers (i.e. manufacturers and service delivery centres) through infrastructure investment and co-developing security and IP protection protocols.
Local authorities	• Provide a comprehensive set of infrastructure and hardware support for specific industries. • Introduce research universities and technical institutes to provide capabilities for innovation and human capital.

6.3.1 Implications for manufacturers and service delivery centres

This study provides managerial insights for manufacturers that desire to expand their service offerings. Manufacturers that hope to benefit from servitization should consider the operational capabilities that can help them to support the functions, scales and flexibilities necessary to achieve superior performance. Managers of servitizing manufacturers need to consider which operational capability they lack and via which offshoring mode to develop this capability.

This study suggests that manufacturers should consider the operational capabilities they lack, and more importantly, the offshoring modes develop those capabilities. In particular, manufacturers should consider their experience when choosing service offshoring modes. Firms that are inexperienced in specific offshore locations may face increased operational costs due to the 'liability of foreignness' (Xu & Shenkar, 2002; Zaheer, 1995). This study finds that some manufacturers and their service delivery centres are new entrants to the offshore business environment, and thus must rely more on local service specialists for legitimacy, in-country relationship management, scalability and flexibility, which are critical for short-term performance. In contrast, manufacturers with long experience in an offshore location seem to rely on offshore service delivery centres to develop specific capabilities that formerly came from local service specialists. This internalisation could help manufacturers to reduce over-dependence on offshore service specialists. This study suggests that in addition to offshore experience, manufacturers should also consider the transferability of specific operational capabilities when choosing service offshoring modes. Service offerings with higher value-added may require both customisation and standardisation to manufacturers' business processes (Levesque & Boeck, 2017). Manufacturers may choose to develop capabilities that can be quickly learned (e.g. 'process improvement' and 'scalable service-enabling technology) through captive offshoring; in contrast, manufacturers can develop capabilities that require industrial and professional experience through offshore outsourcing. This study suggests that manufacturers should choose the offshoring modes that allow them to improve performance in specific market situations.

This study also provides managerial insights into manufacturers' offshore service delivery centres. Owing to their over-reliance on headquarters, some service delivery centres in this study are unable to quickly prepare for the changing market needs and competition from local service specialists. When the market for existing services reduces, these service delivery centres are slow to develop new or customised services to meet the new market needs. In this case, offshore service delivery centres are advised to develop new capabilities by interacting with local service specialists. Such interactions can take the form of in-country outsourcing (Mode 3). Service delivery centres may at first rely on local service specialists to obtain licenses for expanded service offerings, develop complementary capabilities to tailor products and services to suit specific markets and gradually internalise business processes for competitive advantage. The competition and cooperation (coopetition) relationship between some service delivery centres and service specialists in this study suggest that simply monitoring and preventing local service specialists' opportunistic behaviours (Nordin, 2008) is not enough. Instead, this study advises that service delivery centres encourage long-term commitment through trust-building and inter-personal relationships between managers. Mode 3 may also allow service delivery centres to co-develop security and IP protection protocols. This study finds that such protocols practised by local service specialists could contribute to the performance of service offshoring contracts. Meanwhile, some service delivery centres in this study tried to reduce over-dependence by developing some operational capabilities (e.g. product/service customisation) that used to come from local service specialists. Managers of service delivery centres could consider this effort after their firms become experienced in offshore markets.

6.3.2 Implications for local service specialists

Servitizing manufacturers and their service delivery centres need complementary capabilities from offshore service specialists. This study recommends that the offshore service specialists should 1) work closely with service delivery centres to understand the required capabilities for the service components they are co-developing and 2) work closely with local colleges and technical institutes to design and develop customised courses to train and supply scalable technical talents. These measures are important as they could help local service specialists to embed into manufacturers' offshore service networks and upgrade their capabilities and profits to address rising operational costs (e.g. labour costs) in the local market. In addition, local service specialists should integrate a Western managerial style (Pheng & Leong, 2001) into training courses, so that local employees can quickly adapt to the work requirements of foreign customers (i.e. manufacturers and service delivery centres). According to this study, preparing Chinese employees for a Western managerial style seems important to improve the work efficiency of local service specialists and customer satisfaction.

Moreover, this study suggests several ways for offshore service specialists to develop and maintain trust from foreign customers. First, offshore service specialists could have their service systems and processes certified by the International Organization for Standardization (ISO) to prove their quality, safety and efficiency. Second, maintaining physical proximity and face-to-face communication could help build trust and avoid misunderstandings. Proximity is particularly important for service offshoring contracts that involve customers' trade secrets. Capable service specialists should also invest in specific infrastructure to meet customers' service needs and, more

importantly, demonstrate their commitment to long-term relationships with customers. With well-maintained relationships and trust, local service specialists are likely to convince foreign customers to offshore more business processes of higher value and improve profits.

6.3.3 Implications for local authorities

This study has implications for local authorities that have invested in infrastructure and developed preferential policies to attract manufacturers' service delivery centres and local service specialists. First, local authorities should provide a comprehensive set of infrastructure and hardware support for specific industries. As this study suggests, well-equipped industrial parks could provide capabilities to allow manufacturers to turn ideas into scalable services. While some industrial parks have highlighted cutting-edge technologies and public infrastructure, they still lack local service specialists that cover a comprehensive service network. This incomplete service network could negatively affect some manufacturers' offshoring decisions. In other words, authorities could consider building specialised industrial parks that provide an extensive set of operational capabilities for manufacturers; for example, BioBAY[11] in Suzhou supports the fields of drug discovery, medical devices and diagnostics, biotechnology, nanotechnology and contract research (CRO). Second, local authorities should consider introducing research universities and technical institutes to provide capabilities for innovation and scalable and well-trained service talents. According to this study, research universities can assess and develop prototypes for manufacturers' service ideas, while technical institutes can recruit and

[11] http://en.biobay.com.cn/about/?67.html

train scalable and flexible skilled labour to support actors in local business environments.

6.4 Limitations and future research

Constraints in time and resources led to four limitations in this study; these limitations suggest directions for future research.

First, it is desirable to measure the performance of manufacturers' service offshoring contracts in an objective manner, as subjective performance evaluations from upstream network actors may not perfectly reflect the actual performance of manufacturers' service offshoring performance. However, it was hard for the author to obtain firms' actual performance, as such data are often treated as trade secrets and possessed by manufacturers. As such, this study used performance measures and matrices according to respondents' perceptions. The literature recognises subjective perceptual measures from managers as accurate, though imperfect, surrogates of objective performance measures (Dess & Robinson, 1984). However, respondents' evaluations of the performance of service offshoring contracts might be biased. Future studies could consider using publicly available data, such as the financial reports disclosed by publicly listed firms.

Second, this study only evaluated the performance based on the perception of offshore upstream network actors' perspective. The overall performance of manufacturers' service offerings could also include the measurements from the manufacturers' perspective. Although managers from the qualitative study stressed that KPIs could objectively reflect their firm-level contribution to the performance of manufacturers,

adding performance measurements from manufacturers could contribute to a more thorough evaluation of manufacturers' operational performance. Future research could include upstream network actors, servitizing manufacturers and downstream customers to develop a fuller picture of the sources and impacts of operational capabilities on the performance of manufacturers' servitization activities. In addition, including manufacturers could allow the researcher to compare the dynamic capabilities developed from manufacturers' service offshoring activities, as well as the contribution of in-country outsourcing (Mode 3) towards manufacturers' performance.

Third, this study generally assumes a direct relationship between operational capabilities from upstream network actors and the performance of manufacturers' service offshoring contracts, with limited moderating effects from offshoring modes. However, operational capabilities might interact with each other in a non-linear manner, in combination with potential moderating and mediating effects. Therefore, future studies could adopt different research techniques (e.g. in-depth interviews and Qualitative Comparative Analysis (QCA)) to develop refined results.

Fourth, this study focuses on servitization in an offshore context, which may miss how offshore activities contribute to manufacturers' servitization efforts in onshore markets. Future studies could compare manufacturers' servitization activities in onshore and offshore markets to further determine the shared and distinct relationships between motivations, actors, operational capabilities and performance, as well as the mechanisms during these activities.

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Appendices

Appendix 1: Interview invitation in the qualitative stage

Zhuang Ma

全部答复

周日 2016/6/5, 17:52

a.walschewski@ceramtec.de; Meng.Wang1402

Hello Alex,

My name is Steed Zhuang Ma, and I am a PhD student in management from Xi'an Jiaotong-Liverpool University. I have heard about your company and obtained your business card from one of my PhD colleague (Mona Meng Wang). I hope to conduct an interview to you regarding the operations and management of your company. I would be very grateful if you can spare 30 minutes and accept my request for interview.

I am currently conducting a research on service management and business process outsourcing in such fields as Bio-Medical R&D, Financial Service, Manufacturing, Test & Inspection, and MNC Shared Service Center, etc. The current stage of my research involves interviews to 20 companies in SIP, and the next stage will involve surveys to 500 enterprises in the Yangtze River area.

In return, I would be happy to present the findings of our project in your company when it is finished.

If you are too occupied with work, could you please recommend one of your colleagues to me?

Appendix 2: Presentations at Suzhou Industrial Park Institute of Service Outsourcing (SISO) in May and July of 2018

Appendix 3: Respondent and secondary data details

(Note: One person interviewed for each company; DS= directly servicing customers; DM= decision-making in administering contracts with customers)

Offshoring modes (Headquarter location)	Service sectors	Interviewee position (involvement in service offshoring contracts)	Secondary data (No. of documents)
Captive offshoring (Mode 1)			
M1-1 (USA)	Backoffice	Operations manager (DS)	Research paper (1) Industrial reports (4)
M1-2 (Italy)	Shared service centre	General manager (MD)	Company profile (1) Industrial report (1)
M1-3 (USA)	R&D	Supply chain manager (DS)	Company profile (1) Industrial report (1)
M1-4 (Singapore)	Consulting	Branch manager (DS)	Company profile (1) Industrial report (1)
M1-5 (Germany)	R&D	Operations manager (DS)	Company profile (1) President's speech slides (1) Company case study (1)
M1-6 (USA)	Back office	Operations manager (DS)	Company profile (1) Industrial report (1)
M1-7 (France)	Shared service centre	Supply chain manager (DS)	Research paper (1) Company case study (1) Industrial reports (4)
M1-8 (Germany)	R&D	Operations manager (DS)	Company profile (1)
M1-9 (Taiwan, China)	Shared service centre	Operations manager (DS)	Company profile (1)
M1-10 (Singapore)	Shared service centre	Operations manager (DS)	Company case study (1) Industrial reports (1)
Offshore outsourcing (Mode 2)			
M2-1 (China)	Background support	Human resource manager (DS)	Company profile (1) Company case study (5)
M2-2 (China)	R&D	General manager (DM)	Company Profile (1)
M2-3 (China)	ACG & creative	CEO (DM)	Company Profile (1)
M2-4 (China)	Professional	Chief engineer (DS)	Company Profile (1)
M2-5 (China)	Software, cloud computing, & background support	General manager (DM)	Company case study (1) Industrial reports (1)

Offshoring modes (Headquarter location)	Service sectors	Interviewee position (involvement in service offshoring contracts)	Secondary data (No. of documents)
M2-6 (China)	Background support	Operations manager (DS)	□ Company profile (1) □ Industrial report (1)
In-country outsourcing (Mode 3)			
M3-1 (China)	Bio-R&D	CEO (DM)	□ Company profile (1)
M3-2 (China)	Software, R&D	Administrative director (DM)	□ Company profile (1)
M3-3 (China)	Bio-testing	Deputy general manager (DM)	□ Company profile (1)
M3-4 (China)	Financial background	Human resource manager (DS)	□ Company profile (1) □ President's speech script (1)
M3-5 (China)	Cloud Computing & background support	Marketing manager (DS)	□ Company profile (1) □ President's speech script (1)
M3-6 (China)	Back office	General manager (DM)	□ Company profile (1)
M3-7 (China)	Data services	CTO (DS)	□ Company profile (1) □ Manager’s speech script (1)
M3-8 (China)	Training & coaching	President (DM)	□ Company profile (1)
M3-9 (China)	IT-testing	Operations manager (DS)	□ Company profile (1)
M3-10 (China)	R&D	President (DM)	□ Company profile (1)
Total		**26 interviews**	**51 documents**

Appendix 4: Constructs and corresponding items

Constructs (References)	Items	Item code
Process improvement (PI) (Koval et al., 2018; Tomic et al., 2017)	My company is able to remove non-value-added activities (e.g. unnecessary steps, delays, underused resources, or excessive inventory) from customers' processes.	PI1
	My company uses proven methodologies (e.g. total quality management, lean, six sigma) to enhance customers' business processes.	PI2
	My company's top management team members pay attention to improving our customers' business processes.	PI3
	My company regularly communicates with our customers to learn about their business process goals.	PI4
	My company regularly communicates customers' business goals to all employees.	PI5
	My company regularly communicates customers' key performance indicators (KPIs), such as customers' system reliability, quality and response time against service level agreements within the organisation.	PI6
Scalable service-enabling technology (SST) (Zhang & Hartley, 2018)	My company has scalable IT tools such as hardware and operating systems which allow us to manage variable customer requirements.	SST1
	My company has IT facilities that are compatible with almost all our customers' IT environments.	SST2
	My company has specialized equipment which can be scaled to manage variable customer requirements.	SST3
	My company has scalable service infrastructure such as laboratories/offices, which allow us to manage variable customer requirements.	SST4
Scalable and well-trained service talents (SWS) (Sharabati et al., 2010)	My company is able to recruit employees in suitable numbers to address the needs of our customers.	SWS1
	My company's employees have the expertise and experience to meet the needs of our customers.	SWS2
	My company is able to continuously update and develop employees' knowledge and skills through training to address the needs of our customers.	SWS3
	My company is able to retain qualified employees to address the needs of our customers.	SWS4
	My company has enough qualified employees to match the variable needs of our customers.	SWS5
Service and process innovation (SPI) (Lin, 2007)	My company is able to rapidly develop new ideas to address our customers' needs.	SPI1
	My company is able to explore new opportunities to provide innovative services for our customers.	SPI2
	My company is able to study our customers' future market needs.	SPI3
	My company is able to develop innovative services to support our customers' functional tasks such as engineering, operations and marketing.	SPI4
	My company efficiently and rapidly uses information from different resources to develop new services for our customers.	SPI5
	My company supports and encourages workers to participate in innovative activities such as service development and idea generations.	SPI6
Product/service customization (PSC) (Liu & Deitz, 2011)	Our service design process has been modified and extended to better serve the needs of our customers.	PSC1
	My company is able to provide customized services to our customers.	PSC2
	My company is able to quickly respond to our customers'	PSC3

Constructs (References)	Items	Item code
	customization requirements.	
	My company is able to provide customized services to our customers without compromising quality.	PSC4
	My company is able to provide customized services to our customers without increasing prices	PSC5
In-country relationship management (IRM) (Pham et al., 2017)	My company has relationships with local companies who can help improve our business processes.	IRM1
	My company has relationships with local government bodies who can help improve our business processes.	IRM2
	My company has relationships with local research institutions such as universities and technical institutes who can help improve our business processes.	IRM3
	My company is able to develop new relationships with local companies who can help improve our business processes.	IRM4
	My company is able to develop mutual trust with local companies.	IRM5
Security and IP protection protocols (SIP) (Zaied, 2012)	My company has processes to protect trade secrets from inappropriate use inside the organization.	SIP1
	My company has processes to protect trade secrets from inappropriate use outside the organization.	SIP2
	My company has technology that restricts access to trade secrets.	SIP3
	My company has extensive policies and procedures for protecting trade secrets.	SIP4
Performance (OP) (Liu et al. 2018; Wu et al., 2010)	Our sales are growing strongly.	OP1
	Our profits are growing strongly.	OP2
	We are growing our customer base in this market.	OP3
	We are saving our customers money.	OP4
	We are helping our customers to deliver improved services to end-users.	OP5
	We are helping our customers to meet their key performance indicators (KPIs) (e.g. customers' system reliability, quality and response time against service level agreements).	OP6

Appendix 5: Final questionnaire for this study

Thank you for taking the time to complete this survey about service offshoring. The survey is part of my PhD project at Xi'an Jiaotong-Liverpool University. It aims to investigate the operational capabilities of offshoring firms that are operating in the five cities of the Yangtze River Delta Area (Hangzhou, Nanjing, Shanghai, Suzhou and Wuxi). We hope to provide some theoretical guidance and managerial suggestions for domestic and international firms undertaking service offshoring activities in China. The survey should take no more than 30 minutes to complete. Your responses are confidential and will only be available to the four academics running this research project. To ensure anonymity, only aggregated findings and anonymous quotations will be used for academic and managerial publications. No individual or company will be identifiable in these publications. Please answer all the questions. If you are interested in this research, contact 15995841053 or zhuang.ma@xjtlu.edu.cn, and I am happy to share a copy of the managerial findings to you.

Instructions:

'Service offshoring' in this survey refers to situations where 1) an onshore manufacturer relocates service needs such as R&D, data analysis, software testing, engineering techniques and management consulting to its service delivery centres or local service specialists in China, or 2) an onshore manufacturer's service delivery centre in China outsources the above service needs to local service specialists.

For a manufacturer's offshore service delivery centre, the term 'customer' refers to the onshore focal manufacturer (captive offshoring). For an offshore outsourcing specialist, the term 'customer' refers to the onshore focal manufacturer (offshore outsourcing).

Please complete all sections of the survey. You can go back at any time to revise your answers.

Section I. Basic information

1. Company location
○ Hangzhou
○ Nanjing
○ Shanghai
○ Suzhou
○ Wuxi

2. Year of establishment
○Before 2000
○2001-2005
○2006-2010
○2011-2015
○2016-present

4. What is your company's ownership structure like?
○100% Chinese
○ 100% non-Chinese
○ Others (Please specify)

5. What best describes your job title?
○General Manager
○Marketing Manager
○Operations Manager

○Technical Manager
○Human Resource Manager
○Others (pls specify)

6. How many years have you been working in this company?
○Less than 2 years
○2-5 years
○5-10 years
○Over 10 years

SECTION II. Please indicate your agreement with each of the following statements: '1' means you strongly disagree; '7' you strongly agree; '4' you neither agree nor disagree and numbers in between indicate less strong views. If you wish to make any additional comments about your responses for clarification, please do so in the box at the end of the survey.

1. Process improvement

1a. My company is able to remove non-value-added activities (e.g. unnecessary steps, delays, underused resources, or excessive inventory) from customers' processes.

○1 ○2 ○3 ○4 ○5 ○6 ○7

1b. My company uses proven methodologies (e.g. total quality management, lean, six sigma) to enhance customers' business processes.

○1 ○2 ○3 ○4 ○5 ○6 ○7

1c. My company's top management team members pay attention to improving our customers' business processes.

○1 ○2 ○3 ○4 ○5 ○6 ○7

1d. My company regularly communicates with our customers to learn about their business process goals.

○1 ○2 ○3 ○4 ○5 ○6 ○7

1e. My company regularly communicates customers' business goals to all employees.

○1 ○2 ○3 ○4 ○5 ○6 ○7

1f. My company regularly communicates customers' key performance indicators (KPIs) (e.g. customers' system reliability, quality and response time against service level agreements) within the organisation.

○1 ○2 ○3 ○4 ○5 ○6 ○7

2. Scalable service-enabling technology

2a. My company has scalable IT tools such as hardware and operating systems which allow us to manage variable customer requirements.

○1 ○2 ○3 ○4 ○5 ○6 ○7

2b. My company has IT facilities that are compatible with almost all our customers' IT environments.

○1 ○2 ○3 ○4 ○5 ○6 ○7

2c. My company has specialised equipment which can be scaled to manage variable customer requirements.

○1 ○2 ○3 ○4 ○5 ○6 ○7

2d. My company has scalable service infrastructure such as laboratories/offices, which allow us to manage variable customer requirements.

○1 ○2 ○3 ○4 ○5 ○6 ○7

3. Human capital

3a. My company is able to recruit employees in suitable numbers to address the needs of our customers.

○1 ○2 ○3 ○4 ○5 ○6 ○7

3b. My company's employees have the expertise and experience to meet the needs of our customers.

○1 ○2 ○3 ○4 ○5 ○6 ○7

3c. My company is able to continuously update and develop employees' knowledge and skills through training to address the needs of our customers.

○1 ○2 ○3 ○4 ○5 ○6 ○7

3d. My company is able to retain qualified employees to address the needs of our customers.

○1. ○2 ○3 ○4 ○5 ○6 ○7

3e. My company has enough qualified employees to match the variable needs of our customers.

○1 ○2 ○3 ○4 ○5 ○6 ○7

4. Service and process innovation

4a. My company is able to rapidly develop new ideas to address our customers' needs.

○1 ○2 ○3 ○4 ○5 ○6 ○7

4b. My company is able to explore new opportunities to provide innovative services for our customers.

○1 ○2 ○3 ○4 ○5 ○6 ○7

4c. My company is able to study our customers' future market needs.

○1 ○2 ○3 ○4 ○5 ○6 ○7

4d. My company is able to develop innovative services to support our customers' functional tasks such as engineering, operations, and marketing.

○1 ○2 ○3 ○4 ○5 ○6 ○7

4e. My company efficiently and rapidly uses information from different resources to develop new services for our customers.

○1 ○2 ○3 ○4 ○5 ○6 ○7

4f. My company supports and encourages workers to participate in innovative activities such as service development and idea generations.

○1 ○2 ○3 ○4 ○5 ○6 ○7

5. Product/service customisation

5a. Our service design process has been modified and extended to better serve the needs of

our customers.

○1 ○2 ○3 ○4 ○5 ○6 ○7

5b. My company is able to provide customised services to our customers.

○1 ○2 ○3 ○4 ○5 ○6 ○7

5c. My company is able to quickly respond to our customers' customization requirements.

○1 ○2 ○3 ○4 ○5 ○6 ○7

5d. My company is able to provide customised services to our customers without compromising quality.

○1 ○2 ○3 ○4 ○5 ○6 ○7

5e. My company is able to provide customised services to our customers without increasing prices.

○1 ○2 ○3 ○4 ○5 ○6 ○7

6. In-country relationship management

6a. My company has relationships with local companies who can help improve our business processes.

○1 ○2 ○3 ○4 ○5 ○6 ○7

6b. My company has relationships with local government bodies who can help improve our business processes.

○1 ○2 ○3 ○4 ○5 ○6 ○7

6c. My company has relationships with local research institutions such as universities and technical institutes who can help improve our business processes.

○1 ○2 ○3 ○4 ○5 ○6 ○7

6d. My company is able to develop new relationships with local companies who can help improve our business processes.

○1 ○2 ○3 ○4 ○5 ○6 ○7

6e. My company is able to develop mutual trust with local companies.

○1 ○2 ○3 ○4 ○5 ○6 ○7

7. Security and IP protection protocols

7a. My company has processes to protect trade secrets from inappropriate use inside the organisation.

○1 ○2 ○3 ○4 ○5 ○6 ○7

7b. My company has processes to protect trade secrets from inappropriate use outside the organisation.

○1 ○2 ○3 ○4 ○5 ○6 ○7

7c. My company has technology that restricts access to trade secrets.

○1 ○2 ○3 ○4 ○5 ○6 ○7

7d. My company has extensive policies and procedures for protecting trade secrets.

○1 ○2 ○3 ○4 ○5 ○6 ○7

8. Reflecting on the performance of your contracts with your customers, please answer the following: (1: strongly disagree; 4: neither agree nor disagree; 7: strongly agree).

8a. Sales are growing strongly.

○1 ○2 ○3 ○4 ○5 ○6 ○7

8b. Profits are growing strongly.

○1 ○2 ○3 ○4 ○5 ○6 ○7

8c. We are growing our customer base in this market.

○1 ○2 ○3 ○4 ○5 ○6 ○7

8d. We are saving our customers money.

○1 ○2 ○3 ○4 ○5 ○6 ○7

8e. We are helping our customers to deliver improved services to end-users.

○1 ○2 ○3 ○4 ○5 ○6 ○7

8f. We are helping our customers to meet their key performance indicators (KPIs) such as customers' system reliability, quality and response time against service level agreements.

○1 ○2 ○3 ○4 ○5 ○6 ○7

SECTION III. Classification questions

9a. Our company's services belong to this sector

○Cloud computing
○Software R&D & testing
○Integrated Circuit and Electronic Circuit design
○Logistics & supply chain management
○E-commerce platform
○Big data analysis
○Industry design
○Engineering technology
○Management consulting
○Medical and biological R&D
○Information technology solutions
○Culture & Creative Services
○MNC shared services
○Financial & banking
○HR
○Call centre
○Others (please specify)）

9b. Organisation size （Current number of employees）

○51-100
○101-500
○501-1000

○1001-5000

○5001-10000

○>10001

9c. Are there any other comments you would like to make about your responses or the survey in general?

_____

This is the end of the questionnaire.

Thank you for your support!

Appendix 6: Cover letter for the survey

Dear participant,

My name is Zhuang MA, a PhD student at Xi'an Jiaotong-Liverpool University. For my PhD project, I am examining how service offshoring could help firms develop operational capabilities. Because you are working in the offshoring company, I am inviting you to participate in this research study by completing the survey in the following link: https://www.wjx.cn/jq/33706532.aspx

The questionnaire will require approximately 30 minutes to complete. There is no compensation for responding nor is there any known risk. To ensure that all information will remain confidential, please do not include your name. Copies of the project will be provided to my supervisors from Xi'an Jiaotong-Liverpool University and the University of Liverpool. If you choose to participate in this project, please answer all questions as honestly as possible and submit the completed questionnaire after you finish. Participation is strictly voluntary, and you may refuse to participate at any time.

Thank you for taking the time to assist me in my research endeavours. If you would like a summary copy of this study, please contact me 15995841053 or zhuang.ma@xjtlu.edu.cn.

Sincerely,

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Appendix 7: Kolmogorov-Smirnov (K-S) normality test results

Items	K-S Statistic	S.D.	Sig
PI1	.257	1.319	.000
PI2	.149	1.362	.000
PI3	.160	1.376	.000
PI4	.214	1.395	.000
PI5	.153	1.286	.000
PI6	.151	1.315	.000
SST1	.220	1.041	.000
SST2	.208	0.986	.000
SST3	.214	1.092	.000
SST4	.220	0.978	.000
SWS1	.187	1.048	.000
SWS2	.205	1.133	.000
SWS3	.187	1.131	.000
SWS4	.196	1.158	.000
SWS5	.167	1.227	.000
SPI1	.185	1.303	.000
SPI2	.174	1.495	.000
SPI3	.168	1.584	.000
SPI4	.174	1.481	.000
SPI5	.162	1.666	.000
SPI6	.191	1.412	.000
PSC1	.206	1.310	.000
PSC2	.187	1.520	.000
PSC3	.216	1.523	.000
PSC4	.237	1.494	.000
PSC5	.188	1.358	.000
IRM1	.184	1.607	.000
IRM2	.201	1.485	.000
IRM3	.209	1.556	.000
IRM4	.187	1.639	.000
IRM5	.209	1.576	.000
SIP1	.145	1.675	.000
SIP2	.204	1.567	.000
SIP3	.209	1.521	.000
SIP4	.239	1.403	.000
OP1	.184	1.846	.000
OP2	.178	1.804	.000
OP3	.203	1.945	.000
OP4	.193	1.869	.000
OP5	.185	1.863	.000
OP6	.188	1.882	.000