

Strategic fit of service supply chains

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“To my Ammumma”

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Raveen R. Menon

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Abstract

Supply chain fit is one of the foundational tenets of supply chain management. It refers to an enabling of the right supply chain for a given product, namely, having responsive supply chains for innovative goods or turbulent markets and efficient supply chains for functional goods or stable markets. Building on this foundation, the supply chain fit literature has predominantly sought to align firms' demand variables (for example, product life-cycle, product variety, volume) with certain supply chain variables (inventory, product design, supplier selection, etc.) in goods context. Despite the significant role that services play in the global economy, however, there has been minimal scholarship on the service firm/supply chain equivalent to this concept; namely, fit-for-purpose frameworks for *service supply chains*.

A systematic literature review of the supply chain fit literature revealed opportunities to extend existing frameworks to predominantly service-focused firms. A qualitative study involving interviews with managers of service firms supports the findings of the review and found that the prime focus on intangible skills and knowledge (operant) resources in service-dominant logic is rarely studied in the context of service supply chains. Further analysis of interview data using Gioia methodology identified a set of operant resources and certain service supply chain variables relevant to service firms. The findings of the qualitative study form the basis for a new '*service supply chain fit*' framework.

Extending the concept of strategic fit to the service supply chain and by aligning it with the operant resources using a resource-based view of firms, this study formalizes a view of fit. This thesis defines *service supply chain fit as the strategic consistency between a firm's operant resources and its supply chain*. In the research model, service supply chain acts as both moderator and mediator vis-à-vis the three service supply chain characteristics – responsiveness, efficiency, and agility – and positively affects the relationship between operant resources (namely, innovative, efficient, and innovative-efficient) and firm performance.

This thesis developed a survey scale to measure the firm's operant resources. Two sets of academic experts tested the questionnaire for validity, and it was followed by a pilot study of survey with top managers of service firms. An exploratory factor analysis identified poor-performing items and helped finalize the scale. The study conducted a two-

stage data collection in Amazon's Mechanical Turk (MTurk) and Qualtrics with added attention checks and a scenario-based experiment (to ensure the data quality). The final dataset showed high reliability and a confirmatory factor analysis of the scale showed high convergent and discriminant validity.

The analysis indicated that the interaction between operant resources and service supply chain characteristics increased after a particular value for both moderators - service supply chain responsiveness and service supply chain efficiency, showing a strong impact of service supply chain fit on firm performance. On the other hand, the results showed that innovation-efficiency operant resources indirectly affected firm performance through service supply chain agility as a mediator. Thus, this thesis demonstrates how the degree of 'fit' between operant resources and service supply chain characteristics impacts firm performance. By revealing the positive effect of service supply chain fit on firm performance, the findings help managers to develop profitable strategies by identifying the right supply chain (agile, responsive, or efficient) for their services based on their operant resources.

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Chapter 1

Introduction

Service supply chains (also called service chains) are different, in key ways, from traditional ‘goods supply chains’. Yet in most prior research, the strategic frameworks, and resources that underpin these two supply chain types, are treated as conceptually the same. Although service supply chains are considered the next frontier of competitive advantage (Sampson and Spring, 2012), most strategic supply chain frameworks are designed with tangible product supply chains in mind (Stavrulaki and Davis, 2014). Whilst a goods-centric view of supply chains has some applicability to services, its key limitation is a focus on operand, rather than operant resources. Operant resources are those which act on operand resources to produce effects (Constantin and Lusch, 1994), are mostly invisible and intangible (Vargo and Lusch, 2004), and are the main source of competitive advantage to service supply chains. For services, the core competencies of the organization are not its physical assets, but rather “bundles of skills and technologies” (Hamel and Prahalad, 1994, p. 202), which are essentially operant resources (Vargo and Lusch, 2004).

The preeminent role of services in the global economy (IMF, 2018) necessitates frameworks designed specifically for service supply chains, with a focus on service-relevant strategic performance objectives namely, speed, variety, quality, cost of service (Ellram, Tate and Billington, 2004). According to service-dominant logic, operant resources – rather than operand resources – are the highest order resources or organizational competencies (Hunt, 2000). “Operand resources are mostly physical (for example, raw materials), whereas operant resources are human (for example, skills and knowledge of individual employees), organizational (for example, controls, routines, cultures, and competences), informational (for example, knowledge about market segments, competitors, and technology) and relational (for example, relationships with competitors, suppliers, and customers)” (Madhavaram and Hunt, 2008, p. 67). However, prior work on strategic fit between organisation and supply chain, such as Fisher’s (1997) framework, emphasize the criticality of ‘fit’ between a firm’s products and its supply chain

characteristics. While this has produced a relevant body of work on strategic fit for manufacturing supply chains (e.g., Wagner, Grosse-Ruyken and Erhun (2012)), limited research has sought to extend service-focused notions of fit, or assess the importance of fit, to service supply chains (Stavrulaki and Davis, 2014).

Recent global dynamism, including the COVID-19 pandemic, has disrupted economies worldwide and forced a fundamental rethink of long-standing business models for supply chains. While most firms have struggled to survive, a handful – particularly service firms – have become more profitable during the pandemic. Agile supply chains focused on collaboration and transparency and greater flexibility in capabilities have experienced high survival rates during the pandemic (Sharma, Adhikary and Borah, 2020). For example, Meddo, an Indian health care digital application, initially rolled out in September 2018, onboarded a significant number of investors and clinics by February 2020 (Chick, Aggarwal and Brandwein, 2021). By the time pandemic hit India in January 2020, Meddo had served 300 clinics and 2.5 Million patients with a growth rate of 300% in four months. Building on its digital platform, Meddo continued its service delivery using its telemedicine platform and 24/7 video consultations. Meddo could sustain its growth during the pandemic and generate sales growth similar to pre-Covid levels.

Similarly, China Minsheng Bank and Slack leveraged their employees' knowledge base and skills to respond quickly and adapt their services during the early stages of the pandemic (Butterfield, 2020; Panetta, 2020). In each of these cases, service firms that were unconstrained by physical products and able to draw on intangible, unique resources were capable of responding rapidly during a major crisis. Along with other substantial examples of service firms leveraging their operant resources for survival and success, including adaptable procurement processes, there is scope for a substantial re-think of what enables service firms along with their supply chains, to succeed. We propose that events such as COVID should further enliven debate on the extent to which product-focused supply chain frameworks based on operand resources are sufficient to describe and advance the strategies of service firms.

Research on operations strategy and its implications for firm performance are well defined in the operations management literature, yet its extension to the supply chain context has emerged only recently (Wagner et al., 2012). Equally, much of this prior work aligns firms' demand characteristics (such as product life-cycle, product variety, volume)

to their supply chain characteristics (such as inventory, product design and supplier selection), with limited discussion of how intangible, operant resources fit with supply chain strategy (Luo and Yu, 2016; Hult, Ketchen Jr, Cavusgil and Calantone, 2006; AlHusain and Khorramshahgol, 2018; Gligor, 2017). This has key implications for services given they have a greater reliance on such resources. Prior work regarding the resource-based view of firms in particular, has largely neglected operant resources as a source of competitive advantage (focusing only on resources broadly) (Wernerfelt, 1984). Resource-based view is firm-specific and is mainly applied to goods-focused contexts. Thus, the shift from operand-based logic to operant-based logic necessitates a shift from goods-specific resource-based view, to a service-specific view of resource-based view, which enables the incorporation of a more service-dominant logic in any frameworks that are based on resource-based view of firms.

Fisher's (1997) strategic fit framework has been one of the foundational tenets of supply chain management. It refers to an enabling of the right supply chain for a given product; for example, having a responsive supply chain for innovative goods or turbulent markets and efficient supply chains for functional goods or stable markets. Additionally, Gligor (2016) conceptualized supply chain agility by understanding the need for supply chains to be both responsive as well as efficient, especially to cater to the needs of volatile markets during disruptions. Despite the predominant role that services play in the global economy, there has been minimal scholarship on the service firm/supply chain equivalent to this concept; namely, fit-for-purpose frameworks for service supply chains. The supply chain fit literature has predominantly sought to align the firms' demand variables (for example, product life-cycle, product variety, volume) with certain supply chain variables (inventory, product design, supplier selection, etc.) (Boone, Craighead, Hanna and Nair, 2013; Li and O'Brien, 2001; Morita and Machuca, 2018; Selldin and Olhager, 2007; Christopher, Peck and Towill, 2006), with a focus on operand resources. A few recent empirical studies have stressed upon the need to "fit" firms' operant resources with their supply chain strategy (AlHusain and Khorramshahgol, 2018; Schmidt and Wagner, 2019; Gligor, Feizabadi, Russo, Maloni and Goldsby, 2020). However, for the most part, frameworks that guide service firms in evaluating their strategies and aligning resources with their service supply chain are absent in the extant literature. Specifically, the concept of agility – an essential characteristic of supply chain operations during disruptions – is yet to be introduced into services.

This gap – while understandable given the evolution of supply chain frameworks out of a fundamental physical product-focus – suggests a substantial rethink to develop more service-oriented frameworks for supply chains focused on responsiveness, efficiency, and agility with intangible strategic resources at their core. As such, this thesis builds on Fisher’s (1997) strategic fit concept and develop a service supply chain fit model using service-dominant logic, places operant resources as the core competency of service firms (Vargo and Lusch, 2004).

Thus, the research model is based on operant resources, which are a firm’s prime source of competitiveness (Vargo and Lusch, 2004), and incorporates responsiveness, efficiency, and agility (Fisher, 1997; Gligor, 2016) into service supply chains. This thesis seek to answer the following research question: *What is the right service supply chain for service firms, based on their operant resources?* Existing frameworks that provide firms with suitable guidance on “fitted” solutions between their operant resources and their supply chain remain under-developed (Vural, 2017). The research model facilitates effective use of a firms’ resources in order to better align strategic resource objectives (as opposed to just production objectives) with service supply chain (Ellram et al., 2004). It thus aligns firms’ operant resources with their service supply chains.

This study follows a sequential mixed-method approach (Creswell and Clark, 2017), where the first part – qualitative study – explores the role of operant resources in service supply chains (Golicic and Davis, 2012). This identified a set of service supply chain variables and operant resources, and found that operant resources (not operand resources) are the primary source of competitive advantage. In the second study of the sequential mixed-method approach, this thesis hypothesizes a model of service supply chain fit to investigate the relationship between service supply chain fit and firm performance, which is then validated through survey research, and the thesis further identifies the role of service supply chain fit as both moderator and mediator.

This thesis provides a view of strategic fit between organisation and supply chain that both: (i) extends the concept of service-dominant logic to service supply chains, and (ii). better aligns service dominant logic with a resource-based view of firms and their supply chains. This thesis provides strategic insight as to why (and which) operant resources specifically, are critical to value creation by firms in the context of their supply chains. The primary contribution is to elevate service-relevant operant resources in the discussion of

strategic supply chain fit, which has focussed largely on goods-centric supply chains and operand resources. The study develops a concept of service supply chain fit, based on the strategic consistency between a firm's operand resources and supply chain characteristics. In prior discussions of supply chain fit, there is a lack of research specific to the intangibility of resources that support services – this work demonstrates a need for an improved discussion of the importance of fit between a firm's intangible resources and its supply chain (and not just demand characteristics), adding to a much-needed process-oriented views of supply chains. This thesis also contributes to valuable discussion of operand resources, particularly for service firms, and their alignment with supply chain characteristics. Finally, for resource-based view specifically, this study provide support for the role of operand resources (and not just 'resources') in value creation by service firms, which allows an integration of a service-dominant logic into frameworks based on resource-based view.

A service supply chain fit framework encompassing operand resources has both theoretical and managerial implications. Supply chain fit framework is ought to cover firm variables which are not just demand specific, but also variables that span throughout the firm which are intangible in nature. Operand resources rightly address these issues from a holistic conceptual perspective and naturally hold a key position in service supply chains. By understanding the impact of service supply chain fit on firm performance, this thesis can serve as a guideline for firm managers to outperform their competitors. A profound input on firm resources – what to develop and where to invest – is a much-needed value addition for service firms. “Goods are just means for service provisions” (Vargo and Lusch, 2004), and therefore, by viewing all firms as service firms, irrespective of what the output is (goods or services), this thesis endorse a different but effective way of behavioral change in the managerial assessment of firms.

The framework of service supply chain fit based on operand resources applies to all service firms in general. Therefore, for the qualitative and quantitative study, this thesis collected data from service firm managers of all types, such as banking, information technology, research & development, consultancy, healthcare, hospitality, technical service, etc. Finally, the findings and the study's implications apply to all service firms. Based on the argument of service-dominant logic that goods are just medium for providing service, this thesis argues that the findings are significant to goods supply chains.

The thesis is organized as follows: in chapter 2, a systematic review of the supply chain fit literature is provided; and in chapter 3, a qualitative study with top-level managers of service firms regarding their firms' operant resources, and their significance to supply chain function and performance is provided. Chapter 3 also discusses the findings from the above and summarize it through a conceptual framework of service supply chain fit. Chapter 4 focusses on investigating the relationship between service supply chain fit and firm performance. It provides the theoretical background of service supply chain fit and focuses on hypotheses formation. Later, chapter 4 also presents the research methodology, discuss the scale development and validation. It is followed by a test of validity and reliability of the scales and the results of a pilot test of the scale. Chapter 4 explains the regression analyses and discusses the results along with theoretical and managerial implications. Finally, in chapter 5, this thesis summarises the research output and concludes by providing insights for future research.

Chapter 2

Literature review

Services are defined as the application of specialized competences such as knowledge and skills through deeds, processes, and performances for the benefit of another entity or an entity itself (Vargo and Lusch, 2004). Service supply chain is the “network of suppliers, service providers, consumers and other supporting units that performs the functions of transaction of resources required to produce services; transformation of these resources into supporting and core services; and the delivery of these services to customers” (Baltacioglu, Ada, Kaplan, Yurt And and Cem Kaplan, 2007). In light of the importance of services in a supply chain, Ellram et al. (2004) defined supply chain management as the management of information, processes, capacity, service performance, and funds from the earliest supplier to the ultimate customer. Stavroulaki and Davis (2014) adopted an expanded version of this definition, which is as follows: “Service supply chain management is the management of information, processes, capacity, service performance, funds, and forward and reverse flows of tangible goods from the earliest supplier to the ultimate end customer, including the return and/or disposal of any tangible goods purchased.” In all the above definitions, the ultimate ‘product’ delivered to the customer is a ‘service’ and it is a culmination of different transactions of resources happening in the supply chain, where goods could be a medium for service offering. This core aspect of viewing supply chain as network for resource transaction and not physical good transaction differentiates service supply chains from goods supply chain.

In addition, capacity in service supply chain management takes the production capacity in goods supply chain management. Capacity is a services supply chain replacement for inventory in that it allows a supply chain to increase its level of production to respond to customer demands. Service capacity is the highest quantity of output possible in a given period with a pre-defined level of resources (Niranjan and Weaver, 2011; Lovelock, 1992). Similarly, in service supply chain management, service inventory is the immediately usable service with potential value (for example, the workforce available at a given point inside a

call center) (Niranjan and Weaver, 2011; Ellram et al., 2004). Thus, an effective service supply chain management to secure competitive advantage and to improve organizational performance should focus on firm resources and their management in supply chain context.

Resources are tangible and intangible entities that are available to the firm, which enables it to produce effectively and/or efficiently a service or product that has value (Madhavaram and Hunt, 2008). The framework of Stavrulaki and Davis (2014), which takes into account only operand resources, has only considered the tangibles.

Prior research has provided three main process-oriented frameworks of supply chains for the service sector (Ellram et al., 2004): (i) Hewlett-Packard's model (Lee and Billington, 1995), (ii) the Supply Chain Operations Reference (SCOR) model (Huan, Sheoran and Wang, 2004) and (iii) the Global Supply Chain Forum (GSCF) model (Croxtton, Garcia-Dastugue, Lambert and Rogers, 2001). While each has provided relevant guidance in the management of service supply chains, all three frameworks have significant limitations. In the Hewlett-Packard Model, inventory acts as a buffer at different stages of a supply chain, and inventory is used to manage uncertainty in the environment. While this provides support for the detection of problems with control and over-billing in services, it provides limited guidance as to how these issues impact service supply chains. The SCOR model is structured around five distinct management processes of plan, source, make, deliver, and return. All of these have limited applicability to service supply chains because service chains largely depend on intangible resources. Furthermore, while the GSCF framework (Croxtton et al., 2001) has the following elements in its model – business processes, management components, structure of chain, and customer-supplier relationship – similarly to the SCOR model, it focuses on a system in which goods flow from the supplier to the manufacturer, and then to the customer (Huan et al., 2004; Croxtton et al., 2001). Service supply chains do not operate with such a linear chain flow (Sengupta, Niranjan and Krishnamoorthy, 2018), and as such, these frameworks are largely inapplicable to service supply chains (Ellram et al., 2004; Stavrulaki and Davis, 2014). Stavrulaki and Davis (2010, 2014) proposed two of the most recent strategic service supply chain frameworks, with emphasis on the role of customers.

As opposed to classifications focused on demand uncertainty and product variety, Stavrulaki and Davis (2010) offered a classification focused on two dimensions – “what is being transformed” and “how it is processed”. This strategic framework is based on four

different types of supply chain: (i) build to stock, (ii) assemble to order, (iii) build to order, and (iv) design to order” (Stavroulaki and Davis, 2010, p. 128). In this framework however, transformation is still applied only to a set of goods-focused operand resources, across three broad categories: people, things, and data. Although the framework was intended primarily for use in service supply chains, it neglects the crucial role of operant resources – the core competencies that distinguish a service supply chain from a goods supply chain (Vargo and Lusch, 2004). Prior strategic frameworks largely emanate from a goods-centric view of supply chains. While some authors such as Niranjana and Weaver (2011) propose a unifying paradigm of goods and service supply chains, the majority of prior models for supply chain fit remain aligned with goods-centric frameworks and focused on operand resources. As such, their applicability to service environments remains limited, and their framing is from the perspective of goods rather than the role of customers. With this in mind, this chapter synthesizes the body of knowledge available on supply chain fit with a view to determine gaps relevant to services specifically, and to inform the development of a conceptual model for service-focused supply chains.

As mentioned earlier, while classifying service supply chains, the competency factor is to be considered (Vargo and Lusch, 2004); they are also the highest order resources (Hunt, 2000). Competence is an ability to sustain the coordinated deployment of assets (tangibles or intangibles) that contribute towards the offering of the service or product. Hunt (2000) defines competence as “socially complex, interconnected combinations of tangible basic resources and intangible resources that fit together coherently in a synergistic manner to enable firms to produce effectively and/or efficiently a service or product that has value.” A competitive advantage of a firm depends on its comparative advantage with respect to its resources (Löfberg, Witell and Gustafsson, 2010).

Table 2.1 provides a clear picture of why operant resources should be given prime focus in services. It distinguishes goods- and service-centered view by using operand and operant resources. Thus, it is clear that operant resources are the main sources of competitive advantage for service firms. Operant resources are the ones which provide a sustainable competitive advantage to the firms.

Table 2.1: Significance of operant resources in services (Vargo and Lusch, 2004)

	Goods-centered logic	Service-centered logic
Primary unit of exchange	People exchange for goods that are operand resources.	People exchange to acquire the benefits of specialized competences (knowledge and skills) or services that are operant resources.
Role of goods	Goods are operand resources and end products.	Goods are transmitters of operant resources.
Role of customer	The customer is a co-producer of the service, primarily an operand resource.	The customer is a co-producer of the service, primarily an operant resource.
Meaning of value	The customer is a recipient of goods. It is an operand resource.	The customer is a co-producer of the service, primarily an operant resource.
Firm customer interaction	The customer is an operand resource. Customers are acted on to create transactions with resources.	Customers are primarily operant resources and play an integral part in co-production.
Source of economic growth	Wealth is obtained from surplus tangible resources and goods; wealth consists of owning, controlling, and producing operand resources.	Wealth is obtained through the application and exchange of specialized knowledge and skills. It represents the right to the future of operant resources.

2.1 Operant resources

In order to study service supply chains on the basis of operant resources, a better understanding of operant resources and how it is different from operand resources is a must. As mentioned earlier, operant resources are resources that act on other resources to create value. Operand resources are mostly physical (for example, raw materials), whereas operant resources are human (for example, skills and knowledge of individual employees), organizational (for example, controls, routines, cultures, and competences), informational (for example, knowledge about market segments, competitors, and technology,) and relational (relationships with competitors, suppliers, and customers) (Vargo and Lusch, 2004). Based on Resource - Advantage (R-A) theory, Madhavaram and Hunt (2008) framed the following hierarchy of operant resources: (i) Basic operant resources, (ii) Composite operant resources, and (iii) Interconnected operant resources. As we move up the hierarchy,

they become increasingly interconnected and more difficult for competitors to acquire or develop (Figure 2.1).

2.1.1 Basic operant resources (BORs)

Basic operant resources are underlying, lower-level resources that form the basic blocks of higher order operant resources (Madhavaram and Hunt, 2008). Skills and knowledge level of individual employees are resources that fall into this category.

2.1.2 Composite operant resources (CORs)

Madhavaram and Hunt (2008) define composite operant resources as those resources that are formed as a result of a combination of two or more distinct basic resources with levels of interactivity that collectively enable the firm to efficiently and effectively produce their valued services. Formative measurement is possible with composite operant resources, and they can be the tangible or intangible resources of a firm.

2.1.3 Interconnected operant resources (IORs)

Interconnected operant resources are resources that are formed as a result of interactivity among its basic resources. It is defined as the combination of two or more distinct basic resources in which the lower order resources significantly interact and contribute toward effective and/or efficient offering of valued services (Madhavaram and Hunt, 2008). If an interconnected operant resource is formed as a combination of three basic or higher order resource A, B, and C, its influence can be measured by $A \times B$, $B \times C$, and/or $A \times B \times C$. Madhavaram and Hunt (2008) also state that when an interconnected operant resource is subjected to first-order factor analysis, it will reveal a single factor, which indicates the existence of a distinct, single, interconnected operant resource.

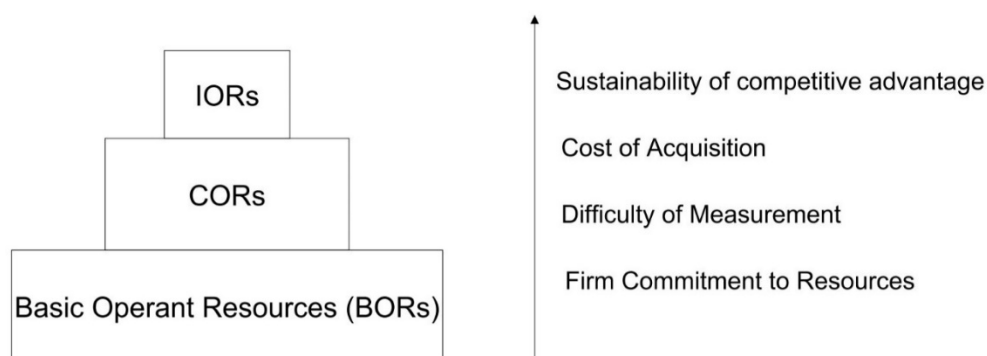


Figure 2.1: Hierarchy of operant resources (Madhavaram and Hunt, 2008)

2.2 Systematic literature review

With an aim to summarize the available body of knowledge in supply chain fit research and to determine the gaps, the first step in conceptual development is to systematically review the supply chain fit literature. The main purposes of the systematic literature review (SLR) are to outline the extant supply chain fit research, to examine the different concepts of supply chain fit in operations literature and to determine the gaps with respect to their applicability in services. Given the importance of strategic fit to service supply chains, the focus of the review was on supply chain fit literature and the application of supply chain fit in services. While supply chain fit is extensively studied in goods context, little is known about their application in services. Therefore, in order to extend the concept of supply chain fit towards services, a systematic review of concerned literature is a much-needed starting point. The prime focus of this review is to study the variables of fit explored in supply chain fit literature and to uncover the inapplicability of existing frameworks in services context.

This thesis conducted a systematic literature review of research articles published since the emergence of the concept of strategic fit in supply chains (Fisher's 1997 paper). In doing so the review revealed several significant gaps in the application of these frameworks to services. The systematic literature review searched for articles using Google Scholar, EBSCO, Scopus, Science Direct, Elsevier, Taylor & Francis, Pro-Quest and Emerald, in the journals listed in Table 2.2 using a two-stage keyword search process, as follows. An initial keyword search using 'strategic fit' yielded 475 papers. Further refinement of the search criteria using the keywords: 'supply chain fit', 'strategic fit & supply chains', and 'supply chain strategic fit' (Durach, Kembro and Wieland, 2017), narrowed the list to 147 papers. Further review eliminated papers that did not have supply chain fit as the focus of study. As a result, 38 final articles were identified. The search went beyond a keyword search of only titles and abstracts to include full text of articles to ensure no papers were missed. Citations were also tracked until searching reached a stage where no additional articles were revealed.

Next, relevant data from these 38 articles were coded to extract general information, and most importantly, variables discussed in the concept of strategic fit of supply chains (Durach et al., 2017).

Table 2.3: Selection demographics

Keywords	1: 'Strategic Fit' 2: 'Supply chain fit', 'Strategic fit & 'supply chain', 'Supply chain strategic fit', and 'fit & supply chain'.
Source	Google Scholar, EBSCO, Scopus, Science Direct, Elsevier, Taylor & Francis, Pro-Quest and Emerald
Time-interval	1997-2018
List of journals and number of articles (Total No. 38)	International Journal of Production Economics (7) Journal of Operations Management (6) The International Journal of Logistics Management (4) Supply Chain Management: An International Journal (5) International Journal of Physical Distribution & Logistics Management (3) Journal of Business Logistics (2) International Journal of Production Research (2) Decision Sciences (2) Transportation Research Part E: Logistics and Transportation Review (1) Journal of Management Information Systems (1) California Management Review (1) Management Decisions (1) Measuring Business Excellence (1) Journal of International Business Studies (1) IEEE transactions on engineering management (1)

Figure 2.2 shows year-wise distribution of articles from 15 journals, with around 50 percent of articles in *International Journal of Production Economics*, *Journal of Operations Management*, *The International Journal of Logistics Management* and *Supply Chain Management: An International Journal*. A steady increase in the number of research articles underscores the importance of the research topic.

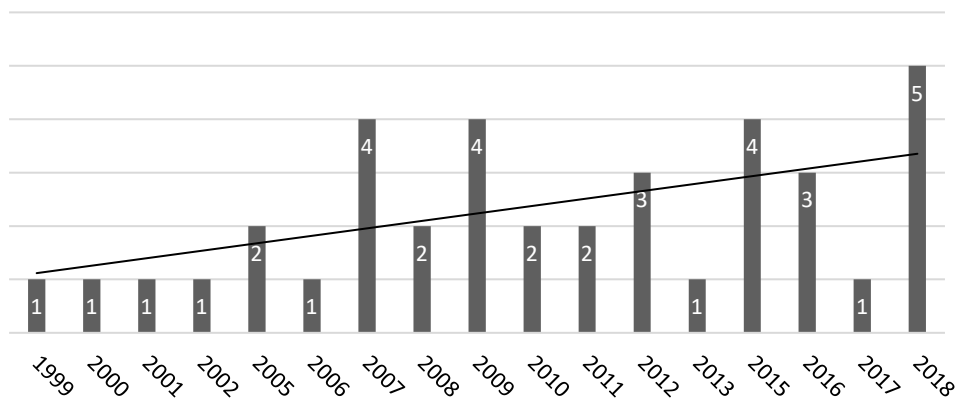


Figure 2.2: Frequency of publications

In terms of methods used, surveys were used the most often, with 20 out of the 38 studies using this methodology Figure 2.3. The bulk of the studies were cross-sectional in nature and used sample sizes large enough to conduct statistical analysis. The remaining studies used literature reviews, concept development or other methodologies. 58 percent of studies were quantitative in nature, 17 percent qualitative, and 11 percent used both quantitative and qualitative methods. The remaining were conceptual or literature review works.

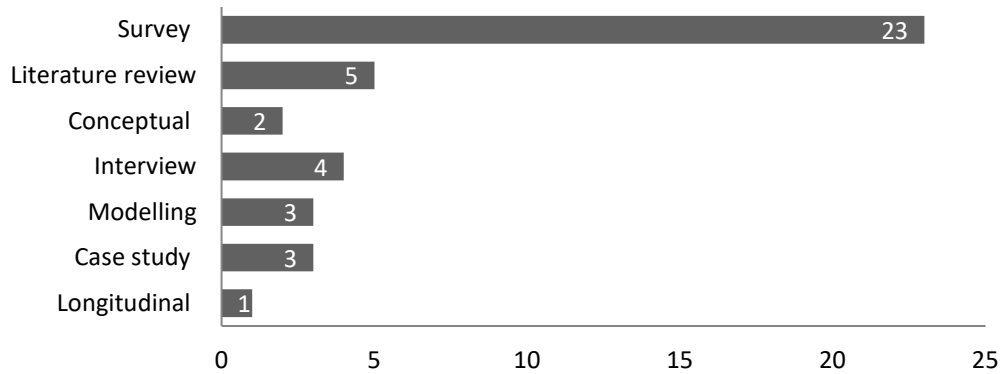


Figure 2.3: Methodologies used

All 38 studies matched two primary variables to explain their respective supply chain fit concepts. The main objective was to summarize the fit definitions and collate two primary variables for fit as: ‘Fit Variable 1’ and ‘Fit Variable 2’. For example, Fisher’s fit (1997) is a match between a firm’s supply and demand characteristics of products (Fit Variable 1), and its supply chain characteristics (Fit Variable 2). In addition, as shown in Table 2.4, the literature review captured the main theoretical contribution relevant to supply chain fit.

Among these 38 articles listed in Table 2.4, 25 studies made use of a specific theory outside of Fisher’s (1997) supply chain fit model. Following Venkatraman (1989), and Umanath (2003), the study classified ‘fit’ into three categories: contingency theory, configuration approach and holistic congruence. Drawing from this categorisation, of the 25 articles that went beyond Fisher (1997), the study found that 11 articles used contingency theory, and three used a configuration approach. Three other articles (Skinner, Bryant and Glenn Richey, 2008; Hult et al., 2006; Liu, Wei, Ke, Wei and Hua, 2016) used resource-based view as their theoretical foundation. The limited use of resource-based view in these studies is a significant finding given the key role of resource-based view in explaining sources of competitive advantage for firms.

Table 2.4: Literature review of different variables studied in strategic fit of supply chains since Fisher (1997)

Article	Definition of fit	Fit Variable 1	Fit Variable 2	Theory/Concept/Logic
Chang, Ellinger and Blackhurst (2015)	Right supply chain risk mitigation strategy for particular risk contexts	Probability and severity as contextual variables	Redundancy and flexibility as primary supply chain risk mitigation strategies	Contingency theory
Caniato, Caridi, Castelli and Golini (2009)	Contingency variables shall be taken into account when evaluating the most suitable supply chain strategy for a certain market context	Critical success factors (contingence variables) in strategy	Fisher's supply chain variables	Contingency theory
Cavinato (1999)	A fit occurs when a supply chain logistics group is at a stage fairly close to rest of the firm	17 attributes of logistics or supply chain management	Five stages of strategic management	
Naesens, Gelders and Pintelon (2009)	The match between two companies, having their own operations and environment, with regard to horizontal collaboration (resource pooling in inventories)	Resource pooling in inventory management of Company 'A' (supply chain variables)	Resource pooling in inventory management of Company B (supply chain Variables)	SCOR model
Huang and Keskar (2007)	Fit of an appropriate set of metrics based on a firm's business strategy with supplier performance	A set of metrics that reflect a firm's business strategy	Supplier selection	An integrated method that uses the Analytical Hierarchy Process (AHP) and linear programming
Stock, Greis and Kasarda (2000)	Appropriate consistency between logistics practices and supply chain structures	Logistics integration capabilities	Supply chain structure	Configurations approach
Lo and Power (2010)	The relationship between product nature and supply chain strategy	Product nature	Supply chain strategy	
Buttermann, Germain and Iyer (2008)	Context variables vs. Firms' partnership orientation	A total of seven context variables are examined including organizational size and age, demand unpredictability, technological turbulence, industry concentration, and industry competitiveness.	Firm's partnership orientation	Contingency theory

Article	Definition of fit	Fit Variable 1	Fit Variable 2	Theory/Concept/Logic
Skinner et al. (2008)	Fit is the active resource commitment to reverse logistics programs	Resource commitment	Reverse logistics	Resourced-based view
Nakano (2015)	Fisher's definition of fit	Patterns of structure/processes	Efficient/responsive strategy and responsive supply chain strategy	
Luo and Yu (2016)	Fit can be defined as the information processing capacity embedded in the supply chain flexibility strategy meeting the information processing requirement of an environment	Environmental uncertainty	Supply chain flexibility	Contingency theory
Boone et al. (2013)	Strategic alignment of inventory on resiliency and continuity	Inventory decisions	Resiliency and continuity	Contingency theory
Premkumar, Ramamurthy and Saunders (2005)	The fit between information process needs and information processing capability and the effect of the fit on procurement performance	Information processing needs	Procurement capabilities	Information processing theory
Morita, Machuca, Flynn and de los Ríos (2015)	Fisher's definition of fit with respect to product life cycle and ability to dynamically adjust	Product characteristics	Supply chain characteristics	
Hult et al. (2006)	Fit among strategy and eight knowledge elements is a key to achieving superior supply chain performance	Knowledge elements	Strategy	Resource-based view, strategic choice theory, and configurational research
Hofmann (2010)	Match between corporate strategy making and supply chain management	Corporate strategy	Supply chain management	
Avittathur and Swamidass (2007)	Matching plant flexibility and supplier flexibility	Plant flexibility	Supplier flexibility	
AlHusain and Khorramshahgol (2018)	Strategic fit between organizational strategy and supply chain capabilities	Organizational strategy	Supply chain capabilities	Binary integer programming model

Article	Definition of fit	Fit Variable 1	Fit Variable 2	Theory/Concept/Logic
Gligor (2016)	The perfect strategic consistency between a product's supply and demand characteristics and supply chain design characteristics	Supply and demand characteristics (such as demand predictability, life-cycle length, product variety, service, lead-times, and specific market requirements)	Supply chain design characteristics (such as inventory strategy, product design strategy, and supplier selection aspects)	
Gligor (2017)	Fisher's definition with a moderation variable	Product characteristics with moderating effect of external resources	Supply chain characteristics	Strategy–structure–performance and contingency theory
Gligor (2018)	The match between the level of flexibility the customer expects from its supplier and the supplier's level of flexibility	Buyer flexibility	Supplier flexibility	Resource orchestration theory
Liu et al. (2016)	Deploying appropriate information technology competency in a manner that fits the supply chain integration of a firm induces superior firm performance	Information technology competency	Supply chain integration	Resource orchestration theory, contingency theory and configuration approach
Faber, De Koster and Smidts (2018)	Fit among warehouse management structure and the context in which the warehouse operates as an important driver of warehouse performance	Warehouse management structure	Warehouse operations	Contingency theory.
Wagner et al. (2012)	The perfect strategic consistency between a product's supply and demand characteristics (such as demand predictability, life-cycle length, product variety, service, lead-times, and specific market requirements) and supply chain design characteristics (such as inventory strategy, product design strategy, and supplier selection aspects)	Product's supply and demand characteristics (such as demand predictability, life-cycle length, product variety, service, lead-times, and specific market requirements) and	Supply chain design characteristics (such as inventory strategy, product design strategy, and supplier selection aspects)	
Morita and Machuca (2018)	Fisher's definition of fit with respect to product life cycle and ability to dynamically adjust	Product characteristics	Supply chain characteristics	

Article	Fit	Fit Variable 1	Fit Variable 2	Theory/Concept/Logic
Hallavo (2015)	The moderating effect of uncertainty impacts the relationship of operational responsiveness and firm performance	Operational responsiveness	Supply chain responsiveness and demand uncertainty	Contingency theory
Li and O'Brien (2001)	Matching product and supply chain characteristics	Product characteristics (value-adding and demand uncertainty)	Three supply chain strategies (manufacturing to order, manufacturing from stocks and manufacturing to stocks)	A sensitivity analysis using a multiple objective optimisation model
Selldin and Olhager (2007)	Fisher's definition	Product characteristics	Supply chain characteristics	
Qi, Boyer and Zhao (2009)	Fisher's definition	Product characteristics	Supply chain characteristics (lean, agile, and lean/agile)	
Simangunsong, Hendry and Stevenson (2012)	Alignment between uncertainty sources and management strategies	Levels of demand and supply uncertainty	management strategies (efficient, responsive, risk-hedging and agile)	Contingency theory
Lee (2002)	Match between demand and supply uncertainty with supply chain strategies	Demand and supply uncertainty	Supply chain strategies	
Sun, Hsu and Hwang (2009)	Alignment between supply chain strategy and environmental uncertainty	Environmental uncertainty	Supply chain strategies	Configurations approach
Liu, Chen and Chou (2011)	A resource fit framework integrating resource-based view and strategic fit concept	Supply chain resources/capabilities	Strategy	
Soni and Kodali (2011)	Fit is a match between competitive strategy and supply chain strategy	Competitive strategy	Supply chain strategy	Supply chain strategy dimensions are selected based on fisher's dimensions.
Griffith and Myers (2005)	Strategic fit of relational norm governance strategies in global supply chain relationships between US firms and their primary Japanese and US partners	Relational norm governance strategies (i.e., information exchange, flexibility and solidarity)	Culturally diverse partners	Relational governance strategies

Article	Definition of fit	Fit Variable 1	Fit Variable 2	Theory/Concept/Logic
Mortensen and Arlbjørn (2012)	Strategic fit between the supplier and buyer in terms of similar background, prior history, strategy, values, attitudes, complementary skills, and reputation between the parties	Supplier characteristics in the supply chain	Buyer characteristics in supply chain	Relationship management theory
Prajogo, Mena and Nair (2018)	The research model theorizes that flexibility and low-cost oriented supply chain strategies should fit with the underlying business environments, and, in turn, supplier management practices (i.e., long-term relationships, supplier assessment, and integration) should fit with the chosen supply chain strategies.	External links between the business environment, internal links between supply chain strategies	Supply chain strategies, supplier management practices	Contingency theory
Naesens, Gelders and Pintelon (2007)	The focus of this research is on the match between two companies, having their own operations and environment, with regard to horizontal collaboration (resource pooling in inventories)	Two companies on resource sharing and inventory pooling	Two companies on resource sharing and inventory pooling	Analytic hierarchy process

Even though Wagner et al. (2012) found strong empirical evidence of Fisher's (1997) model, other works have found only partial empirical support. Li and O'Brien (2001), for example, found partial support when matching product characteristics (value-adding and demand uncertainty) to three separate supply chain strategies (manufacturing to order, manufacturing from stocks and manufacturing to stocks). Similarly, the works by Selldin and Olhager (2007), and Lo and Power (2010) only partially supported Fisher's (1997) model in the Swedish manufacturing industry and Australian context, respectively.

In summary, the systematic literature review identified that extant literature has explored supply chain fit by focussing on demand characteristics and supply chain characteristics (Boone et al., 2013; Li and O'Brien, 2001; Morita and Machuca, 2018; Selldin and Olhager, 2007; Christopher et al., 2006; Lee, 2002; Wagner et al., 2012). This represents only the relationship between a firm's product demand and its operations and supply chain management functions (Droge, Vickery and Jacobs, 2012; Nakano, 2015; Fixson, 2005; Petersen, Handfield and Ragatz, 2005). This focus has had limited applicability to services for the following reasons:

- i. A key aspect – customer interaction in services – is missing in existing frameworks of supply chain fit (Stavrulaki and Davis, 2014).
- ii. It overlooks other firm related characteristics (which are not demand specific), whose relationship with supply chain characteristics have significant theoretical and managerial implications.

These two gaps, as identified from the systematic literature review provide important support for research frameworks that focus on operant resources in supply chain fit for services, and that consideration of service-relevant frameworks are a much-needed addition to the operations and supply chain management literature.

The systematic literature review exposed the gaps in existing studies and provided information on areas where majority studies have already taken place (Clarke and Oxman, 2001; Garza-Reyes, 2015). The systematic literature review also helped advance and refine the concept of supply chain fit towards services (Gligor and Holcomb, 2012; Durach et al., 2017). Therefore, considering the significance of service supply chains and the conceptual support operant resources can offer, this chapter of systematic literature review reveals that a study to develop the concept of service supply chain fit based on operant resources is a much-needed addition to operations management literature.

A service supply chain is a network of suppliers, service providers, consumers, and other supporting units that perform the functions of transaction of resources required to produce services; transformation of these resources into supporting and core services, and delivering these services to customers. We base the concept of service supply chain fit on firms' resource-based view (RBV) because, according to RBV, firms are defined in terms of their resources rather than the products they create (Wernerfelt, 1984). As such, it is a framework that is well suited to services and especially supply chains that are defined by a combination of resources. In resource-based view, firms perform differently from one another due to differences in their firm-specific rent-generating resources, which cannot be easily imitated or substituted (Amit and Schoemaker, 1993; Griffith and Myers, 2005). Because a firm's resources are not limited to its physical resources, firms compete on their ability to develop products rather than on the products themselves (Hamel and Prahalad, 1994).

In addition to the resource-based view of firms' competitive advantages, service-dominant logic offers that operant resources are central to firms' value creation. Service-dominant logic extends the concept of how resources are valued and defined in the resource-based view; as such, operant resources are viewed as being more independently a source of competitive advantage, rather than only holding value when converted into a specific benefit. Service-dominant logic views the resources themselves as the primary source of competitive advantage. It allows operant resources to take a more central role as the focus of the firm's strategy (and as more purposeful in their supply chain). Thus, this research calls for a shift from an operand-based logic to an operant-based logic, making it possible to better incorporate service-dominant logic in resource-based view-focused frameworks.

Drawing on literature that has explored operant resources (especially Madhavaram and Hunt (2008)), this thesis proposes to incorporate operant resources and service-dominant logic in service supply chain management. For services, a greater reliance on intangible operant resources requires an extension to the strictly product-oriented view of supply chains, so that more service-focused goals can be incorporated. While service supply chains have been included in past discussions of supply chain strategy, little attention has been given to strategies that fit service-oriented chains, that: (a) rely on operant resources, and (b) focus on variables that are specific to the service supply chain.

Past research has little information to offer on how operant resources provides a competitive advantage to service firms. Therefore, this thesis develops a framework that focuses on operant resources rather than on operand resources. It is not the tangible resources that matter, rather it is the intangibles that are categorized under operant resources that matter the most. Thus, this thesis develops a framework for service supply chains using operant resources. This study would contribute to operations management literature in several ways. This is the first of its kind to conceive the role of operant resources in achieving service supply chain fit and how it impacts competitive advantage of service firms.

2.3 Chapter summary and research overview

The systematic literature review revealed a continuing emphasis on Fisher's 1997 model in investigations into supply chain fit. While Fisher's model has significant relevance to supply chain strategy development, its relevance to service supply chains has limitations. Most of the 38 papers in the review show little extension to Fisher's (1997) original concept. In addition, none of the articles in the review studied supply chain fit with specific application to services, representing a critical gap in the operations and supply chain management literature. By confining fit to demand characteristics, and by excluding customer interaction, operant resources (in particular) did not have a significant role in any of the existing frameworks. Moreover, the concept of matching operant resources to service supply chain characteristics was also unexplored by the papers.

Given the inapplicability of extant literature to utilize operant resources in a service firm's supply chain strategy, in the next chapter, this thesis conducts a qualitative study in a service setting. As mentioned in chapter 1, the overarching research question of this thesis is: "*What is the right service supply chain for service firms, based on their operant resources?*" In order to answer this research question, the next chapter addresses the following sub-objectives, and they are:

- i. Develop a theoretical framework which describes the strategic fit of operant resources with service supply chain characteristics.
- ii. A classification of service supply chains based on operant resources.
- iii. Empirically validate the service supply chain fit using firm performance.

Chapter 3

Service supply chain fit: A qualitative study

The thesis sought to extend the findings of the systematic literature review, addressing the role of service strategy and supply chain fit, in semi-structured interviews with senior managers. This chapter conducted a qualitative study involving interviews with 20 managers of service firms in India, to explore firms' use of operant resources in their supply chains. Services contribute more than half of India's gross domestic product, and India has become both a major market for services, and is the preferred destination for back-end operations for major service firms globally (IMF, 2018). Thus, India provided an ideal location for sampling of service firms with significant supply chains and international reach. The selection of firms involved purposeful sampling and informants were identified through professional networking platforms, such as LinkedIn. All informants had at least five years of experience in their respective firms, and more than half had at least 15 years of experience in their industry. Final demographics of the informants of this qualitative study are provided below (Figure 3.1 and Table 3.1). All interviews were conducted face-to-face, except for three which were conducted over the phone, and interviews were each about 30 to 45 minutes.

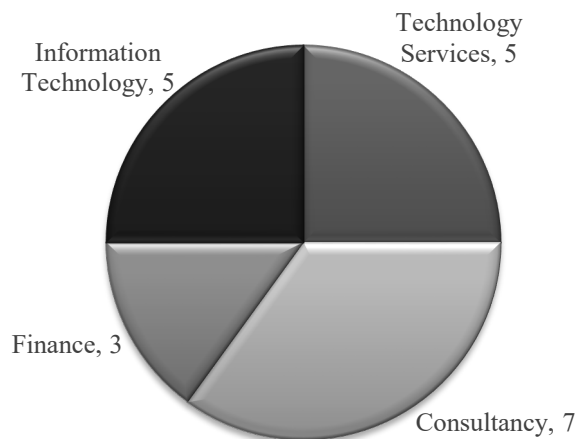


Figure 3.1: Interview sample demographics

Table 3.1: Informants' profile

-
- I1:** Chief executive officer of finance company with over 15 years' experience in strategy development and consulting.
- I2:** Executive assistant - sales and marketing, of a research firm with almost 15 years' experience. Key responsibilities include coordinating manger team and providing them market inputs.
- I3:** Director of a firm providing scientific research tools with 30 years' experience in business development and new service development.
- I4:** Senior human resource manager of a firm providing technology solutions. Works on performance management, policy design and has held country level positions with organization development roles.
- I5:** Executive director and chief operating officer of a financial services company with over 25 years of experience. Works closely with businesses on their strategic plans and ensure smooth business operations.
- I6:** General manager - business development, of an information technology firm with over 20 years' experience in energy and information sector. Has headed sales and marketing division in the country level.
- I7:** Chief experience officer (CXO) of a specialized recruiting service company. Close to 20 years' experience in field and has headed board hiring strategies for start-ups and corporates.
- I8:** Founder, chairman and chief executive of a consulting firm with over 30 years' experience. Held roles of a chief executive across diverse domains of aerospace engineering, media research and information technology.
- I9:** General manager of service division of an automobile company. 15 years of experience in dealership management and business development.
- I10:** Co-founder and chief of an energy management company with 15 years' experience in consulting, start-up advisory and new business setup. Held roles of corporate strategy development and financial planning.
- I11:** Founder and chief executive officer of a professional service company with 15 years' experience in software developing, data analytics and machine learning. Currently working on a technology start-up
- I12:** Senior manager of a technical consulting company with 5 years' experience. Held roles of marketing and technical sales and has expertise in project management for clients.
- I13:** Regional sales manager of financial service firm with over 16 years of experience in banking and non-banking financial companies (NBFC).
- I14:** Associate engineer at a technology service company. Works on research and development of futuristic technologies and has an experience of 5 years.
- I15:** Senior manager at an information technology firm with 15 years of experience with specialization in the areas of technology and solution architecture.
- I16:** Associate scientist at an electrical service firm with 5 years' experience in corporate research and development.
- I17:** Senior engineer at technology service company with 5 years of experience in design of new product development, research, and analysis.
- I18:** Senior consultant at financial service firm with an experience of 5 years. Held responsibilities of system engineer and programmer in other firms.
- I19:** Assistant director in a management consulting firm with 5 years' experience in leading a group of consultant and expertise in providing strategic solutions for clients.
- I20:** Manager in an information technology firm with 7 years' experience. Specialised in retail service and technology development for mobile applications.
-

Interviews were semi-structured and explored themes relevant to the importance of firms' operant resources in the day-to-day management and performance of their supply chain (Appendix A: Interview discussion points). To identify sources of competitive advantage for each firm, this qualitative study focused on the end-to-end activities of their supply chains, rather than discussing only supply or delivery activities. The qualitative study identified themes according to how managers viewed the purpose of various operant resources in the context of their service supply chains. The study then explored the variables of each firm's supply chain to establish 'fit' (match) between important operant resources and service supply chain. Finally, the interviewer asked informants to discuss whether they felt they achieved 'fit' between their operant resources and their service supply chain, and how this 'fit' (or lack thereof) influenced their firm's performance.

3.1 Methodology

After transcription, this study analysed the data using NVivo 12. The analysis of interviews focused on the relationship between a firm's operant resources, and supply chain that provide the firm with competitive advantage, using inductive method with a theory building objective (Guide Jr and Ketokivi, 2015; Gioia and Pitre, 1990). This involved a data-to-theory approach (Gioia, Corley and Hamilton, 2013), to establish connections between the focal constructs – operant resources and supply chains. Initially, the analysis sought informants' descriptions of key activities they deemed to be sources of competitive advantage, and unique to the service firm (1st order concepts). Second, the analysis synthesized these activities further (2nd order themes), into themes that broadly supported specific operant resources (Figure 3.2), such as competency, learning, culture, experiences, and knowledge. By referring back to literature on service-dominant logic pertaining to operant resources, the study further inducted firm activities to extract third order aggregate themes, which captured relationships among themes, as well as critical operant resources and the methods firms adopt to utilize them. Similarly, this study also identified a few important service supply chain variables from the interview data (Figure 3.3) that the firm managers deemed important in their operations. The consensus within the research team about the process and terms used to characterize the operant resources ensured theoretical validity and generalizability of the analysis (Maxwell, 1992). In the following, this chapter summarize the results and implications of these themes to the significance of operant resources in service firms and their supply chains.

3.2 Results and discussion

3.2.1 Operant resources

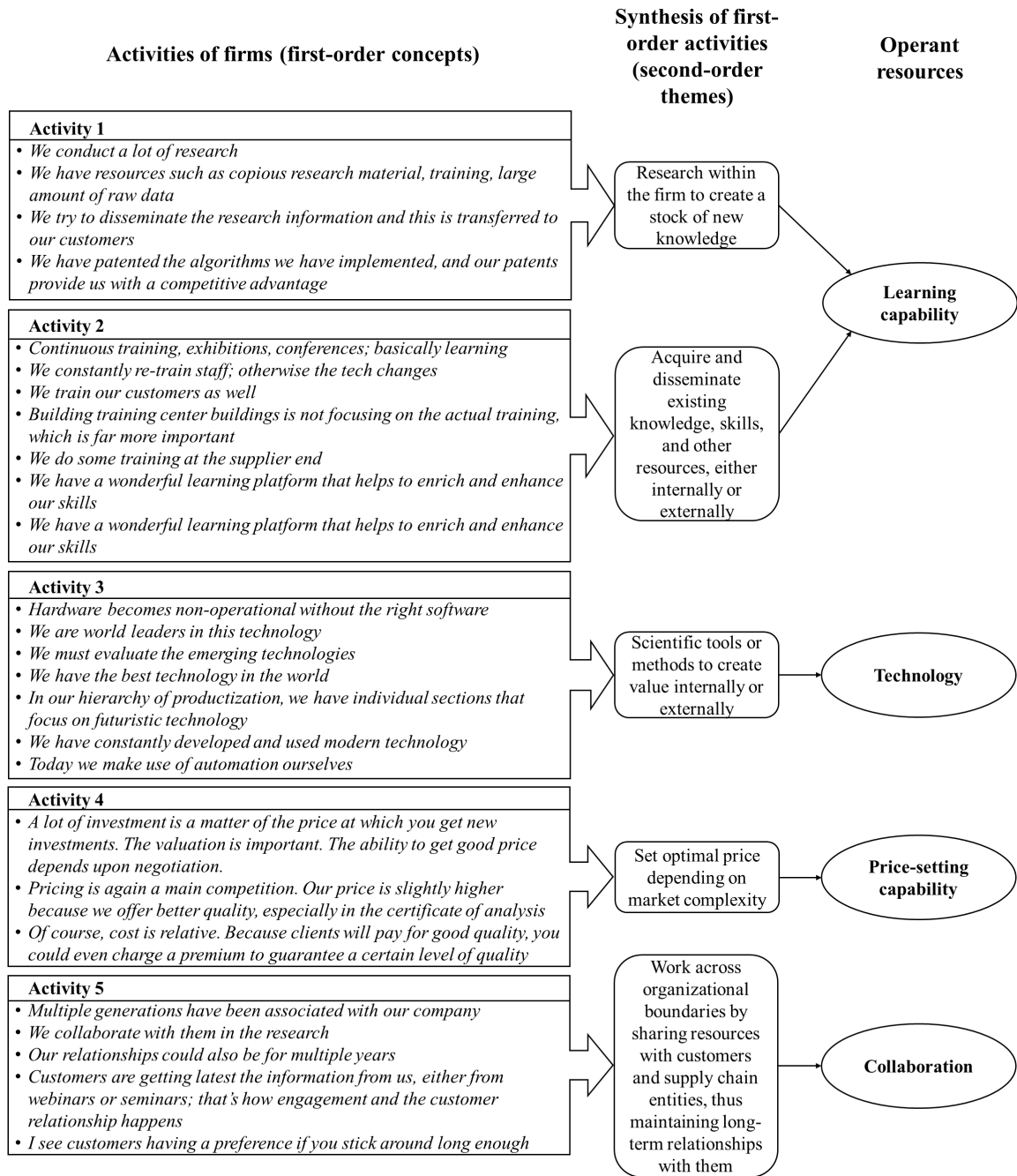
Several operant resources were identified as being important to the service firms in the sample and playing a role in their competitiveness both within and outside the firm. The analysis resulted in an initial set of valuable firm activities, relevant to research, knowledge, technology, culture, market, relationships, and pricing (Figure 3.2). Upon further analysis, these themes were distilled into seven key operant resources of: *learning capability*, *technology*, *knowledge management competence*, *organization culture*, *market orientation*, *collaboration*, and *price-setting capability*. A further unifying theme in managers' descriptions of key firm activities was intangibility. Firms' focus on intangible resources however, and their understanding of the need to develop highly valued operant resources were evident from the discussions. For example, employees' intangible skills and knowledge were frequently linked to the value and advantage of key resources, as one informant (I6) described:

“... when I talk about resources, I always talk about people and process. Because, even if you have best of the infrastructure, if you have people who are not competent, that is of no use... So, investing in infrastructure is normal. But ensuring that people who are up to the level, we have certain benchmarks... In spite of that, we constantly re-train them, otherwise the tech changes. We always keep them on the cutting edge.... We train our customers as well.”

The seven operant resources, their intangibility and the need to align these resources with supply chains are described and discussed further below.

Learning capability

Several initial firm activities were relevant to the second order themes - *research* and *training* (Activities 1 and 2, Figure 3.2). As others have described, research and training play a key role in achieving sustainable competitive advantage by providing a platform for learning within the firm (Jerez-Gomez, Cespedes-Lorente and Valle-Cabrera, 2005). These two themes were further aggregated to the operant resource - *learning capability*.



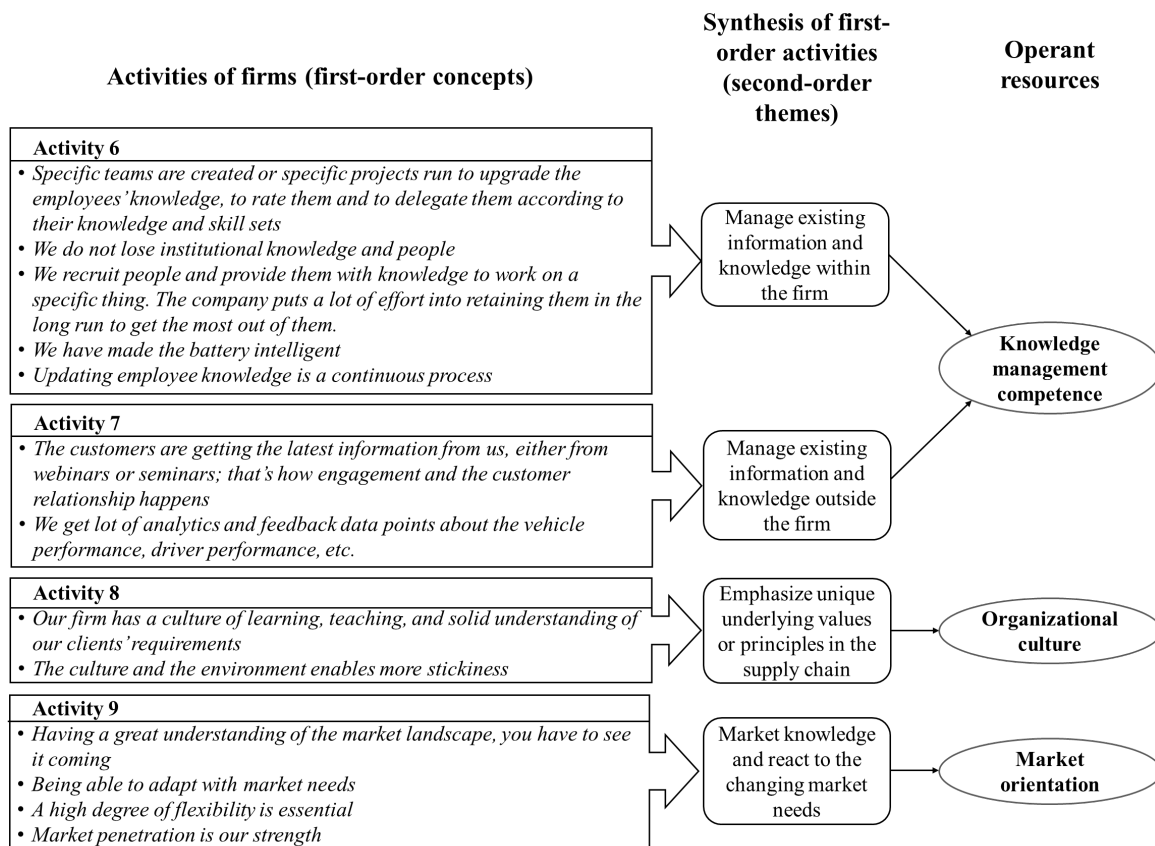


Figure 3.2: Identifying operant resources from interview data

Learning capability has three components: intent to learn, transparency between functional areas to promote learning, and receptivity (capacity to learn) (Johnson and Sohi, 2003). Informants highlighted the importance of learning capability to firm competitiveness:

“We basically do research and fund management. Our research into undiscovered companies is our strength. Resources like, lot of research material, training, lot of raw data, lot of meeting with the people in the ecosystem, and around the company. Be it customers, bankers, auditors, or any such. We do research on the company, to know if it is worth investing and to know it's growth potential.” (I6)

“Our firm has a culture of learning and teaching. Everybody comes in knowing that they learn something new every day. Our training content and being around intelligent people who are constantly learning makes us competitive in the field.” (I10)

While several factors contribute to learning, the strategic development and allocation of resources to learning capability implies a strong intention of the firm to learn. As an example of how this may be exchanged beyond the firm, such that it improves alignment with supply chain capabilities, improved learning capabilities have been shown to drive a relational orientation in logistics provider-client relationships (Panayides, 2007). Thus, firms could actively demonstrate their desire to learn from customers and suppliers, by seeking their input in logistics service processes. Equally, learning capabilities support improvement in the supply chain and foster relationships with learning-capable firms. Firms with learning capability as a resource also require supply chains that can draw from this capability.

Technology

Additional initial firm activities suggested a second order theme in which firms had a focus on scientific tools and methods to create value. As others have noted, it remains important for a firm to build upon its scientific tools and methods, and to understand, use, and exploit such technologies to attain a sustainable competitive advantage (Akaka and Vargo, 2014). Firm activities to develop software or hardware, or use up-to-date automation tools were clearly important to interviewees, which was distilled as the operant resource - *technology* (Activity 3, Figure 3.2). Akaka and Vargo (2014) define technology as a collection of practices and processes, as well as symbols, which are drawn upon to serve a human purpose. Informants described technology's importance to firm competitiveness:

“Hardware become inoperable unless you have the right software to back it up. This was a problem in my firm.” (I1)

“One area we have to change, or transform is technology. Because, technology disruption is happening in all the areas. So, what we have to do is to evaluate the emerging technologies and figure out how they can be incorporated and advice the companies that these are the technologies you should adopt to stay competitive in your service delivery.” (I9)

Technology, as an operant resource, is capable of acting on other resources in a firm's supply chain and is critical for value creation. The use of technology significantly

influences how service is delivered, innovated, and managed (Akaka and Vargo, 2014). The role of technology is well explored in the goods supply chain context. Blockchain technology could be viewed as an operant resource. The recent advancements of this operant resource are expected to ease global supply chain management, thus open up a new area of supply chain research (Saberli, Kouhizadeh, Sarkis and Shen, 2019; Bai and Sarkis, 2020). For example, Provenance, a blockchain service provider, sought to integrate blockchain in the seafood supply chain to ensure transparency and validity of transactions (Baker and Steiner, 2015). Thus, technology, has a crucial role in revolutionizing supply chains, and a firm needs to have a supply chain that can make the most of its technology.

Price-setting capability

Another common set of activities among informants were those relevant to the ability to set an optimal price for a service. These types of activity help firms deal with the complexity of market competitiveness (Activity 4, Figure 3.2), and setting the right price for a service has implications for the fundamental economic activities of the firm (Tung, Capella and Tat, 1997). The interviews identified several activities that centred on this ability, and its importance to firm survival, suggesting a significant need for price-setting capability, which is an operant resource. Price-setting capability is defined as the ability of a firm to set the right prices for the valued services they offer (Dutta, Zbaracki and Bergen, 2003). Informants discussed price-setting capabilities and its importance to firm competitiveness for example, as below:

“Pricing ability can provide our firm a competitive edge over others. There is very tough competition in the market. It is easy to compete. And the pricing is again a main part of competition. Our price is little bit higher price because we offer better quality and especially in the certificate of analysis.” (I4)

“During sales, our pricing isn’t that competitive when you compare to local manufactures. They don’t follow the best procedures, but we have the QC to ensure the best quality of products.” (I12)

Most service pricing strategies suffer from limitations by not considering supply chain operations (Tung et al., 1997). Pricing strategies must be strategically viewed with a firm’s supply chain. Christopher and Gattorna (2005) proposed a pricing strategy based on a link

between buyer-behaviour and the firm's supply chain strategy. Even though their study was in the goods context, it suggests that the right pricing strategies linked with appropriate supply chain could provide opportunities for significant cost reduction and increased profits. Therefore, the findings show that setting up appropriate supply chain would influence the price-setting capability of a firm. As such, this study identifies its role in service firm competitiveness and highlights its strategic value for a firm's supply chain.

Collaboration

Several activities reflected a need to work across organizational boundaries by sharing resources with customers and supply chain partners, and maintaining long term relationships. This suggested the importance of collaboration among supply chain partners as a capability, as a means to improve their performance (Activity 5, Figure 3.2). Thus, collaboration is an important operand resource for service firms. Collaboration is the ability to work across organizational boundaries by sharing of resources - information, people and technology (Beitelspacher, 2012). Collaboration was evident in the interviews as follows:

“But then being a 350-years-old company when I meet distributors, the generations and generations have been associated with our company. If you meet a person, his father, his grandfather also was buying materials from our company. It goes down the line. They instil that in the generations down the line.” (I4)

“We try to disseminate the research information that comes first from global research. That this is transferred to our customers. So, the customers are getting latest information from us. Either from webinars or seminars. So, that's how the engagement happens. The customer relationship happens.” (I3)

In addition, one informant pointed out a basic tenet of service-dominant logic which argues that “goods are mediums for services”, although by asserting that operand resources are a medium for operand resources. They described how a change in work-space layout (operand resource) improved collaboration (operand resource):

“We have changed our office layout from conventional cubicles to a more collaborative open space layout with bright colours.” (I20)

Some studies demonstrate the existence of a relationship between collaboration and logistics service competency (Adams, Richey Jr, Autry, Morgan and Gabler, 2014). A firm focussed on relationship building must strategically develop this operant resource and simultaneously develop a supply chain that then benefits from greater collaboration and relationship building (Swink, Narasimhan and Wang, 2007). Collaboration in a supply chain relationship arises when the skills and knowledge of the employees of different firms are leveraged to coordinate their efforts toward achieving common outcomes. The supply chain members must be able to better define and execute their roles and responsibilities according to their firm strategies by utilizing the operant resource – *Collaboration*.

Knowledge management competence

Interviewees also focused on the importance of activities that provide more effective management of knowledge (Activities 6 and 7, Figure 5), both within and outside of the firm. Several firm activities were aimed at the development, dissemination, and application of knowledge. The qualitative study identified these activities as the operant resource *Knowledge Management Competence*. Knowledge management competence is defined as the “effective management of knowledge of value for the ongoing health and longevity of the firm” (Sedera and Gable, 2010, p. 297). For example, as one informant described:

“Employee knowledge updating is a continuous process. Now, there are specific teams or specific projects being run to upgrade the employees’ knowledge and to rate them and to also delegate them according to their knowledge and skill sets. That is a shift that has happened, and it is giving good dividends.” (I8)

Firms indicated clear intentions to attain knowledge, and apply it for a competitive advantage (Arnett and Badrinarayanan, 2005) both within the firm and through its supply chain activities. The closer the supply chain matches the elements of knowledge and strategy of a firm, the better is its performance (Hult et al., 2006). Considering ‘accessibility’ as an element of knowledge, Hult et al. (2006) showed that the easier the availability of knowledge in the supply chain, the better the supply chain performance.

According to the knowledge-based view, firms must effectively make use of the knowledge they possess, acquire or create to achieve competitive advantage (Choi and Lee, 1997; Grant, 1996). The first example of knowledge management came from Honda, which set up “brainstorming camps” to share, transfer, and create knowledge within their supply chain (Samuel, Goury, Gunasekaran and Spalanzani, 2011). Thus, it is clear that the supply chain serves as a basic support system for knowledge management, and a firm must have a supply chain suited for knowledge management.

Organizational culture

Several firm activities indicated an emphasis on unique underlying values or principles that would unify the supply chain. An organization’s culture will provide important influence on employee behaviour and attitudes towards the firm’s customers and other entities in the supply chain (Beitelspacher, 2012). In this case, interviewees described an objective to develop and facilitate an organizational culture that would support employee commitment and retention (Activity 8, Figure 3.2). Organizational culture in this context, is an organizational climate in which goals and values are focussed on service excellence, and supportive of service-dominant logic (Beitelspacher, 2012). In particular, informants emphasized the importance of creating a positive organizational culture through the development of learning competencies.

“The culture. The way we treat our employees and the learning opportunities that they get. We stand out in terms of learning experiences and training programs that we do for our employees. We don’t lose people; we don’t lose institutional knowledge as fast as we would if we are not doing them.” (I5)

Previous research shows that developing a successful organizational culture would help in choosing key supply chain partners (Beitelspacher, 2012). When organizational culture becomes the focus while selecting supply chain partners, the supply chain activities also complement and foster this organizational culture. This aspect is especially pertinent to service supply chains where customer contact is relatively high, and thus it becomes furthermore important to implement service ideals across a larger operating environment such as the supply chain. This fit provides them a consistent purpose and competitive advantage.

Market orientation

Further activities pointed toward a second order theme in which firms recognized the need to react rapidly to changing market needs. It is important for firms to generate and integrate market information, as a means to create and utilize valuable market knowledge (Jaworski and Kohli, 1993). These activities suggested strong need for operant resources relevant to market orientation (Narver and Slater, 1990; Jaworski and Kohli, 1993) (Activity 9, Figure 3.2). Market orientation is defined as: “the organization wide information generation, and dissemination, and response related to current and future customer needs and preferences” (Jaworski and Kohli, 1993). This was evident in the interviews as follows:

“So, you should think what is available in the market, what can be done and what cannot be done. You decide on strategy and invest in resources. If you know what is going to sell in next 2-3 years and you make strategy accordingly and you react to that in market.” (I15)

“We have internal bulletins, internal workshop, to make employees aware about what is happening in the market. Thus, market knowledge and market research are important resources.” (I18)

A survey-based study of manufacturing firms indicates the mediating role of a supply chain in the *market orientation-performance* link (Min, Mentzer and Ladd, 2007). Apart from that, market orientation could directly impact the coordination with different actors in the supply chain (for example, suppliers, distributors, and consumers). A firm could make use of supply chain actors to understand the market, and the firm could utilize this information only if it has the right supply chain to accrue this market-related information. Thus, the link between market orientation and supply chain is important for a firm to achieve better performance.

3.2.2 Service supply chain variables

The previous literature on service supply chains has been limited to a discussion of two main operating characteristics of service operations: service capacity and service inventory. Service inventory is the immediately usable service that has potential value (for example, the workforce available at a given point of time inside a call center) (Niranjan and Weaver, 2011; Ellram et al., 2004); while service capacity is the highest quantity of output possible

in a given period with a pre-defined level of resources (Niranjan and Weaver, 2011; Lovelock, 1992). While service capacity and inventory can be transferred across supply chain entities and have important value, they provide largely functional value to service firms and little in the way of innovative capability when responding to customers, especially during disruptions. A discussion on additional service and service supply chain variables, such as agility, accessibility, knowledge, information, or delivery reliability, have received limited attention in the context of defining a strategic purpose for service supply chains would allow frameworks to extend beyond basic ideas of capacity and inventory.

The analysis of supply chain activities (referred to as SC Activities 1 through 4, Figure 3.3) at informants' firms provided with insights into a set of service supply chain variables, and ultimately fit or match to their operant resources. The review indicated that the service delivery characteristics of Stavroulaki and Davis (2014) focused only on downstream activities and neglected a more whole-of-chain view that also included operant resources.

Thus in the following, this chapter sought to combine both operant resources and service supply chain variables that encompass the complete service delivery (Stavroulaki and Davis, 2014). Apart from service inventory and service capacity that the thesis identifies from literature, the interviews identified three additional variables pertinent to firms' service supply chain strategy: *supply chain agility*, *service delivery reliability*, and *service accessibility*. This is defined in Figure 3.3, and discussed further below.

Service delivery reliability

Responses related to service delivery and upstream service chain activities (SC Activities 1 and 2, Figure 3.3) pointed to the need for reliability of service delivery. Interviews explored two objectives of the target firms: (a) ensuring service quality by focusing on end-to-end supply chain activities; and (b) timely delivery of service. Delivery reliability is "the ability to meet quoted and anticipated dates and quantities" (Sarmiento, Byrne, Contreras and Rich, 2007), a key element of a firm's competitive dimensions (Vickery, Dröge and Markland, 1997; Scully and Fawcett, 1994; Corbett, 1996). Depending on customer-induced separability and variability of service (Stavroulaki and Davis, 2014), a common characteristic that all service chains should focus on is service delivery reliability. Thus, service delivery reliability must be achieved despite the variability and separability inherent to services (Figure 3.3).

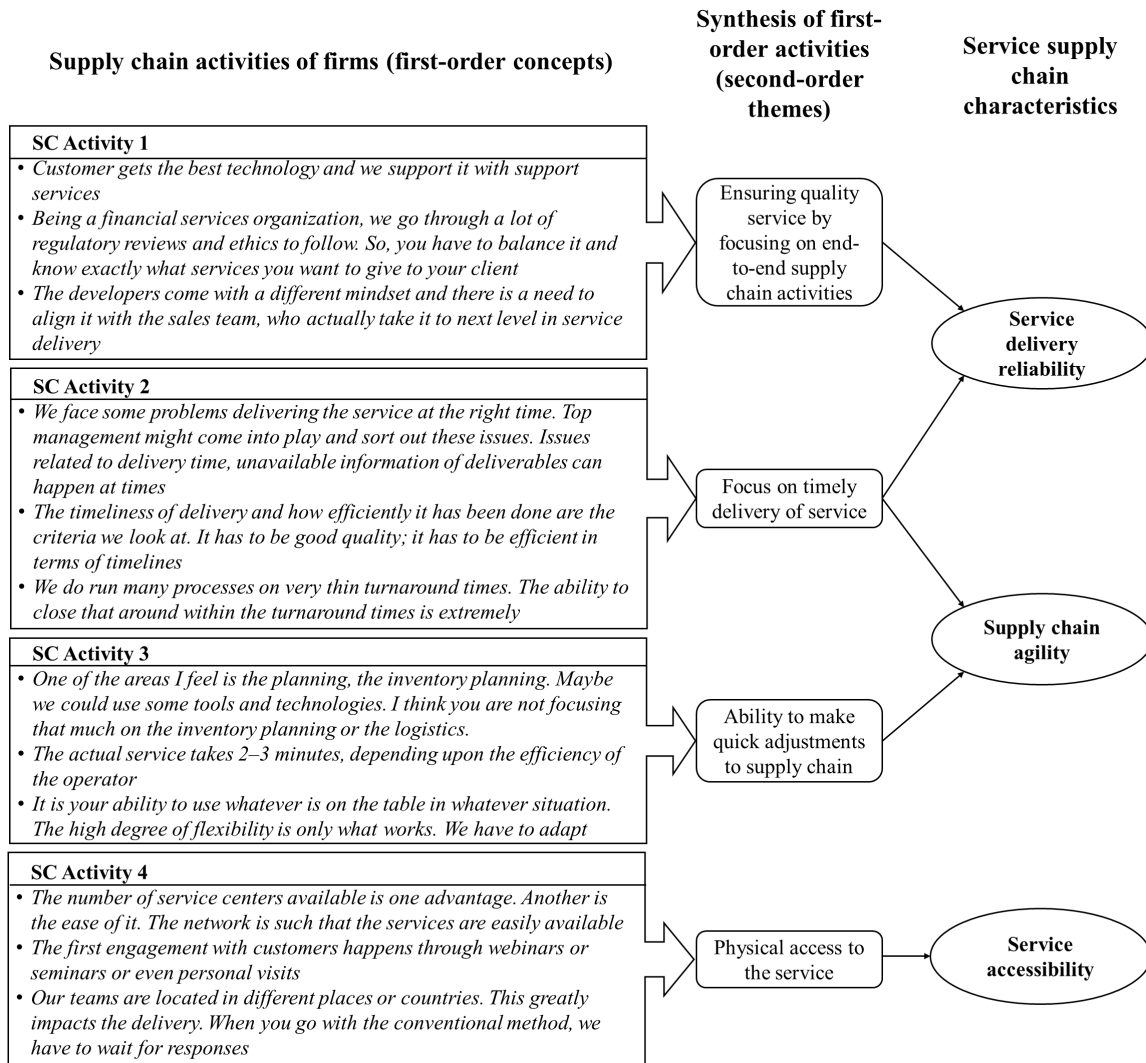


Figure 3.3: Identifying service supply chain characteristics from interview data

Service accessibility

Informants consider customers' physical access to the service as an service supply chain characteristic and they discussed activities that focused on this aspect (SC Activity 4, Figure 3.3). Being co-creators of service, customers are endogenous to a supply chain (Maas, Hartmann and Herb, 2014). It is the customer who incorporates the service into a "specific usage scenario" to generate value in use, and customers' ability to make maximum use of a service is of the utmost importance (Flint and Mentzer, 2006). Thus, providing access to service at a specific place, time, and in a specific form requires coordination among the upstream and downstream entities in the service chain. To provide service in the right form, the preferences or perceptions of services by customers should be

known to everyone involved in the service provision (right from the supplier to the end-service provider) (Figure 3.3).

Service supply chain agility

Supply chain agility (SC Activities 2 and 3, Figure 3.3) is the firm's ability to quickly adjust its supply chain to respond to changes, opportunities, or threats in its environment (Gligor, 2013). It is essential for firms' survival in turbulent and volatile markets (Agarwal et al., 2007). Firms can develop an agile supply chain with the help of certain operant resources. For example, Swafford et al. (2008) empirically proved that supply chain agility can be achieved through information technology integration. Agility is one way of accommodating service variability to enable organizations to deal with high levels of uncertainty (Manuj and Mentzer, 2008) and high-risk situations such as pandemics, natural disasters, or trade disputes.

3.3 Mismatch between operant resources and the supply chain

The interviews indicated the absence of a clear operant resources-based framework to guide service firm managers toward competitive advantage. In addition to the resources discussed above, informants described a frequent mismatch between the advantages that these operant resources provided their firm, and the firms' supply chain activities. Managers recognized the significance of their firm's operant resources relative to those of their competitors, but felt that they often lacked the tools needed to exploit these resources in service delivery and supply chain activities. For example, as some informants described:

“There is lot of information inefficiency in the market. All the models that we study in management do not apply..... So, whatever you gather, you should make sure it is not bad information. To come up with our own proprietary valuation tools.” (I1)

“Our brand is trying to project as something which is totally unpopular with Indians. But foreign brands have been more successful by Indian-ising themselves. So, I am talking about a mismatch between our resources and the service we provide.” (I9)

“There’s always a gap. We have to constantly improve our service delivery, update our equipment, the software or related accessories to reach the optimum level of supply.” (I3)

The responses indicated that managers understood the importance of intangible operant resources to their firm, but that they lacked a tool or framework to make informed strategic decisions based on them. Equally, it was evident from responses that the direct contribution of a specific operant resource in service delivery, to the supply chain, was often missing. As such, despite the expressed importance of operant resources by the firms in the sample, these managers, and this research, struggle to identify frameworks that suggest how they should utilize such resources in a service supply chain context.

In summary, as the informants in the interviews described, operant resources (rather than operand resources) are a source of competitive advantage, and a key factor in supply chain strategy development, and service-dominant logic. While firms frequently possessed a set of relevant operant resources however, they often took a back seat to their operand resources. In addition to substantiating the importance of operant resources to service firm managers, and service firm success, the findings also emphasized the importance of having the right supply chain to complement these operant resource(s). The managers could articulate a role for intangible resources in their firm’s success, but struggled to articulate how these resources adequately matched the needs of their supply chain (or their importance to firm strategy). As such, the findings have value to firms and encourage to develop a framework for improving firm performance through the selection of appropriate operant resources that match firms’ supply chains.

3.4 Service supply chain fit

Building on the findings of the literature review and exploratory study, this thesis develop a conceptual framework through which firms’ service supply chains can be more effectively classified in terms of operant resources. The exploratory study reaffirms the role of operant resources in firm performance. Resource-based view has contributed to literature on developing a firm’s core competencies by strategically exploring their resources (Barney, 1991). Even though operant resources and service-dominant logic are yet to be viewed through the lenses of resource-based view, the study draws from resource-based

view to develop a concept of service supply chain fit. This is because, the interconnections between resource-based view and end-to-end supply chain processes are evident in literature as well as real world (Richey, Tokman and Dalela, 2010).

3.4.1 Resource-based view

Resource-based view looks at firms in terms of their resources rather than their products (Wernerfelt, 1984). This study explores this view to throw a different light on supply chain fit. Resource-based view assumes that firms perform differently due to differences in rent-generating resources that are firm-specific and cannot be easily imitated or substituted (Amit and Schoemaker, 1993; Griffith and Myers, 2005). It is possible to find optimal activities for a firm by specifying its resource profile (Wernerfelt, 1984). Resources discussed in resource-based view are not limited to physical resources; they can be anything that can be considered valuable for the firm. According to this, firms do not compete on products but on the capacity and ability to develop these products (Hamel and Prahalad, 1994). An understanding of the positive relationship between a firm's financial performance and its resources has enabled several marketing scholars to focus their studies on leveraging of resources that can help firms to sustain or create a competitive advantage over others (Wu, Yenyurt, Kim and Cavusgil, 2006).

In service-dominant logic, operant resources are central to the process of value creation, but according to resource-based view, value creation occurs only when a potential resource can be turned into a specific benefit. Service-dominant logic basically recognises the contributions of resource-based view (that resources are central to value creation) and takes a step ahead to expand this theory by bringing in the concept of operant resources, which according to service-dominant logic, is the prime source of competitive advantage. But, operant resources cannot on their own create value or improve performance. To turn these resources into a specific benefit, firstly, they must fit with the firm strategy. Secondly, the significant implications of having the right supply chain for products or services (based on firm strategy) is also inevitable (Fisher, 1997; Wagner et al., 2012). This is where the concept of matching operant resources and supply chain characteristics makes sense. The concept of strategic fit naturally aligns with this idea, and it forms the basis of this study's concept of service supply chain fit. An understanding of the relationship between a firm's supply chain and its resources based on resource-based view is thus the focus of this research. This study proposes operant resource as a fit variable, which according to service-

dominant logic and resource-based view are the primary resources that a firm possesses (Vargo and Lusch, 2004; Wernerfelt, 1984).

Empirical research in strategic management is centred on the concept of fit. Effective management of a supply chain depends on its manager's ability to appropriately fit organizational and strategic elements with environmental factors (Griffith and Myers, 2005). Fit is defined as "the degree to which the needs, demands, goals, and objectives and/or structures of one component are consistent with the needs, demands, goals, objectives and/or structures of another component" (Nadler and Tushman, 1980, p. 45). Fit is the adherence to a specific profile under the profile deviation perspective (Griffith and Myers, 2005).

Strategic fit refers to the efficiency with which the firm's resources are matched with its environment (Snow and Miles, 1984) and the effectiveness of the strategy implemented in certain environments (Xu, Cavusgil and White, 2006). Firms should create or maintain supply chain activities such that their resource sets provide a core capability that generates significant competitive advantages for them (Kakabadse, Kakabadse and Kouzmin, 2003). There is a need for a supply chain framework that can align the firm's resources and its supply chains (Lambert, García-Dastugue and Croxton, 2005). To enable the understanding of the significance of resources in supply chain management, Ellram and Cooper (1990) describe supply chain management as the effective and efficient use of resources in achieving a firm's strategic objectives.

3.4.2 Definition of service supply chain fit

Achieving a fit between the firm and its environment has performance implications. The resource characteristics strategy of a firm is matched with its supply chain, expecting it to have a significant effect on performance.

The adoption of a specific service supply chain strategy has significant implications on firm performance and thus it is imperative for firms to have the right set of resources for those strategies. While firms mostly focus on a set of operand or tangible resources, this thesis conceptualize the importance of intangible operand resources and choosing a right supply chain strategy. By extending the concept of strategic fit to service supply chains and basing its argument on the resource-based view of firms, this thesis formalizes the view of fit. Fisher (1997) formalizes fit by distinguishing products (physical goods) as either

innovative or functional, and supply chains as being either responsive or efficient, but the proposed service supply chain fit is based on the firm's operant resources (not physical goods or resources).

Operational effectiveness is essential to achieve superior performance. In strategic fit concept, theorists postulate the view of constant improvement using phrases and words such as – 'matched with', 'contingent upon', 'consistent with', 'fit congruence', and like (Venkatraman, 1989). Extant literature lacks precise guidelines on using those verbal statements in strategic fit research. The meaning of 'fit' in strategic literature is still a matter of debate. Depending upon the contexts and variables, fit is viewed as mediation, moderation, matching, gestalt, covariation, and profile deviation (Bergeron, Raymond and Rivard, 2001; Buttermann et al., 2008). Fisher (1997), Lee (2002), and Wagner et al. (2012) view fit as matching. But, in general, the systematic literature review suggest that the choice of fit perspectives lacks conceptual and methodological rigor in prior literature. Therefore, before jumping into conclusions, the initial conceptualization of service supply chain fit doesn't assume any interaction (moderation), intervention (mediation) or any other perspectives, because of the non-reference to any criterion variable. Thus, this thesis conceptualize *service supply chain fit is as the strategic consistency between a firm's operant resources and its supply chains.*

A foundational premise of service-dominant logic is that indirect exchanges inherent to services mask the fundamental unit of exchange, and that the organization's bundles of skills and knowledge are the primary units of indirect exchange. Focusing on a firm's functional objectives enhances financial performance (Lusch and Vargo, 2014). Thus, by building on operant resources, which according to service-dominant logic is the prime source of competitive advantage for service firms, and aligning it with supply chain characteristics, this study develops a conceptual model of service supply chain fit. This requires the firm to develop and align its operant resources to its functional objective based on its strategic intent. A goods-centric view of supply chains concentrates on operand resources. However, in service-dominant logic, operant resources are given higher priority because they produce effects (Constantin and Lusch, 1994). More often than not, operant resources are invisible and intangible (Vargo and Lusch, 2004). Hamel and Prahalad (1994) make it clear that the core competences of an organization are not physical assets, but are "bundles of skills and technologies," which are essentially operant resources. Operant resources are resources that produce effects (Constantin and Lusch, 1994). According to

Vargo and Lusch (2004), skills and knowledge are the most important types of resources. Tangible products can be viewed as embodied knowledge or activities (Normann and Ramirez, 1993). The following sections of the thesis will use the concept of masterful operant resources by Madhavaram and Hunt (2008). Even though most firms have operant resources such as good capabilities and competences, few have successfully developed operant resources. Madhavaram and Hunt (2008) views operant resources as resources that enable them to consistently produce valued services efficiently and effectively. Operant resources are those resources which are important for the firm's performance and those which aid firms to achieve their strategic goals. Organizations that have developed masterful operant resources (it can be composite and/or interconnected operant resources) have a competitive advantage over others; they also have the capability to innovate

According to service supply chain fit, service-focused supply chain strategies should revolve around operant resources and vice-versa. This requires the firm to develop and align its operant resources to its functional objective based on its strategic intent. For example, as Lawson and Samson (2001) explain, Cisco determined in 1992 that its suppliers could add more to performance than Cisco could alone. More than its manufacturing capability it was Cisco's relationships with entities outside the chain that lead to improved performance. By matching its operant resource – *collaboration* with its supply chain, Cisco significantly improved innovation and performance. Similarly, as Soosay, Hyland and Ferrer (2008) described, efficient supply chains rely substantially on collaboration to enhance firms' performance and competitive advantage. Home Depot's case illustrates the benefits of operant resource-supply chain alignment. The company emphasized its internal culture to bring 'discipline' to merchandise planning and purchasing (Ton, 2014). By encouraging the use of standards and by recruiting junior military officers, it distilled a discipline-focused internal and supply chain culture, which improved firm performance.

In addition to these examples, numerous important supply-chain goals are service oriented and as such would require the development and exchange of indirect resources if they are to be successful. For example, service delivery reliability, service accessibility, service capacity, service inventory, and service agility, are all intangible goals not dependent on physical goods or resources (Fisher, 1997; Wagner et al., 2012; Gligor, 2016; Niranjana and Weaver, 2011). Thus, it is imperative for service firms to search for ideal frameworks or processes to leverage operant resource(s) and match them with supply chain

characteristics that are often service-focussed, if they are to attain service supply chain fit. In a similar vein, several studies hypothesize (without empirically testing) positive relationships between goods-focused supply chain and some of the operant resources listed above.

3.5 Chapter summary

While this chapter describe a few examples of potential service supply chain fit, this chapter encourage further research aimed at developing such framework(s) that are specific to firm type, industry or existing strategy. Context-specific examples are required for future empirical studies that develop concepts of fit between various operant resources, and the service supply chains that should support them. For example, Gligor (2017) examined different potential moderators of the ‘fit’ relationship, rather than matching. Further empirical studies should identify a more concrete path to the dimensions of fit for service supply chains in particular, and the interplay of the different operant resources with supply chain characteristics.

The next chapter develops a strategic framework to empirically test the concept of service supply chain fit. The study empirically tests the relation between operant resources and firm performance. The next chapter also investigates the perspectives of fit which shall deem suitable in this case.

Chapter 4

Firm performance and service supply chain fit

The increased significance of services in the world economy has resulted in an increased number of studies in service operations, and many of them focus on service supply chains. Although intuitively, service supply chain management is likely to have a positive impact on firm performance, there isn't any specific framework or empirical evidence to support this claim (Stavrulaki and Davis, 2014; Ellram et al., 2004). Even after realizing the importance of services, frameworks in supply chain management literature are still under the influence of goods dominant logic. Thus, it is crucial to empirically study the role of service supply chain management in firm performance. The concept of service supply chain fit is an important first step towards this, and therefore this chapter investigate the relation between service supply chain fit and the performance of service firms.

The concept of fit is the center of empirical research in strategic management. Griffith and Myers (2005) argue that effective management of the supply chain depends on a manager's ability to fit organizational and strategic elements with environmental factors appropriately. Nadler and Tushman (1980) defined fit as "the degree to which the needs, demands, goals, and objectives and structures of one component are consistent with the needs, demands, goals, objectives, and structures of another component." Griffith and Myers (2005) conceptualized fit as the adherence to a specific profile under the profile deviation perspective. Firms should create or maintain supply chain activities, such that their resource sets provide a core capability that generates significant competitive advantages for them (Kakabadse et al., 2003). There is a need for a supply chain framework that can align the firm's resources and its supply chains (Lambert et al., 2005). It is important to view supply chain management as a means of effective and efficient use of resources in achieving a firms' strategic objectives (Ellram et al., 2004). Thus, there is a

need for a framework to empirically validate the significance of resources, especially operant resources in service firms.

A high level of fit is advantageous; therefore, it is always advisable to maximize fit (Day, 1999; Snow and Miles, 1984). Service supply chain fit is based upon the concept of strategic fit and refers to the “efficiency with which the firm’s resources and capabilities are aligned with its environment” (Hofer, 1975) and the “effectiveness with which the firm implements a chosen strategy in certain environments” (Xu et al., 2006). In strategic fit literature, the degree of congruency between a firm’s strategy and its supply chain characteristics has significant performance implications (Hofer, 1975; Fisher, 1997; Wagner et al., 2012). There is a general agreement that the degree of consistency between competitive priorities and operational aspects of a firm determines the effectiveness of a strategy (Boyer and Lewis, 2002). Thus, by developing an understanding of the service supply chain fit on performance, firms can focus on strategies and frameworks best suited for them, and that would be a key to their supply chain. Therefore, this chapter seek to answer the following research question: *How does the fit between service firms’ operant resources and their supply chains impact firm performance?* Achieving a proper fit between the firm and its environment has performance implications. Therefore, this study align the resource characteristics strategy of a firm with its supply chain, with the knowledge of the fact that this has a significant effect on performance.

This thesis confines the concept of strategic fit into the context of this thesis, and hypothesize the aligning of the operant resources of a firm with its supply chain characteristics. By extending the concept of strategic fit to the service supply chain strategy and by aligning it with the resource-based view of firms, the service supply chain encompasses intangible characteristics of firms in the form of operant resources (Vargo and Lusch, 2004; Madhavaram and Hunt, 2008).

4.1 Hypotheses formation

Extending the views of strategic fit and supply chain fit to service supply chain fit, this study develops hypotheses using a moderation perspective. According to the moderation perspective, the impact that a predictor variable has on a criterion variable is dependent on the level of a third variable, which is called a moderator. In this study, the moderator variable - supply chain characteristics (degree of responsiveness and supply chain agility)

is viewed characteristically, and it is expected to affect the direction or strength of the relationship between resource strategy (predictor variable) and firm performance (criterion variable).

This study follows the first-order fit of simple consistency between each activity and the overall strategy. This work rests on one of the foundational premises of service-dominant logic, which indicates that indirect exchanges mask the fundamental unit of exchange. The organization's bundle of skills and knowledge is essential for the fundamental unit of indirect exchange. Focusing more on a firm's functional objective is expected to enhance its financial performance (Vargo and Lusch, 2004). Minimizing the unit service production cost might force a firm to focus more on efficiency to enjoy bigger economies of scale. This could result in a loss of responsiveness to the firm. The firm will be less focused on innovation.

Similarly, a firm focused on innovation will not be efficient and is not expected to enjoy bigger economies of scale. As mentioned above, the firm is expected to enhance its firm performance if they are successful in achieving their functional objectives. This requires the firm to develop and align their operant resources that are focused on their functional objective. From the composite and interconnected operant resources, this study form three clusters of operant resources: innovation cluster, efficiency cluster, and innovation-efficiency cluster. Clusters are formed such that resources that contribute to innovation, efficiency, and both innovation and efficiency are grouped under the innovation cluster, efficiency cluster, and innovation efficiency cluster, respectively.

4.1.1 Innovation

Innovation is the mechanism by which organizations produce new products, processes, and systems that are required to adapt to changing markets, technologies, and modes of competition (Lawson and Samson, 2001). Service innovation is a set of innovations in technology, business models, socio-organizational, and demand to improve existing services (Chen, Wang, Huang and Shen, 2016). Even though few studies directly relate supply chain with innovation capabilities, literature shows a positive relation between key supply chain elements and innovation. Urban and Von Hippel (1988) explain that the "networks and alliances of the firm, suppliers, and other entities that are beyond the traditional boundaries of the firm are the key sources of innovations." The knowledge gained through external network participation is critical to successful innovation (Cohen

and Levinthal, 1990). Resources such as information and service quality widen the opportunity to maintain or enhance innovation (Lawson and Samson, 2001; Gulati, Nohria and Zaheer, 2000).

As explained above, in a case study, Lawson and Samson (2001) explain how, in 1992, Cisco determined that their suppliers could add more to innovation than Cisco alone; and they recognized that it was not their manufacturing capability, but their relationships and partnerships with entities outside their network as their core capability that could lead to innovations. Similarly, the informant I16 (refer Table 3.1, Chapter 3) – who works for a firm that provides high-end robotics technology to automobile giants like Mitsubishi and Honda – stated the need for specific resources such as learning capability and research to aid innovation. According to I6:

“Apart from dealing with present-day problems, we focus more on innovation, research, and technology development for futuristic problems. To work on such problems, we have provided knowledge to employees, and we need to retain them in the long run.”

While these resources are, individually, the firm’s key sources of innovations, entities beyond the focal firm’s traditional boundaries and the firm’s relationships with supply chain partners are also important for innovation (Urban and Von Hippel 1988).

Service supply chain fit seeks to capture the effective use of service firms’ resources to better align operant resources with the strategic objectives of their supply chains. Therefore, we support the contention that a positive supply chain fit will positively impact service firm performance (Stank et al. 2012; Wagner et al. 2012; Christopher and Ryals 2014; Frankel and Mollenkopf 2015; Gligor 2017). By building on the concept of strategic fit, this study hypothesizes based on the argument that innovative operant resources with responsive supply chains outperform firms with innovative operant resources and efficient supply chains. The following is the hypothesis:

Hypothesis 1: Service firms with innovation operant resources and responsive supply chains outperform service firms with innovation operant resources and efficient supply chains.

4.1.2 Efficiency

The aim of efficient services is cost-efficient service offerings through cost reduction strategies (Wagner et al., 2012; Stavroulaki and Davis, 2014). The resource-based view asserts that certain resources that a firm possesses can enable it to execute strategies that can lead to improvements in efficiency (Barney, 1991). Efficient supply chain strategies aim to achieve low-cost products and to improve performance (Li and O'Brien, 1999). Strategies that can efficiently manage a firm's supply chain have proven to be effective in the reliable delivery of products at the lowest cost (Liang, Yang, Cook and Zhu, 2006). When supply chain members use resources appropriately, it will result in cost-effective products and services (Liang et al., 2006). "A product with a stable demand and a reliable source of supply should not be managed in the same way as one with a highly unpredictable demand and an unreliable source of supply" (Lee, 2002). So, the right supply chain strategy for efficient products is the devising of efficient supply chains. Based on the above logical reasoning, it is the resources that enable a firm to execute its "efficiency" strategy and relate resources to the firm's performance. This study build hypotheses on the basis of service-dominant logic that was proposed by Vargo and Lusch (2004). Operant resources that can help organizations attain operational efficiency are will be clustered in the efficiency cluster. A firm's competitive priority and its resources must support and match its supply chain.

For example, two informants – I4 and I9 (refer Table 3.1, Chapter 3) – who represented firms that adopt efficiency strategies, asserted that they focus on competitive pricing, and thus, for them, the price-setting capability is a more critical resource (than those firms focusing on innovative strategy) than 'learning' or any other operant resources that would aid supply chain responsiveness. I4 pointed out that:

"Our competitive advantage is mainly through pricing. There is very tough competition in the market. IT is easy to compete. And the pricing is again a main competition."

Operant resources in the efficiency cluster support the firm in providing functional products (low-profit margins, less variety, and high volume). So, the firms that aim for operational efficiency should focus on building supply chains that are efficient.

In summary, firms that have efficient operant resources support efficient supply chains, rather than responsive supply chains, and it is positively associated with a firm's performance. Based on the arguments above, this study hypothesizes the following:

Hypothesis 2: Service firms with efficiency operant resources and efficient supply chains outperform service firms with efficiency operant resources and responsive supply chains.

4.1.3 Innovation and efficiency

Firms that simultaneously offer innovative and functional products should adjust their supply chain base according to the innovativeness or the efficiency of the product (Gligor, 2016). They define supply chain agility as “the firm's ability to make quick adjustments to its supply chain to respond or adapt to changes, opportunities, or threats in its environment.” Agility is the fundamental characteristic of a supply chain and is vital for survival in turbulent and volatile markets (Agarwal, Shankar and Tiwari, 2007). Supply chain agility is different from supply chain responsiveness. Supply chain agility of a firm that allows it to be either more responsive or more efficient depending on the product and external environmental characteristics (Gligor and Holcomb, 2012). Thus, while operating in an environment that may either demand innovative or functional services, firms need to develop supply chain agility to achieve the desired supply chain fit.

Firms are under pressure to improve performance by offering products with high operational efficiency and being agile enough to offer innovative products. Specific resources can be influential in contributing to supply chain agility by integrating efficiency and responsiveness into a supply chain (Swafford, Ghosh and Murthy, 2006; Madhavaram and Hunt, 2008; Yusuf, Gunasekaran, Adeleye and Sivayoganathan, 2004). From our interviews, it was clear that firms that intended to be agile lacked the understanding of resources they require to have, as informant I7 explains:

“In our industry, we have no direct control over what happens. Honestly, there are no critical resources within the firm that really give you the advantage. It is your ability to use whatever is on the table in whatever situation. The high degree of flexibility is only what works.”

All these points toward the fact that certain operant resources can help a firm in devising agile supply chains and that have significant performance implications. Operant resources

in the innovation-efficiency cluster will contribute to innovation and functional products. Supply chains for innovative products should focus on responsiveness, in contrast, to supply chains for functional products, which should focus on efficiency. While operating in environments that demand innovation and efficiency simultaneously, there is enough evidence to hypothesize that firms with agile supply chains outperform those that do not have agile supply chains. Therefore, this study hypothesizes that:

Hypothesis 3: Service supply chain agility positively mediates the relationship between innovation-efficiency operant resources and firm performance.

This study follows the first-order fit of simple consistency between each activity and the overall strategy. Figure 4.1 shows the theoretical model depicting the hypothesized-relationships of interest (H1, H2, and H3) and the underlying direct-relationships (D1, D2, D3, and D4).

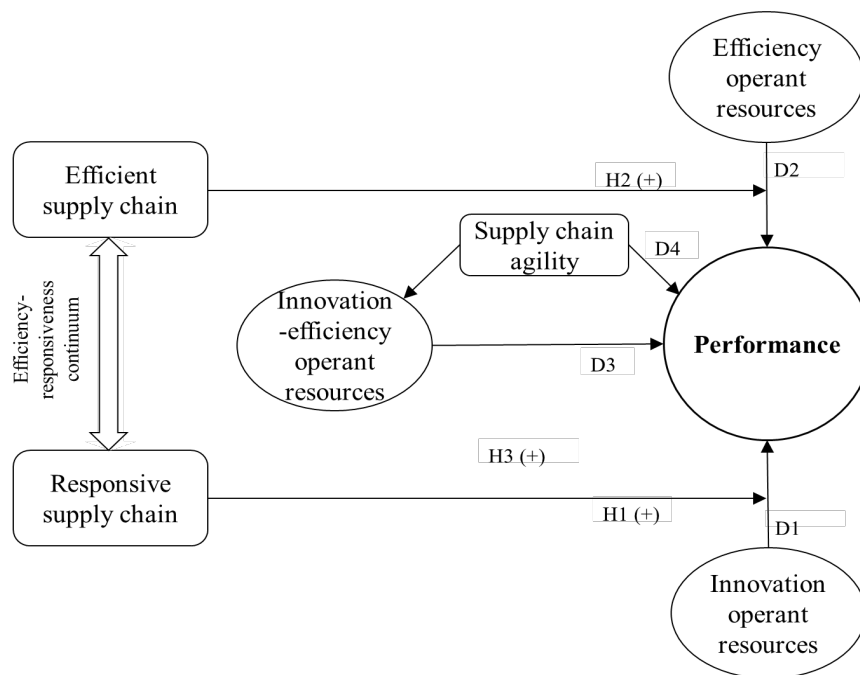


Figure 4.1: A theoretical model depicting the relationships of interest between a firm's operant resources and its supply chain characteristics.

H1 and H2 test the moderating effects of corresponding service supply chains on the relationship between operant resources and firm performance. H3 tests the mediating role of service supply chain agility on the relationship between innovation-efficiency operant resources and firm performance.

4.2 Methodology

To test the hypotheses, this study conducted survey research with detailed questionnaires. This empirical study pretested the questionnaires on executives and managers of target firms and measured the constructs of interest by using data from the questionnaire survey. Single-item scales are designed and used to assess the innovativeness and efficiency capability of firms based on their operant resources. To measure the supply chain responsiveness (responsive supply chains or efficient supply chains), this study use the approach of Wagner et al. (2012). Even though those survey items with respect to a firm's product line, the empirical work was based theoretically on competitive priorities in operations management. Therefore, this study adopt the methodology adopted by Wagner et al. (2012) in the context of service supply chains. This methodology can also help capture the strategic priorities of a firm's supply chain strategy. The survey design and scale development are discussed in detail below.

4.2.1 Survey design

To test the hypotheses, this study list out operant resources and cluster firms according to their ability to contribute towards innovation and efficiency. Then, this study conducts survey research with detailed questionnaires with an objective to measure the availability of operant resources for service firms. pretested the questionnaire on executives and managers of target firms. Marketing research advocates the use of multi-item measures. But it is costly and practically impossible for certain service researchers to use multi-item scales (Drolet and Morrison, 2001). The heavy pressure and burden these multi-item scales place on respondents' forces researchers to restrict survey length. Drolet and Morrison (2001) argue that the primary purpose of doing a survey using any scale, multi-item or not, is to gain information. Thus, any scales should be evaluated based on the information that they collect. Using multi-item measures with the given number of questions reduces the number of constructs that could be investigated using a single-item scale. In this case, there is a similar trade-off between two things. One, to collect data of all listed 24 resources using a single-item scale and second, to collect data of a reduced number of resources using a conventional multi-item scale. Considering the significance and characteristic of the research question, this study collect the firm's availability of operant resources using a single item for each resource. Drolet and Morrison (2001) argue that one or two good items that elicit appropriate respondent behaviour will yield better information than poorly

presented multiple items. Multi-item scales are prone to error term correlations and can also stimulate inappropriate response styles. Thus, this study support the use of a single-item scale with an argument that - increases in the number of items increase inappropriate response behaviour. Drolet and Morrison (2001) illustrate how multi-item measures negatively affect the information content of scales. The increase in the number of items can lead to fatigue, boredom, and lack of attention of respondents. The incremental information that multi-item scales provide (with reasonable error terms) is extremely small compared to single-item measures (Drolet and Morrison, 2001). All the factors mentioned above would improve the response quality and information content of the scale. Bergkvist and Rossiter (2007) studied the predictive validity of multi-item measures and single-item measures of the same constructs. Their study proves that the difference between the predictive validity of these two measures is insignificant. They conclude that for many constructs in marketing that consist of concrete singular object and concrete attribute, scales with single-item measures will be appropriate.

On similar grounds, Rossiter (2002) proposed the C-OAR-SE procedure of scale development. C-OAR-SE stands for construct definition, object classification, attribute classification, rater identification, scale formation, and enumeration and reporting. This method explained that if the object can be conceptualized as concrete and singular, it does not require multiple items for measurement; instead, a single-item scale is more desirable. Based on open-ended pre-interviews with raters, COAR-SE relies on logical arguments, an expert judgment. Following the C-OAR-SE procedure of scale development, the first step in this study's scale development is to transform the theoretical concepts of operant resources into observable and measurable elements and is called construct operationalization (Forza, 2002). The alignment between theoretical concepts and empirical measures, perceptual nature of the questions, multi-dimensional constructs are some of those. To solve this, this research uses operational definitions by transforming each resource into singular concrete objects. There is enough support for this method from previous works that report experiences and suggestions on measure development in similar situations.

The operationalization of constructs into a single-item scale is evident in operation management research. For example, Wagner et al. (2012) assessed five supply chain responsiveness measures about the main product line on a five-point scale. One of these is the construct delivery reliability. Wagner et al. (2012) used a single-item scale to measure

this construct. Other works on this construct- delivery reliability use scales with multiple items (Handfield and Pannesi, 1992; White, 1996). Wagner et al. (2012) pre-tested his single-item measure for ambiguity and clarity with executives and managers. Several academicians evaluated their questionnaire to confirm whether individual items are appropriate measures of respective constructs (content validity test). Thus, this thesis follows the same procedure of validation of the single-item scales.

4.2.2 Psychometric analysis

This study uses perceptual measures in the survey. Perceptual surveys are widely used in operations management literature (Ketokivi and Schroeder, 2004). A number of operations management scholars have questioned the use of objective data, especially in large-scale samples. Ward, McCreery, Ritzman and Sharma (1998) stated that the objective measures do not necessarily provide reliable data of constructs that is supposed to be measured. They stated this based on the empirical results of their study to identify the manufacturers' competitive priorities in developing a strategy. They advocate the use of multiple respondents from individual firms in those studies which use an unproven scale. According to Ward et al. (1998) respondents are more reluctant to disclose objective information than perceptual, which supports the use of perceptual measures. Use of perceptual data is a better approach to follow in studies which are cross-industry and cross-country investigations (Ketokivi and Schroeder, 2004). Questions on respondent honesty are expected while using perceptual surveys. Ketokivi and Schroeder (2004) lists a few of them and they are:

- “Is their response a reflection of what is or what should be.”
- “Does everyone interpret the notions ‘*strongly agree*’ and ‘*strongly disagree*’ in a similar manner.”

By admitting the fact that these problems do exist in perceptual measures, this study is based on the understanding that the above-mentioned issues of validity can be addressed.

4.2.3 Operant resources and measurement items

As mentioned earlier, composite operant resources are those resources that are formed as a result of the combination of two or more distinct basic resources with levels of interactivity that collectively enable the firm to efficiently and effectively produce their valued services. Resources that are formed as a result of interaction among their basic resources are called interconnected operant resources. Madhavaram and Hunt (2008) identified a set of

composite and interconnected operant resources, of which a few pertain to marketing strategy and others corresponds to business strategy. Apart from those listed by Madhavaram and Hunt (2008), this study adds a few additional resources to that list, which is important to services that are listed below. Table 4.1 and Table 4.2 lists out the set of operant resources (composite and interconnected) with their components.

Table 4.1: Composite operant resources (Madhavaram and Hunt, 2008)

Resources	Components
Market orientation	Customer orientation, competitor orientation, inter-functional coordination, intelligence generation, organization wide responsiveness, and culture
Market knowledge Competence	Customer knowledge process, marketing research and development interface, synergy of new products with their existing competences, and competitor knowledge process
Alliance competence	Alliance experience, alliance manager development capability, and partner identification propensity
Absorptive capacity	Potential absorptive capacity and realized absorptive capacity
Price-setting capability	Identifying competitor prices, pricing strategy based on service differentiation, client-driven price adjustment, and commitment to new prices
Market-focussed strategic flexibility	Options, intent, and capability
Network competence	Network management task execution, integration, collaboration, and network management qualifications
Technology	Technology collaboration reasons, and technological expertise
Marketing planning capability	Future anticipation skills, alternative generation skills, and efficient and rapid plan implementation skills
Customer response capability	Customer response expertise, customer response speed, and customer importance
Knowledge management competence (explicit)	Knowledge development, knowledge retention, knowledge dissemination, and knowledge application
Knowledge management competence (tacit)	Knowledge development, knowledge retention, knowledge dissemination, and knowledge application
Internal marketing orientation	Internal intelligence generation, internal intelligence dissemination, and response to internal intelligence generation

The target respondents for measuring operant resources are senior-level managers who are directly involved in operational and strategic decision making. The respondents for measuring supply chain characteristics are managers (middle or top level) with knowledge of supply chain processes and activities. The respondents for each of the survey are

different but from the same firm. The questionnaire also has a scale with items to measure firm performance of the firm.

Table 4.2: Interconnected operant resources (Madhavaram and Hunt, 2008)

Resources	Components
Market-Relating Capability	Orientation knowledge, skills integration, and alignment
Product Innovation Competence	Technological and customer competence
Learning Platform Capability	Learning intent, transparency, and receptivity
Organizational Learning Capability	Managerial commitment, systems perspective, openness and experimentation, and knowledge transfer and integration
Knowledge Creation Capability	Access, combination, and value anticipation
Entrepreneurial Proclivity	Innovativeness, risk taking, autonomy, and competitive aggressiveness
Market Orientation and Innovativeness Capability	Market orientation and innovativeness
Logistics Service Orientation	Logistics service quality
Organizational Service Culture	Service policies and customer favouring provisions
Collaboration	Collaborative communication and governance mechanisms
Integration	Commitment and coordination with firm's functional areas

In survey research, the most important aspect of sampling procedure is to set a sample frame (Malhotra and Grover, 1998) that can represent the population of interest. The unit of analysis for the study is the firm. As mentioned above, senior-level managers are expected to have comprehensive knowledge of all the activities of the firm. This study captures a cross-industry phenomenon which is relevant to all types of service firms. Thus, the sample frame is not confined to service firms of any particular type. This study created items for measurement of operant resources after operationalizing the constructs and measure the items on a 5-point scale (1: strongly disagree and 5: strongly agree) by requesting the respondent to “please rate the following items on a 5-point scale with respect to your firm”. Each of the operant resources is explained in detail. Below we discuss the items for measuring operant resources in detail.

Market orientation

Market orientation is the organizational culture that most effectively and efficiently creates the behaviours, to produce superiorly valued services (Kohli and Jaworski, 1990; Narver and Slater, 1990; Deshpandé, Farley and Webster Jr, 1993). Narver and Slater (1990) did an exploratory study to explain the relationship between sustainable competitive advantage and market orientation, and why market orientation is the biggest factor in creating effective and efficient valued services for consumers. According to them, three components that forms the part of market orientation are - *customer orientation*, *competitor orientation* and *inter-functional coordination*. Other prominent researchers that conceptualized market orientation are - Kohli and Jaworski (1990) and Deshpandé et al. (1993). For Kohli and Jaworski (1990), the components of marketing orientation are - intelligence generation, intelligence dissemination and organization-wide responsiveness. Whereas, culture (market and adhocracy), innovativeness and customer orientation are components of market orientation according to Deshpandé et al. (1993). Using components of market orientation to measure its availability in service firms (Narver and Slater, 1990), this study design the survey question to measure these three components of market orientation. Customer orientation is defined as the sufficient understanding of one's target buyers to be able to continuously create superior value for them (Narver and Slater, 1990). Competitor orientation is the understanding of short-term strengths and weaknesses and long-term capabilities and strategies of both the key current and potential competitors (Narver and Slater, 1990). Inter-functional coordination is the coordinated use of firm's resources to create superior value for customers. Based on the above definitions of customer orientation, competitor orientation and inter-functional coordination, the following are the items for measurement.

- Customer orientation: We are oriented towards our customer with an aim to provide highly valued services to them.
- Competitor orientation: We understand our competitor's performance and behaviour.
- Inter-functional coordination: Our business functions share resources and integrate them to serve the needs of our target customers.

Internal market orientation

Internal market orientation focusses on the internal relationship between service employees and the top management (Lings, 2004), which is found to have a great impact on the competitive advantage of a firm. According to Gounaris (2006), internal marketing orientation comprises the strategies and programs that a firm deploys in its internal market so as to achieve external objectives. The components of internal market orientation are internal intelligence generation, internal intelligence dissemination, and response to internal intelligence generation. The item for measuring internal market orientation is mentioned below.

- Internal market orientation: We are committed to producing value for our employees by understanding their needs.

Logistics service orientation

Logistics service orientation is the strategy and decisions of the logistics service provider which enable the achieving of the firm's goal of delivering the service (Panayides, 2007). Based on literature, Panayides (2007) identified the firm's goal with regard to logistics. They are on-time service delivery, timely response to requests, accurate information storage and delivery, development of the ability to solve problems, fulfilment of promises, and assistance to the clients in accomplishing their own objectives. Thus, this operant resource using the below mentioned item.

- Logistics service orientation: We focus on strategic decisions of logistics, which enable the timely delivery of quality service.

Alliance competence

Alliances are collaborative efforts between two or more firms, in which they pool their resources in an effort to achieve mutually compatible goals that they would not achieve easily alone (Lambe, Spekman and Hunt, 2002). Relationships that are considered as alliances can be between different entities in a supply chain. Lambe et al. (2002) define alliance competence as an organizational ability to find, develop and manage such alliances. They have also identified three facets of alliance competence: alliance experience, alliance manager development capability, and partner identification propensity. Their study empirically supports the view that alliance competence contributes to alliance success. Below is the item for measuring this operant resource.

- Alliance competence: We share our resources with two or more other firms with an aim to achieve mutually compatible goals.

Market knowledge competence

Market knowledge competence is a process that generates and integrates market knowledge (Li and Calantone, 1998). Market knowledge is defined as knowledge that comprises structured and organized information about the market. Several characteristics that market knowledge competence exhibits are: (i) Inimitableness, (ii) Immobility, and (iii) Undiminishableness (Hamel and Prahalad, 1994; Li and Calantone, 1998). Market knowledge can be considered as a refined form of marketing orientation that focusses on knowledge generation. Li and Calantone (1998) suggest that market knowledge competence has three components: the customer knowledge process, the marketing research and development (R & D) interface, and the competitor knowledge process. The important facets that are categorized under market knowledge competence operant resource are, the customer knowledge process, the marketing R and D interface, synergy of new products with their existing competences, and the competitor knowledge process. Below is the item for measuring market knowledge competence.

- Market knowledge competence: We are competent in integrating the market knowledge we generate.

Product innovation competence

Product innovation is a process that links technology and customers (Dougherty, 1992). Product innovation competence is the firm's competence in bringing together the competencies that are related to technology and customers (Danneels, 2002). Danneels (2002) identified that linking of technological and customer competencies will result in product innovation competence. Product innovation competence is measured using the item mentioned below.

- Product innovation competence: We create new products by linking the competencies that are related to technology and customers.

Network competence

Network competence is defined as “the degree of network management task execution and the degree of network management qualification possessed by the people handling a

company's relationships" (Ritter, Wilkinson and Johnston, 2002). A firm's ability to initiate, handle, use, and terminate inter-organizational relations is of central importance in services. The components of network competence according to Ritter and Gemünden (2003) are: network management task execution, collaboration, integration, and network management qualifications. Task execution can be relation-specific (tasks to manage single relations) or cross-relational (tasks to manage a network of relations). According to Ritter and Gemünden (2003), qualifications could be specialized qualifications or social qualifications. A firm's innovation success is positively correlated with network competence in a study conducted by Ritter and Gemünden (2003). The item for measuring network competence is mentioned below.

- Network competence: We are competent in managing inter-organizational relations.

Knowledge management competence

Sedera and Gable (2010) defines knowledge management competence as "effective management of knowledge of value for the ongoing health and longevity of the firm." While defining the role of the core-selling team in customer-driven customer relationship management (CRM) strategies, Arnett and Badrinarayanan (2005) identify three components of knowledge management competence, which are the abilities to develop, disseminate, and apply knowledge. This work considers both *explicit* and *tacit* knowledge as two different constructs because there are considerable differences between explicit and tacit knowledge, especially in service innovation and performance. It is evident from the literature that tacit knowledge management competence contributes to innovation and explicit knowledge management competence contributes to efficiency. Items for measuring tacit and explicit knowledge management competences are:

- Explicit knowledge management competence: We are competent in the effective management of standard knowledge (for example procedural documentation).
- Tacit knowledge management competence: We are competent in the effective management of context-specific knowledge (for example, facial recognition is a knowledge that is gained by developing close relationships with key customers).

Absorptive capacity

Absorptive capacity is the ability to assimilate and replicate new knowledge (Tsai, 2001; Cohen and Levinthal, 1990). Zahra and George (2002) recognize absorptive capacity as a dynamic capability that can influence the sustainability of a firm's competitive advantage. According to them, absorptive capacity exists as a subset of two components: potential absorptive capacity and realized absorptive capacity. The ability to acquire external knowledge and assimilate external capabilities is termed as potential absorptive capacity, whereas, realized absorptive capacity includes knowledge transformation and the capabilities to exploit it within the firm. The item for measuring absorptive capacity is mentioned below.

- Absorptive capacity: We have the dynamic ability to assimilate and replicate internal and external knowledge.

Price-setting capability

Price-setting capability is the ability of a firm to set the right prices for the valued services they offer (Dutta et al., 2003). In order to deal with the complexity of market competitiveness, Tung et al. (1997) proposed a multi-step approach to service pricing. The major price-setting capability components in their framework are identifying competitor prices, pricing strategy based on service differentiation, client-driven price adjustment, and commitment to new prices. Price-setting capability is measured using the below-mentioned item.

- Price-setting capability: We are capable of setting optimal prices for services that deal with the complexity of the market.

Marketing-planning capability

Marketing-planning capability is the "ability to anticipate and respond to the market environment in order to direct a firm's resources and actions in ways that align the firm with the environment and achieve the firm's financial goals" (Slotegraaf and Dickson, 2004). The underlying components of marketing-planning capability according to them are future anticipation skills, alternative generation skills, and efficient and rapid plan implementation skills. This can help the firm to apply the collective knowledge, skills, and resources to create efficient and effective valued services (Vorhies and Harker, 2000). Market planning capability is measured using the item mentioned below.

- Marketing-planning capability: We respond efficiently to the market environment by effectively directing the resources.

Customer-demand meeting capability

It is important for an organization to monitor and respond efficiently and rapidly to the changes in customer requirements in order to achieve sustainable competitive advantage (Day, 1994). According to Jayachandran, Hewett and Kaufman (2004), customer response responsibility, and competence in serving customer requirements effectively and rapidly is critical for sustained success. Customer response expertise and customer response speed comprise two important components of customer response capability according to them. Fine, Vardan, Pethick and El-Hout (2002) considered the customer-importance component as a part of customer response capability. Customer-importance takes into account the effects of value chain decision-making on customer preferences. Thus, three components of customer response capability are customer response expertise, customer response speed, and customer importance. The item for measuring this construct is mentioned below.

- Customer-demand meeting capability: We respond to changes in customer requirements.

Market orientation and innovativeness capability

According to Madhavaram and Hunt (2008) the integration of market orientation and innovativeness results in a new operant resource that is termed as market orientation and innovativeness capability. Menguc and Auh (2006) argues that this collectively formed capability resource will have more value when they combine. They tested this combination empirically and proved that the new integrated capability resource has a positive relationship with the performance of the firm. Earlier this chapter mentions the item for measuring market orientation, and below is the item for measuring innovativeness.

- Innovativeness capability: We are committed to adopting new ideas that provide innovative services to the customer.

Market-relating capability

Market-relating capability is an operant resource that is formed as a result of the interaction between processes, orientation, knowledge, and skills in order to create and maintain

relationships between the firm and their most valuable customer (Madhavaram and Hunt, 2008). The item for measuring market-relating capability is mentioned below.

- Market-relating capability: We interact between processes, orientation, knowledge, and skills to create relationships with the most valuable customer.

Organizational service culture

Organizational service culture is defined as “an organizational climate where the goals and values of the firm are focussed on service excellence through development of both frontline and back-end (logistics) competencies” (Beitelspacher, Tokman, Adams and Richey, 2012). Organizational service culture is conceptualized as an internal characteristic that helps retailers to implement service ideals across the value chain and, therefore it should be viewed as a critical operant resource. Literature suggests that service culture is positively related to a retailers’ market performance (Beitelspacher et al., 2012). This positive relation is attributed to two important components: service policies and customer favouring provisions. Below is the item for measuring organizational service culture.

- Organizational service culture: Our goals and values are focused on the service excellence.

Entrepreneurial proclivity

Entrepreneurial proclivity is an operant resource that is defined as the “top managers’ disposition to accept entrepreneurial processes, practices and decision making, characterized by its preference for innovativeness, risk taking and proactiveness, autonomy, and competitive aggressiveness” (Griffith, Noble and Chen, 2006). They studied the consequence of entrepreneurial proclivity in the performance of a firm and concluded that this operant resource helps in the development of knowledge resources and is positively related to market responsiveness. Further, this thesis conceptualize supply chain responsiveness as a basic characteristic of innovative firms (Fisher, 1997; Wagner et al., 2012). Below is the item for measuring this construct.

- Entrepreneurial Proclivity: We engage in entrepreneurial processes in our firm which is characterized by pro-activeness and risk taking.

Market-focussed strategic flexibility

In an ever-changing environment, it is very crucial for a firm to change direction and reconfigure strategically to succeed and achieve sustainable competitive advantage (Aaker and Mascarenhas, 1984). Market-focussed strategic flexibility is defined as “a firm’s intent and capabilities to generate firm-specific real options for the configuration and reconfiguration of appreciably superior customer value propositions” (Johnson and Sohi, 2003). Components of market-focussed strategic flexibility are options, intent, and capability. By options, they mean “preferential access to future opportunities” that may arise from existing investments, knowledge, opportunities and the like. The capability to identify resources, acquire them, and their deployment together refer to the capability component of market-focussed strategic flexibility. The item for measuring this construct is mentioned below.

- Market-focussed strategic flexibility: We have the flexibility to change direction and reconfigure strategically in response to changes in the internal and external environment.

Technology

Akaka and Vargo (2014) define technology as a collection of practices and processes, as well as symbols that are drawn upon to serve a human purpose. Building upon the service eco-systems approach, Akaka and Vargo (2014) are of the view that technology is a resource, value is co-created, and service is a result of innovation. It is essential for a firm to understand, use, and exploit technology internally to attain sustainable competitive advantage (Ritter and Gemünden, 2003). Service innovation demands that the firm possess competence relating to technology (Danneels, 2002; Danneels, 2004). Two components of technology are technology collaboration reasons and technological expertise. This study use the below-mentioned item for measuring this construct.

- Technology: We use technology that constitutes a set of practices and processes that contribute to value creation.

Learning platform capability

Johnson and Sohi (2003) explores how the firm’s learning intent, its receptivity, and its transparency play a role in achieving sustainable competitive advantage by providing strong platform for learning activities. Madhavaram and Hunt (2008) considers learning

platform capability as an important operant resource with aforementioned three components. This operant resource is a source of information dissemination and its shared interpretation. The item for measuring learning platform capability is as mentioned below.

- Learning platform capability: We provide a platform for learning activities through our intent, receptivity, and transparency.

Knowledge creation capability

Smith et al. (2005) studied the impact of new knowledge creation and how it helps the firm in creating innovative services. Three components of knowledge creation capability that contribute towards effective exchange and combination of knowledge are: access to information, ability to absorb and combine information, and anticipate value from this exchange and combination process. Using the above-mentioned definition of knowledge creation capability, below is the item for measuring this operant resource.

- Knowledge creation capability: We have the ability to create new knowledge that provides value to the customer.

Organizational learning capability

Organizational learning capability is the ability of a firm to process knowledge. With a view to improve firm performance, Jerez-Gomez et al. (2005) conceptualized it as “the ability to create, acquire, transfer, and integrate knowledge, and modify its behaviour to reflect new cognitive situation.” Components of this operant resource are managerial commitment, systems perspective openness and experimentation, and knowledge transfer and integration. This study measure the construct organizational learning capability using the below mentioned item.

- Organizational learning capability: We have the ability to process knowledge and, thereby, modify our firm’s behaviour.

Collaboration

Collaboration is the ability to work across organizational boundaries by sharing of resources - information, people and technology (Adams et al., 2014; Beitelspacher et al., 2012). It helps in building and managing relationships for creativity and continuous improvement. Two important components of the operant resource collaboration are

collaborative communication and governance mechanisms. This construct is measured using the below-mentioned item.

- Collaboration: We have the ability to work across organizational boundaries by sharing resources (information, people, and technology) among other supply chain members.

Integration

The term integration is used interchangeably with collaboration in operations literature. Adams et al. (2014) provides clarity in this by viewing integration as an operant resource which helps in achieving operational efficiencies and strategic effectiveness through collaboration. Commitment and coordination with firm's functional areas are the two components of this operant resource. Using the above-mentioned definition of integration, below is the item for measuring this operant resource.

- Integration: We are committed to effectively coordinate with the functional areas of our firm.

4.2.4 Measuring supply chain responsiveness

This thesis defines service supply chain fit as the strategic consistency between a firm's operant resources and its supply chain (responsive or efficient). It states that the perfect strategic consistency for certain/uncertain products is achieved with an efficient/responsive supply chain (Wagner et al., 2012; Chopra, Meindl and Kalra, 2013). This chapter will measure the firm's operant resources and cluster the firms based on their ability to be innovative and efficient. Since the concept of service supply chain fit is the match between operant resources and supply chain characteristics, this thesis identifies the need to operationalize fit by matching these two related variables. To do this, the study identifies the need to measure the supply chain responsiveness of firms. Supply chain fit will be compared with firm performances to test the hypotheses. To measure the supply chain responsiveness (responsive supply chains or efficient supply chains), this study uses the scale developed by Wagner et al. (2012). Even though Wagner et al. (2012) developed the survey items for a firm's product line, the empirical work was based theoretically on competitive priorities in operations management. Therefore, the methodology adopted by Wagner et al. (2012) can be applied in the context of service supply chains. This method

can also help capture the strategic priorities of a firm's supply chain strategy (Wagner et al., 2012). Firms must match their operant resources to their supply chain characteristics to achieve a supply chain fit. This thesis use the following measures of supply chain responsiveness based on Wagner et al. (2012).

Service delivery reliability

Sarmiento et al. (2007) defined delivery reliability as “the ability to meet quoted and anticipated dates and quantities.” The concept of delivery reliability evolved from the strategically important dimension of delivery dependability from goods manufacturing literature (Vickery et al., 1997; Scully and Fawcett, 1994). The strategic importance of delivery reliability along the dimensions of competitiveness is well acknowledged in operations management literature (Skinner, 1978; Corbett, 1996). This thesis adopts this concept to services context. Building on Sarmiento et al.'s (2007) definition of delivery reliability, this study defines service delivery reliability as the ability to meet quoted and anticipated time and services.

Service inventory and service capacity

Inventory and capacity are integral parts of operation management. In service context, service inventory is an important decision variable (Niranjan and Weaver, 2011), and it has a significant effect on quality, response times and pricing (Chopra and Lariviere, 2005). Niranjan and Weaver (2011) proposed a unifying paradigm of goods and services supply chain management. They proposed the service equivalents of goods inventory and production capacity. They are defined below. According to Niranjan and Weaver (2011), service inventory is the immediately usable service that has potential value. Davis, Field and Stavroulaki (2015) defines service inventory as follows. “Any tangible or intangible operand resource that is transformed (i.e., is directly acted upon) by the service provider with or without customer input and is stored prior to the customer's arrival to facilitate steps in the service delivery process with the goal of creating economic value for the customer during the service encounter.” Service inventory is highly perishable and will vary rapidly with each service offerings (Niranjan and Weaver, 2011). Service capacity is the highest quantity of output possible in a given period with a pre-defined level of resources (Niranjan and Weaver, 2011; Lovelock, 1992). This is equivalent to the concept of production capacity in goods supply chain management. The other two measures of

supply chain responsiveness are similar to Wagner et al.'s (2012) measure in goods supply chain context. They are:

- Quick response to unpredictable demand.
- Frequency of new service introduction.

The questionnaire with five items for measuring the above constructs is shown in Table 4.3.

Table 4.3: Scale for measuring supply chain responsiveness (Wagner et al., 2012)

Please indicate the strategic supply chain priorities for the main services of your firm (1: not important at all - 5: extremely important):

- Improve service delivery reliability
 - Maintain immediately usable service which is arranged prior to the customer's arrival
 - Retain service capacity which can provide highest quantity output
 - Respond quickly to unpredictable demand
 - Increase frequency of new service introduction
-

4.2.5 Measuring supply chain agility

According to Gligor (2016), firms that simultaneously offer innovative and functional products should adjust their supply chain base according to the innovativeness or the efficiency of the product. They define supply chain agility as “the firm’s ability to make quick adjustments to its supply chain to respond or adapt to changes, opportunities or threats in its environment.” Agility is the fundamental characteristic of a supply chain and it is must for survival in turbulent and volatile markets (Agarwal et al., 2007). Supply chain agility is different from supply chain responsiveness. Supply chain agility of a firm allows it to be either more responsive or more efficient depending on the product and external environmental characteristics (Gligor, 2013). Hence, while operating in an environment that may either demand innovative or functional services, firms need to develop supply chain agility to achieve the desired supply chain fit. It is empirically proven that supply chain agility is positively associated with a firm’s performance (Gligor, 2017). Firms are under high pressure to improve their performance by offering products with high operational efficiency, and simultaneously, to be flexible enough to offer innovative products (Yusuf et al., 2004). Yusuf et al. (2004) also identified certain resources that are influential in integrating efficiency and responsiveness into a supply chain, which is listed as operant resources by Madhavaram and Hunt (2008). Swafford et al. (2006) studied the

antecedents of supply chain agility and identified certain resources that contribute toward supply chain agility, some of which are listed by Madhavaram and Hunt (2008). Swafford, Ghosh and Murthy (2008) empirically prove that supply chain agility can be achieved through information technology integration and flexibility.

All these points toward the fact that certain operant resources can help a firm in devising agile supply chains and that have significant performance implications. Operant resources in the innovation-efficiency cluster will contribute to innovative and functional products. Supply chains for innovative products should focus on responsiveness, in contrast to supply chains for functional products, which should focus on efficiency (Fisher, 1997; Stavroulaki and Davis, 2014). Gligor (2016) empirically proves that while operating in environments that demand innovation and efficiency simultaneously, firms that have agile supply chains outperform those that do not have agile supply chains. Building on resource-based view, (Gligor, 2013) identified a set of five capabilities of firms with agile supply chains. They are alertness, accessibility, decisiveness, swiftness, and flexibility.

- Alertness: “It is the ability to quickly detect changes, opportunities, and threats.” (Gligor, 2013).
- Accessibility: “It is the ability to access relevant data (Gligor, 2013) in order to decide on how to act” (Gligor, 2016).
- Decisiveness: “It is the ability to make resolute decisions on how to respond to changes” (Gligor, 2016).
- Swiftness: It is the ability to quickly implement the decisions (Gligor, 2013).
- Flexibility: “It is the ability to modify the range of tactics and operations to the extent needed” (Gligor, 2013).

The scale for measuring agility constitutes of items for measuring the above-mentioned capabilities. To measure the supply chain agility of firms thesis use a 14-item scale for measuring a firm’s supply chain agility (Gligor, 2013). Gligor (2013) followed a systemic approach to develop the scale after a series of steps including pre-testing the scale for validity and reliability followed by a statistical study which brought down the number of items from 30 to 14. The scale for measuring the supply chain agility of firms is as shown in the Table 4.4.

Table 4.4: Items for measuring supply chain agility (Gligor, 2017)

<i>Alertness</i>
<ul style="list-style-type: none"> • Our firm can promptly identify opportunities in its environment. • My organization can rapidly sense threats in its environment. • We can quickly detect changes in our environment.
<i>Accessibility</i>
<ul style="list-style-type: none"> • We always receive the information we demand from our suppliers. • We always obtain the information we request from our customers.
<i>Decisiveness</i>
<ul style="list-style-type: none"> • We can make definite decisions to address opportunities in our environment. • My organization can make firm decisions to respond to threats in its environment. • My company can make resolute decisions to deal with changes in its environment.
<i>Swiftness</i>
<ul style="list-style-type: none"> • We can swiftly deal with threats in our environment. • My firm can quickly respond to changes in business environment • We can rapidly address opportunities in our environment.
<i>Flexibility</i>
<ul style="list-style-type: none"> • When needed, we can adjust our supply chain operations to the extent necessary to execute our decisions. • My firm can increase its short-term capacity as needed. • We can adjust the specification of orders as requested by our customers.

4.2.6 Clustering of operant resources

This thesis identify operant resources that are an integral part of services from extant literature (Madhavaram and Hunt, 2008). With detailed inputs on the components of these resources and their nature of being either composite or interconnected operant resources, Madhavaram and Hunt (2008) identified a set of “masterful” operant resources, of which a few pertain to marketing strategy, and others correspond to business strategy. Apart from those listed by Madhavaram and Hunt (2008), this study adds a few resources to that list.

Further, this chapter cluster the operant resources according to their ability to support “innovativeness” or “efficiency” (Figure 4.2) These clusters are formed by studying the consequences and components of the operant resources. Later this study hypothesize that the firms within these clusters are strategically fit based on the operant resources they possess.

To understand the ability of the set of operant resources to contribute to innovation or efficiency, it is necessary to consider the key performances of service firms that are important in providing core customer benefits. Next step is to identify a set of key

performances of service firms that are innovative, efficient, and innovative-efficient and then connect the set of operant resources with these key performances. So, this research cluster the operant resources by linking key performances with the strategy, and later these key performances will lead to the identification of operant resources.

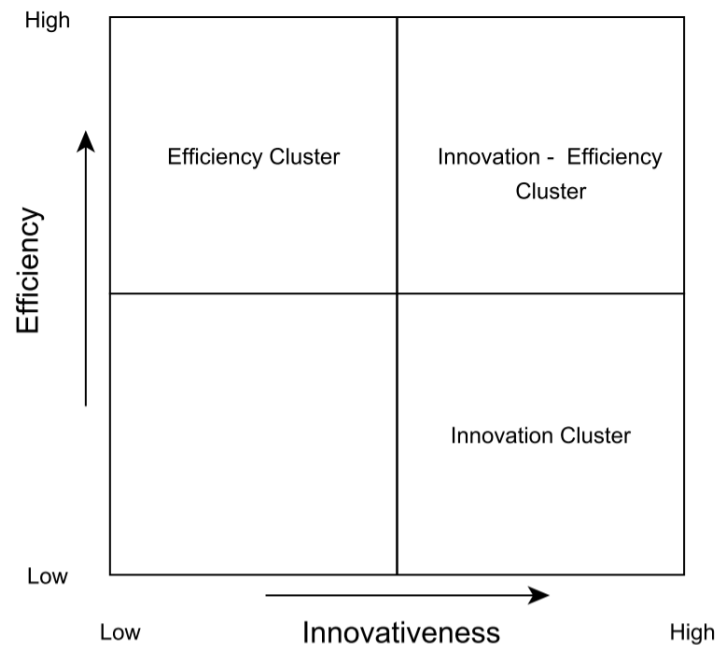


Figure 4.2: Clusters of operant resources

The approach to identify operant resources influencing innovation and efficiency involves the following steps:

- Identify key performances of service firms according to their strategic intent
- Identify operant resources that influence the key performances

Identifying key performances of service firms

First, this study analysed the key performances of service firms (innovative, efficient, and innovative-efficient) from the extant of literature available. This is done by analysing key performances based on key success factors of service firms, and the core values and benefits the firms provide to the customer. As mentioned above, these key performances are identified depending on the capability to which they are principally related: (i) innovation, (ii) efficiency, and (iii) innovation-efficiency. Theoretical developments in innovation bolster the study's process-oriented view, which attempts to link the operant resources with firm-level performance variables (Rangone, 1999; Bharadwaj, 2000). The view of efficient firms is generally referred to as manufacturing competitive firms in operations management

literature. Most researchers view these firms as those dominated by strategies defined by weighing manufacturing capabilities in the likes of low cost, quality, dependability, flexibility, and delivery (Boyer and Lewis, 2002; Rangone, 1999).

Identifying operant resources that influence the key performances

In this step, this research identify operant resources that influence the key performances from the list of operant resources and link them together. For each key performance, the study analysed the major activities to link operant resources (necessary to carry out these activities) with these performances. Later this research build on the components of operant resources (Madhavaram and Hunt, 2008) to link key performances with operant resources. The performance acts as a link between operant resources and the strategic intent to innovate or be efficient.

Figure 4.3 reports the key performances of innovating firms and the operant resources from which firms derive these performances. The blue box shows the key performances of innovative, efficient, and innovative-efficiency firms. The green boxes are the operant resources that derive these key performances. Thus, the key performance of firms acts as the link between operant resources and corresponding strategic intent. Similarly, Figure 4.4 and Figure 4.5 reports the key performances of efficient firms and innovative-efficient firms, respectively. The operant resources which contribute to these key performances are mentioned in green boxes.

4.3 Pre-testing the scale

First, the study tested the questionnaire for validity by academic experts. They reviewed the questionnaire for ambiguity, clarity, and, most importantly, the item's ability to represent the constructs. This was conducted to ensure content validity. Content validity refers to the subjective agreement among judges that the scale logically appears to reflect accurately what it purports to measure (Zikmund, Carr and Griffin, 2013). During this test, the questionnaire provided the conceptual definitions of the resources to the experts for judging the constructs. This test asked the expert judges to rate each item as either "not representative," "somewhat representative," or "very representative" (Ngo and O'Cass, 2009) to the construct definition (Appendix B: Validity questionnaire).

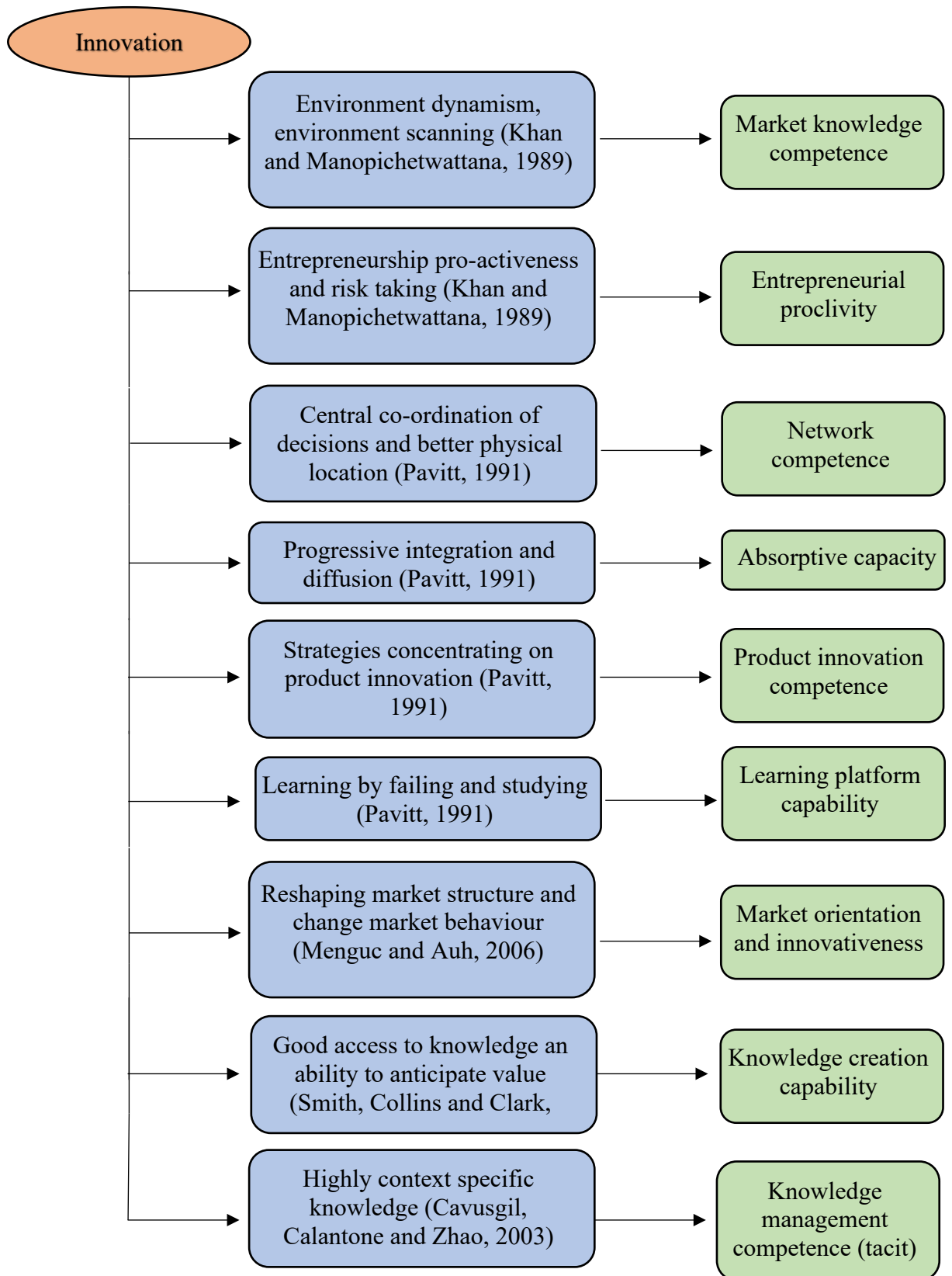


Figure 4.3: Clustering of operant resources: Innovation

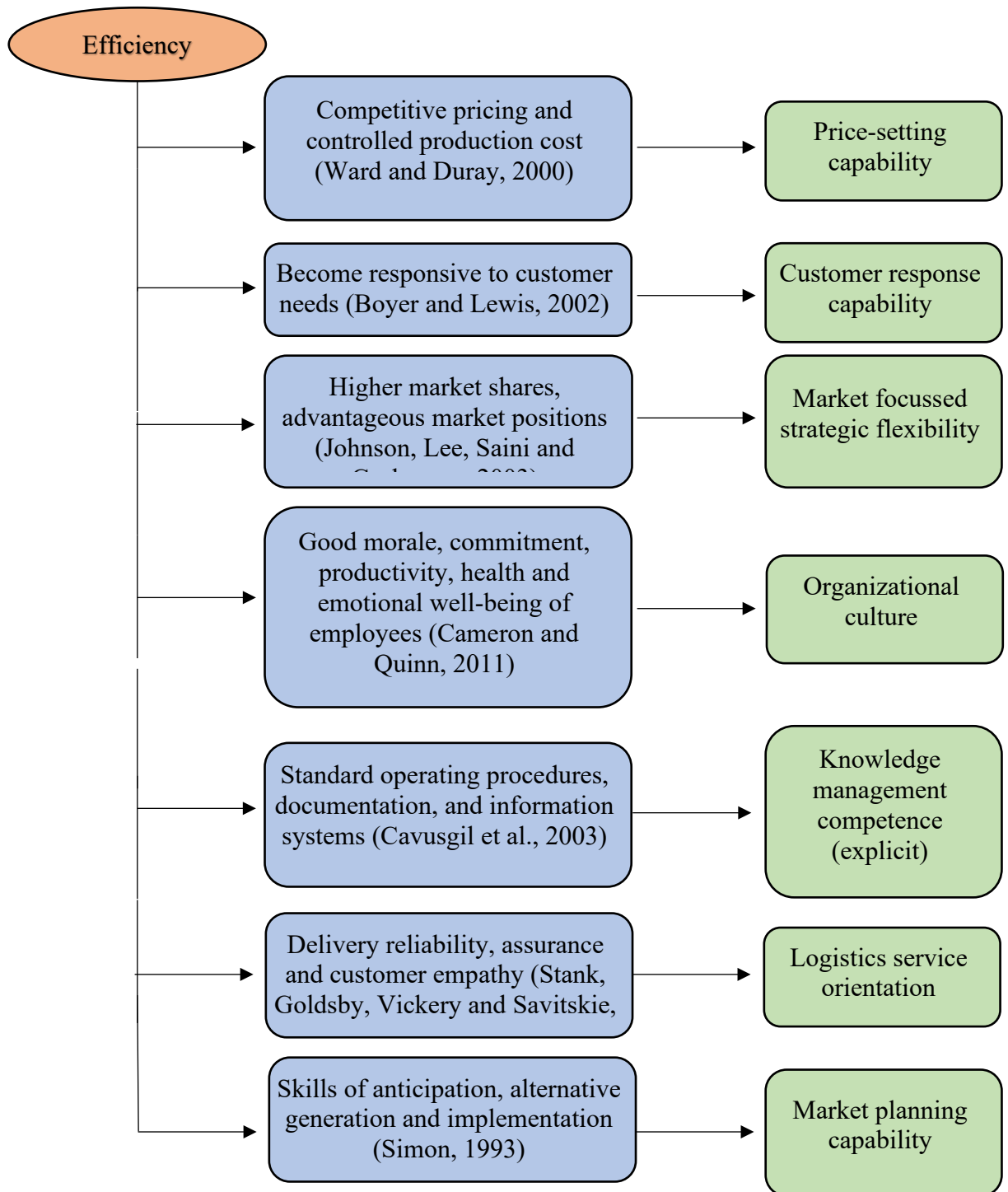


Figure 4.4: Clustering of operant resources: Efficiency

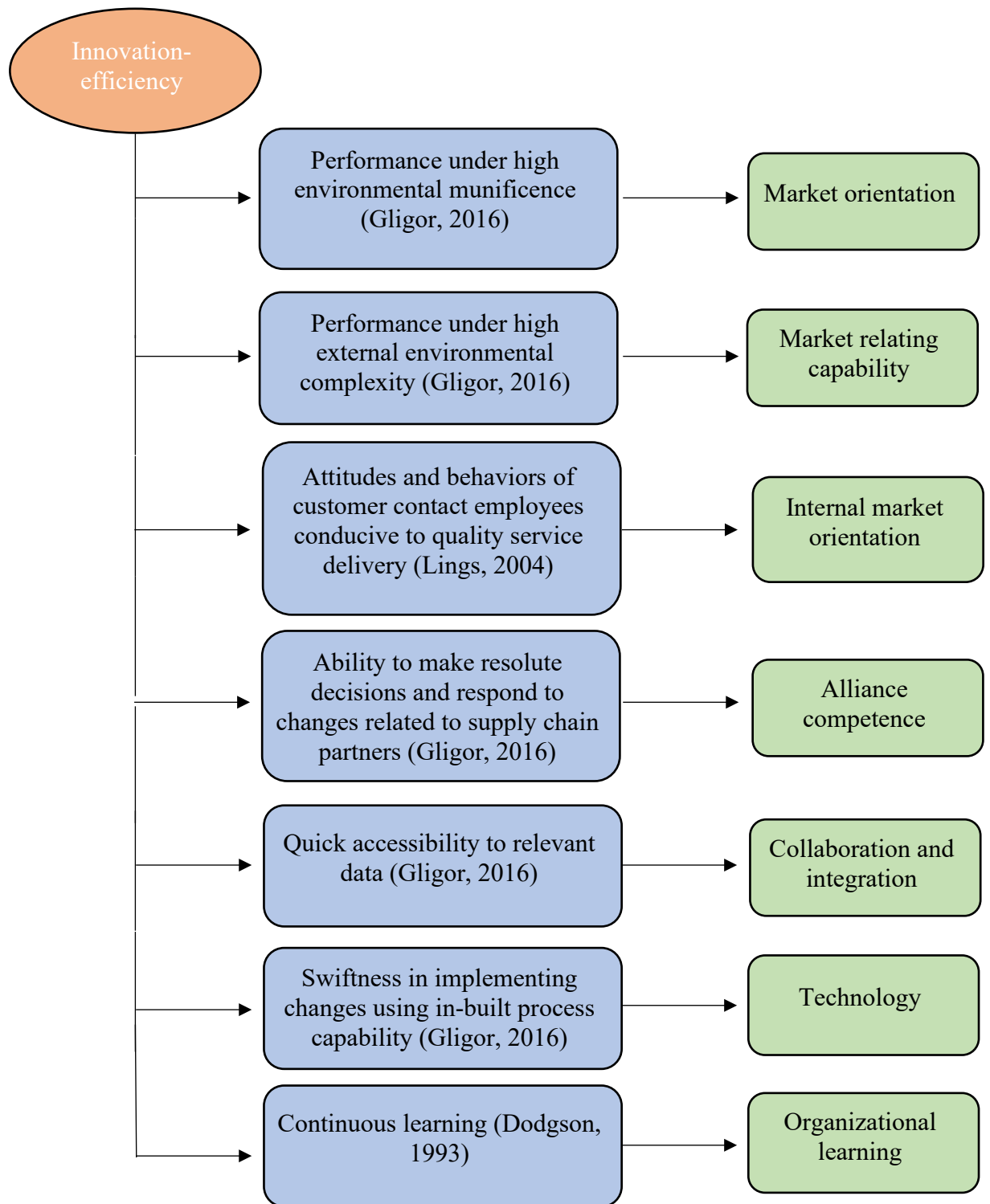


Figure 4.5: Clustering of operant resources: Innovation-efficiency

The study considers only those items which are marked as very representative or somewhat representative by at least four of five judges as valid. Apart from the responses, this pre-test also involved the study of the subjective inputs and suggestions of experts on the items of measurement, which was later incorporated into the questionnaire. During this pre-test, this scale-development procedure corrected three items after conducting the first round of validity tests and then conducted a second round of similar test (Appendix C: Validity test results) with a different set of academic experts. This test found the items to be representative.

4.3.1 Pilot study

Next step in the data collection is to conduct a pilot study. For that, first the study emailed an internet-based survey questionnaire to 100 top-level managers of service firms. The survey generated 40 responses, out of which 25 were usable. The pilot test aimed to identify poor performing items. In the pilot test, all the items have the recommended 0.70 cut-offs for alpha, and factor analysis in SPSS showed some issues of cross-loading between items. Then this study corrected those items which had cross loadings to ensure that the scale is clean and free of errors for further data collection. Next, designed the questionnaire by grouping the items for measuring the firm's operant resources on the basis of their intent (Appendix D: Survey questionnaire). The questionnaire also had an attention check (Abbey and Meloy, 2017). It was then followed by a face validity test.

4.3.2 Pilot test results

Innovation

First, the study considers items which are used to measure the availability of operant resources that contribute to innovation. The reliability test provided the Cronbach's alpha value of 0.826. The factor analysis showed a component matrix showing all meaningful loadings on two components (Table 4.5). From the output, the items Innov_OR12 and Innov_OR13 seem to have cross -loadings and therefore removed Innov_OR12 and Innov_OR13. The loadings after removal are shown in Table 4.5, which explains the reliability results and item statistics.

Efficiency

Next, the study considers items which are used to measure the availability of operant resources that contribute to efficiency. The reliability test provided the Cronbach's alpha

value of 0.686. The factor analysis showed a component matrix showing all meaningful loadings on two components (Table 4.6). From the output, the item Effi_OR10 seem to have cross-loadings and was therefore removed. The new Cronbach's alpha is 0.709, which makes the scale reliable. The output before and after the removal of them Effi_OR10 is shown in reliability and loadings for measuring efficiency in Table 4.6.

Innovation-efficiency

The items to measure the firm's availability of resources which simultaneously contributes to innovation and efficiency is considered here. The reliability test provided the Cronbach's alpha value of 0.763. The factor analysis showed a component matrix showing all meaningful loadings on two components (Table 4.7). From the output, the items Innov-Effi_OR1, Innov-Effi_OR7, Innov-Effi_OR8 and Innov-Effi_OR9 seem to have cross-loadings.

Table 4.5: Reliability results and statistics (pilot test): Innovation

Scale items	Mean	SD	Before deletion		After deletion	
<i>Innovation (N=25)</i>			Item loadings (2 components)	Alpha	Item loadings (1 component)	Alpha
					0.826	0.784
Innov_OR6: We are competent in managing inter-organizational relations.	3.76	0.72	0.589			0.569
Innov_OR12: We have the ability to create new knowledge that provides value to the customer.	4.24	0.66	0.653	0.333		
Innov_OR13: We provide a platform for learning activities through our intent, receptivity, and transparency.	4	0.96	0.68	0.338		
Innov_OR14: We are competent in integrating the market knowledge we generate.	3.84	1.11	0.789	-0.353		0.865
Innov_OR16: We are competent in the effective management of context specific knowledge (for example, facial recognition is a knowledge that is gained by developing close relationships with key customers).	3.96	1.02	0.831	-0.343		0.874
Innov_OR17: We have the dynamic ability to assimilate and replicate internal and external knowledge.	3.96	0.68	0.855			0.829
Innov_OR18: We create new products by linking the competencies that are related to technology and customers.	3.56	1		0.636		0.271
Innov_OR20: We are committed to adopting new ideas that provide innovative services to the customer.	4.16	1.03	0.734			0.771
Innov_OR26: We engage in entrepreneurial processes in our firm which is characterized by pro-activeness and risk taking.	3.64	1.19	0.493			0.462

Table 4.6: Reliability results and statistics (pilot test): Efficiency

Scale items	Mean	SD	Before deletion			After deletion					
<i>Efficiency (N=25)</i>			Item loadings (3 components)			Alpha	Item loadings (3 components)			Alpha	
Effi_OR2: We respond rapidly to changes in customer requirements.	4.08	0.862	0.761		-0.424	0.686	0.749	-0.248	-0.363	0.709	
Effi_OR10: We focus on strategic decisions of logistics, which enable the timely delivery of quality service.	4.24	0.779	0.343	-0.754							
Effi_OR15: We are competent in the effective management of standard knowledge (for example procedural documentation).	4.24	0.879	0.556	0.465	0.349			0.603	0.514		
Effi_OR19: We are capable of setting optimal prices for services that deal with the complexity of the market.	3.92	1.038	0.223	0.725	0.325			0.293	0.844		
Effi_OR21: We respond efficiently to the market environment by effectively directing the resources.	3.92	0.909	0.931					0.927			
Effi_OR23: We have the flexibility to change direction and re-configure strategically in response to changes in the internal and external environment.	3.76	0.879	0.786		-0.393			0.801	-0.286		-0.25
Effi_OR25: Our goals and values are focused on the service excellence.	4.68	0.690	0.445	-0.424	0.69			0.39			0.887

Table 4.7: Reliability results and statistics (pilot test): Innovation-efficiency

Scale items	Mean	SD	Before deletion				After deletion		
<i>Innovation-Efficiency (N=25)</i>			Item loadings (4 components)				Alpha 0.767	Item loadings (2 components)	
Innov-Effi_OR1: We are oriented towards our customer with an aim to provide highly valued services to them.	4.48	0.918	0.321	0.59		0.675	0.749	-0.248	
Innov-Effi_OR3: We understand our competitors' performance and behavior.	4.16	0.850	0.643		-0.61		0.695	-0.564	
Innov-Effi_OR4: Our business functions share resources and integrate them to serve the needs of our target customers.	3.88	1.013	0.727	-0.42	-	0.213	0.864		
Innov-Effi_OR5: We have the ability to work across organizational boundaries by sharing resources (information, people, and technology) among other supply chain members.	3.76	0.779	0.514	-0.44	0.556	-0.22	0.48	0.619	
Innov-Effi_OR7: We are committed to effectively coordinate with the functional areas of our firm.	4.08	0.640	0.56	0.527	0.228	-0.39			
Innov-Effi_OR8: We share our resources with two or more other firms with an aim to achieve mutually compatible goals.	3.04	1.306	0.631		0.274	0.401			
Innov-Effi_OR9: We are committed to producing value for our employees by understanding their needs.	3.76	0.926	0.635	0.235	0.438				
Innov-Effi_OR11: We have the ability to process knowledge and, thereby, modify our firms behavior.	4.12	0.666	0.538	-0.34	-	0.545	0.731		
Innov-Effi_OR22: We interact between processes, orientation, knowledge, and skills so as to create relationships with the most valuable customer.	4.32	0.627	0.603	0.408	-	-0.45	0.485	-0.586	
Innov-Effi_OR24: We use technology that constitutes a set of practices and processes that contribute to value creation.	4.08	0.909	0.541	-0.64	0.217		0.65	0.604	

Supply chain responsiveness

The reliability test of the scale used to measure supply chain responsiveness provided the Cronbach's alpha value of 0.689. This value is lesser than 0.70 limit, and this issue needs to be addressed. The factor analysis showed a rotated component matrix showing all meaningful loadings on two components (Table 4.8). The reliability measure could be improved once the study has a larger sample size of at least 50. This study uses the same scale for measuring efficiency as this thesis build on the concept that supply chain responsiveness (SCR) and supply chain efficiency (SCE) is a measure on a continuum (refer Figure 4.1).

Table 4.8: Reliability results and statistics (pilot test): Supply chain responsiveness

Scale items	Mean	SD	Item loadings (2 components)		Alpha 0.689
<i>Supply chain responsiveness (N=25)</i>					
SCR1: Improve service delivery reliability	4.52	0.823	0.656	0.383	
SCR2: Maintain immediately usable service which is arranged prior to the customer's arrival	3.6	1.19	0.246	0.742	
SCR3: Retain service capacity which can provide highest quantity output	4.04	0.978	0.722	-0.423	
SCR4: Respond quickly to unpredictable demand	3.92	0.997	0.483	-0.622	
SCR5: Increase frequency of new service introduction	3.16	0.898	0.718	0.239	

Supply chain agility

Next, the study analysed the supply chain agility scale which had 14 items. The Cronbach's alpha value of 0.897 is within the permissible limits. The factor analysis showed a component matrix with meaningful loadings on three components. Items SCA1, SCA2, SCA3, SCA4, and SCA5 have cross-loadings (Table 4.9).

Table 4.9: Reliability results and statistics (pilot test): Supply chain agility

Scale items	Mean	SD	Before deletion			After deletion		
			Item loadings (3 components)			Alpha	Item loadings (2 component)	
Supply chain agility(N=25)						0.902		0.883
SCA1: Our firm can promptly identify opportunities in its environment.	4	1.04	0.552	-0.433	0.36			
SCA2: My organization can rapidly sense threats in its environment.	3.92	0.76	0.732		0.542			
SCA3: We can quickly detect changes in our environment.	4	0.71	0.603		0.652			
SCA4: We always receive the information we demand from our suppliers.	3.4	1.22	0.73	0.375				
SCA5: We always obtain the information we request from our customers.	3.36	1.22	0.405	0.825				
SCA6: We can make definite decisions to address opportunities in our environment.	3.96	0.98	0.774	0.274		0.712	0.297	
SCA7: My organization can make firm decisions to respond to threats in its environment.	3.72	0.89	0.891		-0.231	0.928		
SCA8: My company can make resolute decisions to deal with changes in its environment.	4	0.71	0.838		-0.287	0.875		
SCA9: We can swiftly deal with threats in our environment.	3.64	0.99	0.857	-0.271		0.868	-0.273	
SCA10: My firm can quickly respond to changes in business environment.	3.76	0.88	0.765	-0.223	-0.464	0.842	-0.301	
SCA11: We can rapidly address opportunities in our environment.	3.72	0.84	0.845		-0.296	0.902		
SCA12: When needed, we can adjust our supply chain operations to the extent necessary to execute our decisions.	3.56	1.23	0.737	0.207		0.75	0.299	
SCA13: My firm can increase its short-term capacity as needed.	3.76	1.09		0.801			0.893	
SCA14: We can adjust the specification of orders as requested by our customers.	3.76	1.05	0.647			0.629		

4.4 Sampling

The target respondents for measuring operant resources are senior-level managers who are directly involved in operational and strategic decision making. The respondents for measuring supply chain characteristics are managers (middle or top-level) with knowledge of supply chain processes and activities. The questionnaire also has a scale with items to measure the performance of the firm. In survey research, the most important aspect of the sampling procedure is to set a sample frame (Malhotra and Grover, 1998) that can represent the population of interest. The unit of analysis for the study is the firm. As mentioned above, senior-level managers are expected to have comprehensive knowledge of all the activities of the firm. The research model intends to capture a cross-industry phenomenon that is relevant to all types of service firms. Thus, the sample frame is not confined to service firms of any type. The study then conducted the online data collection using Qualtrics by recruiting participants from Amazon Mechanical Turk (MTurk), offered a reward of 4 USD for each respondent and specified additional qualifications for them to meet to take the survey. The employment service industry and the 'Master' criteria of workers are the two additional qualifications. Extant literature highly recommends the use of MTurk for the survey, and it justifies the quality of samples (Ta, Esper and Hofer, 2018). The respondents had to indicate the extent to which they agreed or disagreed with the statement on a five-point Likert scale (1-low, 5-high). This thesis designed the questionnaire by grouping the items for measuring the firm's operant resources based on their intent (Appendix C). The questionnaire also had an attention-check (Abbey and Meloy, 2017).

The study collected the data in two stages. First, the study recruited participants from September to October 2018. This survey received 145 responses from this sampling frame, out of which 30 failed the attention check. The response time for seven responses was very less, and thus deleted those responses as it suggested a lack of attention. Finally, the study had 108 valid responses. Further, the study analysed the data and assessed the measurement reliability and validity. Even though it indicated high reliability, the average variance extracted (AVE) values were below the threshold of 0.5, and it suggested the non-existence of convergent validity. The sampling demographics showed that most of the respondents (more than 30 percent) are not manager-level employees, and it suggested low-quality responses. To solve this problem, this study conducted the second stage of the online survey in MTurk (from December 2018 to January 2019), added a scenario-based experiment

(Appendix C) to make sure that the respondents can differentiate between innovative and efficient services.

This scenario-based experiment had two vignettes, where respondents have to choose whether a firm is innovative or efficient based on the scenarios. Only those who responded correctly to these two vignettes could take the survey. The scenario-based experiment and attention ensured high-quality responses to the survey. This strictly ensured that all the respondents are manager-level employees of service firms. This online survey received 78 responses from this sampling frame, four of which failed the attention check and those were deleted since they did not meet the mandatory qualification of being manager-level employees. Refer Table 4.10 for sample demographics. The study then analyzed these 70 responses for their validity and reliability and found the response quality had improved substantially. A t-test among a random 50 responses from the first group (without vignettes) and the second group (with vignettes) showed no statistically significant mean differences among all items. Thus, it was concluded that non-response bias was not a problem.

Table 4.10: Sample demographics

Type of industry	<i>N</i>	%	Number of employees	<i>N</i>	%
Information Technology	25	36.62	<100	21	30.96
Retail/Wholesale Trade	10	14.08	100-499	13	18.31
Information Media	4	5.63	500-999	10	14.08
Accommodation and Food Services	1	1.41	1000-9,999	16	22.57
Banking, Financial and Insurance Services	12	16.90	> 10,000	10	14.08
Consultancy, Professional, Scientific and Technical Services	5	7.04			
Health Care and Social Assistance	5	7.04			
Education and Training	6	8.45			
Arts and Recreation Services	2	2.82			
			Role in the company		
			CEO/President	5	7.04
			Senior Manager	11	15.5
			Manager	33	46.49
			Assistant Manager	21	31

4.5 Validity and reliability tests

Discriminant validity refers to the extent to which factors are distinct and uncorrelated. The rule is that variables should relate more strongly to their own factor than to another factor. Two primary methods exist for determining discriminant validity during an EFA. There are a few measures that are useful for establishing validity and reliability: Composite Reliability (CR), Average Variance Extracted (AVE), Maximum Shared Variance (MSV),

and Average Shared Variance (ASV). The thresholds for these values are as follows (Hair, Black, Babin, Anderson and Tatham, 1998; Fornell and Larcker, 1981; Gefen and Straub, 2004) (Table 4.11):

- Reliability: CR > 0.7
- Convergent Validity: AVE > 0.5
- Discriminant Validity: MSV < AVE, ASV < AVE, Square root of AVE greater than inter-construct correlations.

Table 4.11: Conditions for reliability, convergent validity and discriminant validity

Assessment	Criterion	Note	Source
Item Reliability	Individual item standardised loading on parent factor	Minimum of 0.5	Hair et al. (1998)
Convergent validity	Individual item standardised loading on parent factor	Minimum of 0.5	Hair et al. (1998)
	Loadings with sig. <i>p</i> -value	$p < 0.05$	Gefen and Straub (2004)
	Composite Reliability (CR)	>0.70	Fornell and Larcker (1981)
	Average Variance Extracted (AVE)	>0.50	Hair et al. (1998)
Discriminant validity	Square-root of AVE	More than the correlations of latent variables	Hair et al. (1998)

If convergent validity does not exist, the variables do not correlate well with each other within their parent factor, i.e., the latent factor (innovation and efficiency) is not well explained by items. If discriminant validity does not exist, the variables correlate more highly with variables outside their latent factor than with the variables within their latent factor; i.e., the latent factor is better explained by some other variables (from a different factor), than by its own observed variables. Assessed the measurement reliability using internal consistency method, Cronbach's alpha (CA) (Cronbach, 1951), and composite reliability (CR) (Fornell and Larcker, 1981). All value in Table 4.12 shows high reliability with scales composite reliability ranging from 0.91 to 0.94. The Confirmatory Factor Analysis via AMOS indicated high suitable fit of model ($\chi^2 = 620.042$, $\chi^2 / df = 1.932$, RMSEA = 0.083). The convergent validity via average variance extracted (AVE) of all

items are well above the threshold of 0.5 and discriminant validity, with the square root of all AVEs being larger than the corresponding squared correlations Hair et al. (1998).

Table 4.12: Measurement reliability and validity

Construct	CR	CA	AVE	1	2	3	4	5
Innovation operant resources (Innov_OR)	0.94	0.94	0.63					
Efficiency operant resources (Effi_OR)	0.91	0.90	0.62	0.61				
Innovation-efficiency operant resources (Inno-Effi_OR)	0.92	0.91	0.54	0.63	0.59			
Supply chain responsiveness/efficiency (SCR)	0.84	0.83	0.52	0.57	0.63	0.62		
Supply chain agility (SCA)	0.95	0.95	0.56	0.66	0.63	0.63	0.55	
Performance	0.91	0.90	0.51	0.61	0.56	0.69	0.56	0.51

CR = Composite Reliability, CA = Cronbach's Alpha; AVE = Average Variance Extracted; the squared correlations are provided in bold

4.6 Analysis and results

The analysis tested the hypotheses via OLS multiple regression modeling using SPSS. First, the study analysed three critical assumptions of linearity, homoscedasticity, and normality in OLS regression analysis. The variance inflation factors, VIF of independent variables (maximum: 3.4) was well within the commonly suggested threshold of 10 (Cohen and Levinthal, 1990), proving that there is no issue of multicollinearity. The visual analysis of the scatter plot (Appendix E: Visual analysis) of predicted versus residual variables indicated that the data is homoscedastic, proving that the residuals are equally distributed. Visual residual analysis using normal Q-Q plots (Appendix E: Visual analysis) showed no serious outliers, and it appears residuals are approximately normally distributed. Thus, the above three tests confirmed the appropriateness of the scales and methodology adopted in this study.

Table 4.13 shows the hypotheses results. The initial regression results show the direct effects of operant resources (D1-4, Table 4.13). Further, this thesis tested the hypotheses for moderation effects of supply chain responsiveness and efficiency on the relationship between operant resources and performance (H1 and H2, Table 4.13). The results indicate that supply chain responsiveness positively moderate the relationship between total performance and innovation operant resources ($F(3, 65) = 16.618, p < 0.01, R^2 = 0.434$). This suggests that the higher the supply chain responsiveness, the better the firm's performance due to the presence of innovation operant resources. This supports H1 (firms

with innovation operant resources and responsive supply chains outperform firms with innovation operant resources and efficient supply chains). Similarly, supply chain efficiency positively moderates the relationship between total performance and efficiency operant resources ($F(3, 66) = 23.911, p < 0.01, R^2 = 0.521$). This suggests that the higher the supply chain efficiency, the higher the firm performance due to efficiency operant resources. This shows that firms with efficiency operant resources and efficient supply chains outperform firms with efficiency operant resources and responsive supply chains, and supports H2.

Table 4.13: Hypotheses test results

	Model 1 D1	Model 2 D2	Model 3 D3	Model 4 D4	Model 5 (H1)	Model 6 (H2)	Model 7
Independent variables:							
Innov_OR	.223(.004)*						.509(.020)*
Effi_OR		.333(.004)*					.518(.018)*
Innov-Effi_OR			.020(.46)*				1.105(.017)*
SCA				.593(.004)*			.937(.015)*
Innov_OR x SCR					.0011(.0005)**		.630(.001)**
Effi_OR x SCE						-.013(.0005)*	.476(.001)***
Control variable:							
Firm size	-.025(.003)**	.022(.002)*	-.008(.003)	-.102(.002)	.002(.004)*	-.005(.003)*	-.014(.002)***
Model F	663.698	797.138	13.523	16.251	16.618	23.911	1137.317
R ²	.992	.993	.539	.337	.434	.521	.995
ΔR^2	.992	.993	.539	.337	.049	.056	.995

Innov_OR: Innovation operant resources, Effi_OR: Efficiency operant resources, SCR: Supply chain characteristics, SCE: Supply chain efficiency, SCA: Supply chain agility, Innov-Effi_OR: Innovation-efficiency operant resources. Dependent variable: Performance. *** $p < 0.1$,

This thesis further applied the Johnson-Neyman technique using the PROCESS technique in SPSS Statistics (Hayes, 2017) to explore the moderating effects to derive the region of significance based on values of the interaction of operant resources with supply chain characteristics. Johnson-Neyman technique provides the two values of the moderator at which the slope of the predictor goes from non-significant region to significant region. This technique shows interactions at two different scores of the moderator (supply chain characteristics). It indicates the regions of high and low interaction, that is, the effect of moderating variable (supply chain characteristics) on the relationship between independent (operant resources) and dependent variable (firm performance). For example, Figure 4.6 shows that if the firm has high innovation operant resources and high supply chain

responsiveness, the firm performance is higher than a scenario where the firm has low innovation operant resources and low supply chain responsiveness (Hypothesis 1).

The value 18 (squared) is the boundary value where the moderator (supply chain characteristics) changes the nature of the interaction. As this score exceeds 18, the interaction increases with $t(65) = 3.17, p < 0.01, b = 3.17$ at the highest supply chain characteristics score of 30. Below the score of 18, the interaction decreases with $t(65) = 1.99, p = 0.05, b = 0.082$. This proves the first hypothesis.

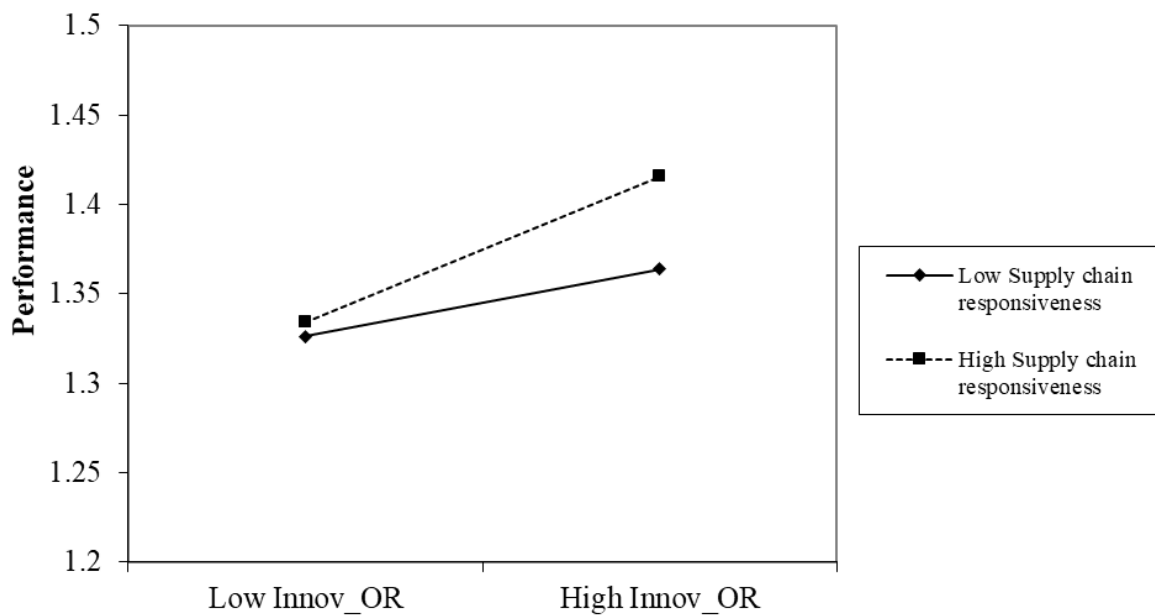


Figure 4.6: Interaction effect (Innovation operant resources Vs. Performance)

On the other hand, at an efficiency score of 18, efficiency operant resources and supply chain responsiveness are significantly related to $t(66) = 2.77, p=0.05, b=0.013$. As this score goes below 18, the interaction increases with $t(66) = 4.681, p<0.01, b=0.03$ at the highest efficiency score of 30. As the value of operant resources contributing to efficiency increases, supply chain responsiveness decreases, and this proves the second hypothesis (Figure 4.7).

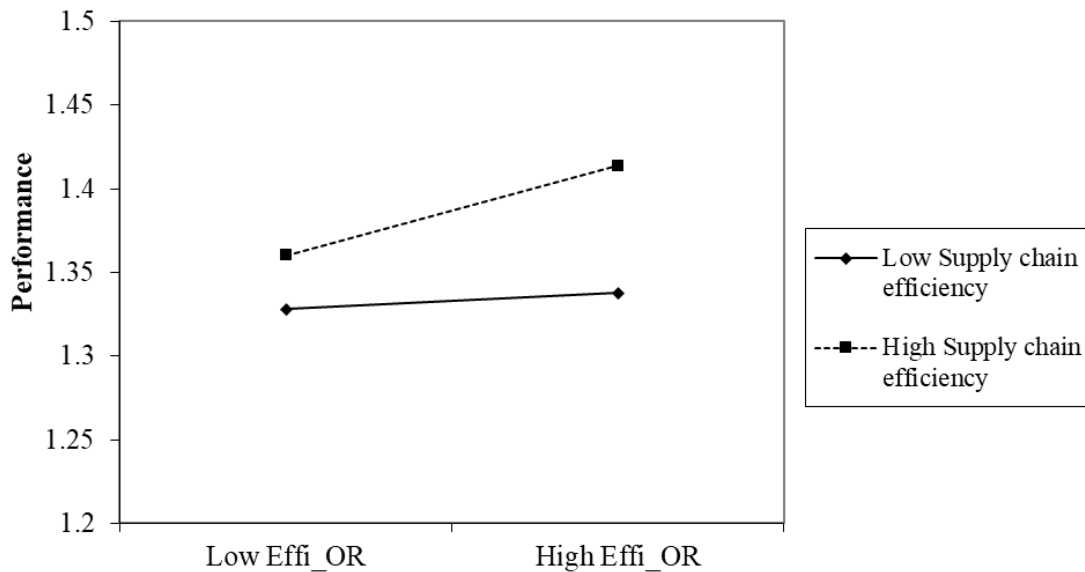


Figure 4.7: Interaction effect (Efficiency operant resources Vs. Performance)

Next, the study investigated the mediating role of supply chain agility (H3) based on Gligor’s (2014) findings on similar grounds. The results indicate that supply chain agility positively mediates the relationship between innovation-efficiency operant resources and firm performance and supports Hypothesis 3 (Table 4.14).

Table 4.14: Mediation results of supply chain agility

Independent variable - IV	Mediating variable - M	Dependent variable - DV	Effect of IV on M	Effect of M on DV	Direct effect	Indirect effect	Total effect	95% CI for mean indirect effect
Innovation-efficiency operant resources	Supply chain agility	Firm performance	0.115	0.132	0.005	0.015	0.020	0.005, 0.029

The mediating effect of supply chain agility in the relationship between innovation-efficiency operant resources and firm performance was statistically significant at $p < 0.01$ with 95 percent CI = 0.005, 0.029 (zero not contained in 95 percent CI point estimates). However, the direct effect of innovation-operant resources on performance was not significant ($p = 0.46$) in the presence of supply chain agility as a mediator. This indicates indirect only mediation (Zhao, Lynch Jr and Chen, 2010). Innovation-efficiency operant resources indirectly affect firm performance through the supply chain agility score of 0.0152, and it is statistically significant ($p < 0.01$). The total effect of innovation-efficiency resources on firm performance is 0.02, out of which the indirect effect of supply chain agility is 75 percent. Further, the results also indicated that for every one-unit increase in supply chain agility, the firm performance increase by 16 percent.

4.7 Chapter summary

Building on the theoretical background laid down in chapter 3, this chapter developed a model of service supply chain fit and empirically validated it using a scenario-based survey research. By viewing Fisher's (1997) strategic fit concept through service-dominant logic and building on the "operant resource-based view," this chapter test a service supply chain fit model based on (a) the operant resources (namely, the operant resources that contribute towards the firms' innovation and/or efficiency) and (b) the service supply chain characteristics of responsiveness, efficiency, and agility. Later this chapter discusses the methodology involved in testing the impact of the service supply chain fit model on firm performance. This involved various stages of scale development, its validation and pilot test. Finally, the analysis and results section test the hypotheses based on the empirical data collected using the survey tool.

The following chapter discusses the theoretical and managerial implications of findings from this thesis and provides input to both academicians and managers on improving firm performance by achieving service supply chain fit. The insights on various operant resources and their relationship with supply chain in service context in laid down in chapter 5.

Chapter 5

Discussion

A foundational premise of service-dominant logic is that indirect exchanges inherent to services mask the fundamental unit of exchange, and that the organization's bundles of skills and knowledge are the primary units of indirect exchange. Focusing on a firm's functional objectives enhances firm performance (Lusch and Vargo, 2014). Thus, by building on operant resources, which according to service-dominant logic is the prime source of competitive advantage for service firms, and aligning it with supply chain characteristics, this thesis develops a conceptual model of service supply chain fit

As this thesis identifies in the research model, service-focused supply chain strategies should revolve around operant resources and vice-versa. This requires the firm to develop and align its operant resources to its functional objective based on its strategic intent.

Supply-chain goals are often service oriented and as such would require the development and exchange of indirect resources if they are to be successful. For example, service delivery reliability, service accessibility, service capacity, service inventory, and service agility, are all intangible goals not dependent on physical goods or resources (Fisher, 1997; Wagner et al., 2012; Gligor, 2016; Niranjana and Weaver, 2011). Thus, it is imperative for service firms to search for ideal frameworks or processes to leverage operant resource(s) and match them with supply chain characteristics that are often service focused, if they are to attain service supply chain fit.

The primary objective of this study was to investigate the relationship between service supply chain fit and the performance of the firm. Goods based '*Supply chain fit*' is well investigated in manufacturing context (Wagner et al., 2012; Gligor, 2017) and the empirical validation of the newfound concept of service supply chain fit is a much-needed value addition to operations and supply chain management literature and service industry. Below, this chapter discusses the contributions of this research to literature as well as managerial implications.

5.1 Contributions to the literature

This thesis makes several theoretical contributions to the growing field of service supply chain literature. The qualitative study explored and substantiated the need for a supply chain fit framework in services. Informed by these findings, this thesis integrates service-dominant logic and Fisher's (1997) framework into a service supply chain fit concept. By validating service supply chain fit through survey research, and with multi-country, multi-industry samples of service firms, this empirical research is the first of its kind to develop and validate the concept of strategic fit for services.

By developing a methodology and measurement scales to facilitate the analysis of operant resources, this research offers ideas that may be replicated in different contexts. The data collection using MTurk involved two stages. The data collected in the first stage did not elicit high-quality responses. To overcome this issue, the survey categorized the preferred respondents' profile based on a set of service industries, ensured the "Master" qualification of respondents, converted the survey into a vignette-based experimental survey, and further added comprehension-cum-attention checks. These steps of enhancing the response quality of organizational data can be followed in future studies.

Service supply chain fit could be conceptualized as moderation and mediation for different dimensions of responsiveness, efficiency, and agility. The meaning of "fit" in strategic literature remains a matter of debate: depending on the context and variables, fit is viewed as mediation, moderation, matching, gestalt, covariation, and profile deviation (Bergeron et al., 2001; Buttermann et al., 2008; Fisher, 1997; Lee, 2002). While Wagner et al. (2012) studied supply chain fit as a match between product and supply chain, Gligor (2017) confirmed the role of environmental uncertainty as a moderator in the supply chain fit. Meanwhile, the results of this research show both moderation and mediation among the constructs. In general, the perspectives on fit in the supply chain fit literature lack conceptual and methodological rigor. Thus, depending on the strategy and variables, supply chain fit could take either perspective. This study paves the path for future studies pursuing in-depth analysis into why and how the nature of supply chain fit varies in different contexts.

The resource-based view has contributed to developing firms' core competencies by guiding firms to explore their resources strategically (Barney, 1991). By drawing on resource-based view to establish the concept of service supply chain fit, this study – for the

first time – views operant resources and service-dominant logic through the lens of the resource-based view. Thus, this thesis provide a base for future research to link resource-based view and service-dominant logic, which can have significant applications in management literature. While the study identifies operant resources to aid strategies of innovation, efficiency, and innovation-efficiency, future research could build on the findings to identify a specific set of operant resources for different types of service industries.

5.2 Managerial implications

The strength of relationships between operant resources and the respective supply chain characteristics underpins the strategic significance of having the right supply chain for services. The results indicate that service supply chain fit can exist as either mediation or moderation with respect to the characteristics of operant resources and service supply chains. At low levels of operant resources, the moderating effects of supply chain responsiveness were not as impactful as it was at high levels of operant resources. Service supply chain agility acts as a mediator between innovation–efficiency operant resources. The innovation–operant resources do not show a direct effect on performance. Therefore, it becomes all the more critical for firms to have operant resources contributing simultaneously to innovation and efficiency along with agile service supply chains. Therefore, in today’s disruptive world, firms are not expected to perform well without agile service supply chains. Unless managers view service supply chain fit strategically and invest in developing the operant resources and the right supply chain, future COVID-like disruptions may severely harm firm performance. Thus, the firm and the supply chain must operate in tandem towards service supply chain fit by focusing on the relationship between specific operant resources and service supply chains.

To achieve service supply chain fit, firms must consider the following steps. First, they need to know their type of service (innovative or efficient). Second, they need to understand their service supply chain's characteristics and capabilities, that is, their position along the efficiency-responsiveness continuum, or their agility. Third, they need to ensure that they possess operant resources consistent with their supply chain characteristics. For managers, the findings offer insights on different resources they should invest in to achieve their strategic objectives. For example, to achieve agility to tackle COVID-19 like disruptions,

firms should ensure developing the operant resources – collaboration and integration, to provide quick access to relevant data. Operant resources that enable access to data from different entities in a supply chain can help a firm gather disruption-related information upfront and improve agility.

A few recent examples show how each operant resource, or a combination of operant resources “fitted” with the right supply chain will enhance service firm performance and help achieve specific strategic objectives. A recent example is Pfizer, one of the world's largest pharmaceutical companies heading the global COVID-19 vaccination program. In 2019, months before the pandemic was first detected in China, Pfizer declared a bold strategy to focus exclusively on innovative medicines and vaccines, with a plan to supply over one million investigational vaccines or drugs to over 70 countries. Pfizer felt the need to develop a cross-functional decision-making hub and pilot a 24-hour workforce model with the Clinical Research Pharmacy function (Hill and Tedards, 2021). In early 2020, as the company was onboarding its first hires, COVID-19 had started to make its way around the globe. By July 2020, Pfizer’s specially recruited team had already laid down plans to develop and supply COVID-19 vaccines. Pfizer partnered with the German company BioNTech in developing the COVID-19 vaccine. Pfizer’s pro-activeness and risk-taking approach, combined with the research capabilities of BioNTech, contributed to their service supply chain needs of delivery reliability, capacity, inventory, and accessibility. BioNTech developed the vaccine, and Pfizer handled the clinical trials, logistics, and the manufacture of the vaccine in most parts of the world. Pfizer partnered with regional firms of some countries (for example, Fosun in China and Hong Kong) for manufacturing, trials, government approvals, and logistics. Pfizer’s ongoing vaccination drive worldwide indicates how critical it is to attain the fit between operant resources and service supply chain in disruption management.

While this thesis empirically validates a model of service supply chain fit, the study encourages further research aimed at developing such framework(s) that are specific to firm type, industry or existing strategy. Context-specific examples are required for future empirical studies that develop concepts of fit between various operant resources, and the service supply chains that should support them. Furthermore, while this research conceptualize service supply chain fit as a strategic consistency between resource and supply chain capability based on moderation perspective, further research could also consider supply chain fit from other perspectives (Venkatraman, 1989). For example,

Gligor (2017) examined different potential moderators of the 'fit' relationship, rather than matching perspective investigated by Wagner et al. (2012). Further empirical studies should identify a more concrete path to the dimensions of fit for service supply chains in particular, and the interplay of the different operant resources with supply chain characteristics.

Service supply chain fit is a much needed first step towards empirically exploring the strategic role of operant resources in supply chain management. The exploratory qualitative study and further development of supply chain fit concept (in chapter 3) suggests that service supply chain fit may improve firm performance. As discussed earlier in the exploratory study, most of the interviewees failed to explain the direct contribution of a specific operant resource towards service delivery. The managers were unable to provide specific answers evincing a match between their resources and supply chain. By identifying a set of operant resources and their use in different strategic contexts, this study considers the prime role of operant resources in firm performance by exploring the most important intangible characteristics of operant resources. The exploratory study captured themes from managers' responses and linked it with marketing, information systems and strategy literature. This resulted in a list of operant resources. By empirically exploring operant resources, this contribution to service-dominant logic literature can be utilized by researchers in other disciplines of management to unearth the operant resources in firms. Operations management literature has discussed how supply chain management aligns with resource-based view along with operations strategy and performance (Hitt, Xu and Carnes, 2016). However, this study brings operant resources under resource-based view and helps in deeper understanding of resources which can help firms improve their performance. This contribution to resource-based view literature can create new areas of research in operations management on the basis of service-dominant logic and operant resources.

In contrast to developing goods-based supply chain frameworks and applying it to services, this thesis develops a service supply chain fit that is built primarily for services but can be applied to goods as well. The service-dominant logic paradigm subsumes the role of goods as a service provider and not as end products (Vargo and Lusch, 2004). Service-dominant logic's view of goods as a medium for providing services calls for a framework on services, rather than goods. This thesis develops a framework that is meant for services but captures the specifics of goods under its purview and, therefore aims to cover the goods supply chains.

The concept of service supply chain fit aids service firm managers to understand the significance of intangible operant resources for their firm and identify and explore these resources to extract their potential for achieving competitive advantage in their market. The framework of service supply chain fit benefits the firm in developing the right set of operant resources and supply chains that matches each other. Service supply chain fit addresses a concern echoed in the interviews regarding the mismatch of the firm's operational and strategic characteristics. Based on the systematic literature review, this is the first study to consider the significance of operant resources in services. It throws light in the direction of operant resources in a way that could benefit service firms. Today, even erstwhile goods supply chains succeed or fail due to the operant resources they have, be it Information Technology, Blockchain, Artificial Intelligence, or such other modern tools. Thus, a framework intended for service supply chains is critical to all supply chains, be they goods or services. Firms should invest in developing operant resources that suit their strategy along with the right supply chain for it. This approach would help improve the firm performance.

Extant literature has defined supply chain fit in goods-dominant logic as an alignment/match between one or more strategic elements and supply chain characteristics. The summary of extant literature in supply chain fit shows too many constructs that could be brought under the umbrella of supply chain fit. This would confuse practitioners and academicians to choose what suits their firm and profiles best. The possibility of considering one or more strategic elements and that too in different industries brought in a significant amount of untidiness among strategic fit literature in supply chains. Even this wide array of strategic fit studies overlooked service supply chains. This study not only considers service supply chains but also provides a summary of the state of strategic fit literature (using systematic literature review) in operations management even though all of them are based on goods-dominant logic.

5.3 Limitations

There are certain limitations of this research, which may also be viewed as future research opportunities. First, this thesis conceptualizes and measures supply chain responsiveness and supply chain efficiency on a continuum to capture the strategic priorities of a service firm's supply chain. This assumes that the lower the supply chain responsiveness, the

higher the supply chain efficiency and vice-versa, consistent with Fisher's framework. However, while unlikely, a supply chain could be both efficient and responsive at the same time, in absolute terms. Forcing firms to choose their position as either responsive or efficient encouraged firms to rethink their strategic priorities. Underlying Fisher's supply chain fit, and this thesis is the assumption that it is expensive and rarely profitable to excel in both dimensions. Nevertheless, future studies can investigate the same model using two separate metrics for supply chain responsiveness and supply chain efficiency, thereby identifying firms that score high on both these fronts and see how they perform.

The quantitative methodology captures the central firms' service supply chain and operant resource variables. Thus, the model conceptualizes service supply chain fit as dependent on the performance of central firms. Future research may focus on the service supply chain performance of the whole supply chain (and not just the central firm's) by conducting a case study, allowing for a more in-depth exploration of factors that would contribute to service supply chain fit. This would bring out industry-specific service supply chain fit variables and throw light on to different relationships among these fit variables.

Chapter 6

Conclusions and directions for future research

Although the importance of services is widely accepted by the operations and supply chain management community, theoretical frameworks in this area are few and far between. The focus of operations management research has primarily been on goods-based supply chains. While Niranjan and Weaver (2011) proposed a unifying view of goods and services supply chain management, only a handful of prior research have adopted concepts or frameworks from goods supply chain management, and applied it in a service context. On this basis, this thesis demonstrates applicability of such frameworks in service settings (chapter 2), and with a qualitative study (chapter 3), the study developed a service supply chain fit framework, followed by empirical validation (chapter 4).

The concept of *supply chain fit* has been a significant part of the operations management literature in developing supply chain frameworks. Although extant research has tested *supply chain fit* concepts in a variety of contexts and with a range of variables, the application of service focused dimensions or service-relevant variables have remained largely unaddressed in the *supply chain fit* literature. Understandably, the service aspect needs to be addressed in a *supply chain fit* research to help develop frameworks that have their application in service supply chains. Thus, this thesis explored service-dominant logic in supply chain fit context and developed a model/concept of service supply chain fit.

A systematic literature review of the *supply chain fit* literature in chapter 2 exposed the limited applicability of existing frameworks. The qualitative study involving interviews with managers of service firms supports the findings of the review and forms the basis for a new *service supply chain fit* framework (chapter 3). Using insights from service-dominant logic, the service supply chain fit framework considers intangible operant resources as the primary source of competitive advantage. The enquiry regarding the role of operant resources in firm performance involved a qualitative study among service firms.

The concept of service-dominant logic offers theoretical inputs for developing the framework of service supply chain fit. Operant resources and service-dominant logic view of goods as a medium for service is a building block of the concept of service supply chain fit. Even though the characteristics of operant resources are well-explained in service-dominant logic literature, it was only after Madhavaram and Hunt's (2008) paper, that the management research had a specific list of operant resources. The lack of empirical support to validate these resources and without specific methodologies to measure and quantify operant resources, this thesis offered a huge challenge and at the same time an opportunity. So, the first major objective was to identify a set of operant resources, study its components and understand the competitive advantages they can provide to service firms.

The thesis established a role for firms' intangible operant resources in the management of service supply chains through a framework by hypothesizing the relationships between operant resources and supply chain characteristics (chapter 4). Development of a methodology to quantify operant resources involved a scale development with adequate validity and reliability tests. This is a significant methodological contribution to management literature which is yet to develop scales specific to a set of operant resources. The perceptual nature of constructs, the use of single item scales, the empirical and statistical validation of these scales, and collecting firm-level data from top managers in three stages that involved 200 valid subjects in total (including pilot tests) is expected to add methodological value to management literature, which is yet to explore service-dominant logic in its full.

The theoretical and managerial implications of this study would assist not only the operations community but also marketing and other management disciplines. This conceptual framework of service supply chain fit presents avenues for further research. While this thesis explored the moderating effect of supply chain responsiveness, future research may also explore other factors and their relationships which might be in other perspectives of strategic fit. If other perspectives of strategic fit exist, it would be worthwhile to explore why supply chain responsiveness is acting as a moderator and while other supply chain characteristics, (for example, supply chain agility in this case) are not. This might lead to a conclusion that the relationship might vary with respect to constructs or industry or other factors within the strategic fit concept. This might open a large field of supply chain fit research and can also contribute to strategic management and strategy

literature. A typical industry-based study with additional industry-specific constructs would have significant managerial implications.

The concept of service supply chain fit aids service firm managers to understand the significance of intangible operant resources for their firm, and to identify and explore these resources to extract their potential for achieving competitive advantage in their market. The framework of service supply chain fit benefits the firm in developing the right set of operant resources and supply chains that matches each other. Service supply chain fit addresses a concern echoed in the interviews (chapter 3) regarding the mismatch between firms operational and strategic characteristics. Today, even erstwhile goods supply chains succeed or fail due to the operant resources they have, be it Information Technology, Blockchain, Artificial Intelligence, or such other modern tools. Thus, a framework intended for service supply chains is critical to all supply chains, be they goods or services focused. Firms should invest in developing operant resources that suit their strategy along with the having right supply chain for it. This approach would help improve the firm performance.

Directions for future research

The COVID-19 disruption found firms grappling with issues related to demand-supply mismatch, technology, and development of a resilient supply chain. Vulnerability of contemporary supply chain practices has forced the supply chain researchers to re-think the fundamentals of supply chain management (Jack, 2020). To overcome the static and reductionistic assumptions of supply chain management, the recent supply chain disruptions call for an adaptive and integrated supply chains based on a holistic perspective (Wieland, 2020). The recent global disruptions in supply chains have forced firms to overlook the supply chain trade-offs. However, the operations literature over the past decade often positions supply chain variables as points on a spectrum or discrete choices (chapter 2). The advances in supply chain agility, resilient supply chain, Triple-A supply chain, qualitative comparative analysis etc. (Gligor et al., 2020; Sharma et al., 2020) suggest that these strategic approaches may be employed together – and that they, in fact, should be pursued simultaneously.

As mentioned earlier, Fisher's (1997) framework identified the need of supply chain to be either responsive or efficient. However, the COVID-19 disruption calls for a supply chain which must be both agile and efficient at the same time. Therefore, it is no longer

sustainable for a firm to possess a supply chain with single strategic priority. The supply chain should possess a “recipe” of characteristics (Gligor et al., 2020) to attain sustainable competitive advantage in today’s environment. Although considered an essential characteristic of any supply chain operations during disruptions, agility can be costly to sustain in the long run and certain firms can soon lose their competitive advantage if supply chain efficiency is not maintained simultaneously. Therefore, in today’s world it is important for a service supply chain to be both agile as well as efficient. These characteristics of supply chains (which are mostly viewed as two discrete choices) needs to be integrated.

While the conventional supply chain fit model focusses on issues related to demand-supply mismatch, our future research shall build on this thesis and steer the focus towards the service supply chain fit for this integrated framework. Due to the freshness of this line of literature, little is known about what operant resources a service firm should acquire or maintain to simultaneously develop efficiency and agility in its supply chain. This is especially true for service supply chains which are not the focus of mainstream literature despite their growing prevalence. Service supply chains have especially considered agility as one of the important characteristics. In addition, little is known about what operant resources help service firms achieve agility and efficiency simultaneously in their supply chains.

Apart from the above-mentioned integrated model of service supply chain (agility and efficiency), research to conceptualize new models of service supply chains with characteristics and variables which are industry-specific shall be worth exploring. These new supply chains should overlook the trade-offs and develop integrated models with variables that are at the opposite ends of the continuum. Developing a large body of integrated supply chain models in operations literature could pave way for viewing supply chain management as an everchanging organic system even within a firm (Wieland, 2020). Here again, exploring the operant resources that could aid these new service supply chain models can significantly contribute to service supply chain fit literature.

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Appendix A: Interview discussion points

INTERNAL ACTIVITIES

How is your firm different from your close competitors?

Please list critical resources that provide your firm with competitive advantage over competitors?

SUPPLY CHAIN

Elaborate on service delivery along your supply chain, be it B2B or B2C.

- How does it happen?
- What are its priorities?
- What are your supply chain's strengths and weaknesses?
- How do you overcome the weaknesses (if any)?

How do the intangible resources your firm possesses help you manage service delivery in your supply chain?

Appendix B: Validity questionnaire

Please rate the ability of the proposed items to represent the following constructs on a 3-point scale (1: not representative (NR), 2: somewhat representative (SR) and 3: very representative (VR)).

Construct to be measured	Proposed item	Validity of the scale		
		NR	SR	VR
<p>1. Customer orientation</p> <p>Customer orientation is the ability of a firm to successfully orient towards their customer with an aim to provide superiorly valued services.</p>	<p>We are oriented towards our customer with an aim to provide superiorly valued services to them.</p>			
<p>2. Customer-demand meeting capability</p> <p>Customer-response capability is defined as the ability of a firm to monitor and respond efficiently and rapidly to the changes in customer requirements in order to achieve sustainable competitive advantage.</p>	<p>We respond rapidly to changes in customer requirements.</p>			
<p>3. Competitor orientation</p> <p>Competitor orientation is the understanding of the performance and behaviour of both the key current and potential competitors.</p>	<p>We understand our competitors' performance and behaviour.</p>			
<p>4. Inter-functional coordination</p> <p>Inter-functional coordination is the coordinated use of a firm's resources to create superior value for customers.</p>	<p>Our business functions share resources and integrate them to serve the needs of our target customers.</p>			

<p>5. Collaboration</p> <p>Collaboration is the ability to work across organizational boundaries by sharing resources: information, people, and technology.</p>	<p>We have the ability to work across organizational boundaries by sharing resources (information, people, and technology) among other supply chain members.</p>			
<p>6. Network competence</p> <p>Network competence is a firm's ability to initiate, handle, use, and terminate inter-organizational relations.</p>	<p>We are competent in managing inter-organizational relations.</p>			
<p>7. Integration</p> <p>Integration is a firm's commitment and coordination with its functional areas to achieve operational efficiency and strategic effectiveness.</p>	<p>We effectively coordinate with the functional areas of our firm.</p>			
<p>8. Alliance competence</p> <p>Alliance competence is the ability to collaborate the efforts between two or more firms, by sharing their resources in an effort to achieve mutually compatible goals that they would not easily achieve alone.</p>	<p>We share our resources with two or more other firms with an aim to achieve mutually compatible goals.</p>			
<p>9. Internal market orientation</p> <p>Internal market orientation is a firm's commitment to producing value for its internal market by understanding their expressed and latent needs, much in the same way as the commitment that is required to produce value for the company's customers.</p>	<p>We are committed to producing value for our employees by understanding their needs.</p>			
<p>10. Logistics service orientation</p> <p>Logistics service orientation is the strategy and decisions of the logistics service provider, which enable the achieving of the firm's goal of delivering the service.</p>	<p>We focus on strategic decisions of logistics, which enable the timely delivery of quality service.</p>			

<p>11. Organizational learning capability</p> <p>Organizational learning capability is the ability of a firm to process knowledge in order to improve the performance of the firm.</p>	<p>We have the ability to process knowledge and, thereby, modify our firm's behaviour.</p>			
<p>12. Knowledge creation capability</p> <p>Knowledge creation capability is the access to information, the ability to absorb and combine information, and the anticipation of value from this exchange and combination process.</p>	<p>We have the ability to create new knowledge that provides value to the customer.</p>			
<p>13. Learning platform capability</p> <p>Learning platform capability explores how the firm's learning intent, its receptivity, and its transparency play a role in achieving sustainable competitive advantage by providing a strong platform for learning activities.</p>	<p>We provide a platform for learning activities through our intent, receptivity, and transparency.</p>			
<p>14. Market knowledge competence</p> <p>Market knowledge competence is a process that generates and integrates market knowledge.</p>	<p>We are competent in integrating the market knowledge we generate.</p>			
<p>15. Knowledge management competence (explicit)</p> <p>Explicit knowledge management competence is the effective management of the explicit knowledge of value in order to ensure continual health and longevity of the firm.</p>	<p>We are competent in the effective management of standard knowledge (for example procedural documentation).</p>			
<p>16. Knowledge management competence (tacit)</p> <p>It is the effective management of context-specific knowledge of value in order to ensure the continual health and longevity of the firm.</p>	<p>We are competent in the effective management of context-specific knowledge (for example, facial recognition is a knowledge that is gained by developing close relationships with key customers).</p>			

<p>17. Absorptive capacity</p> <p>Absorptive capacity is the dynamic ability to assimilate and replicate new knowledge (internal and external).</p>	<p>We have the dynamic ability to assimilate and replicate internal and external knowledge.</p>			
<p>18. Product innovation competence</p> <p>Product innovation competence is the firm's competence in bringing together the competencies that are related to technology and customers with the aim of creating new products.</p>	<p>We create new products by linking the competencies that are related to technology and customers.</p>			
<p>19. Price-setting capability</p> <p>The price-setting capability of a firm is the ability to set the right prices for the valuable services they offer.</p>	<p>We are capable of setting optimal prices for services that deal with the complexity of the market.</p>			
<p>20. Innovativeness capability</p> <p>Innovativeness capability is the firm's proclivity, receptivity, and inclination to adopting ideas by exploring new opportunities rather than by utilizing current strengths.</p>	<p>We are committed to adopting new ideas that provide innovative services to the customer.</p>			
<p>21. Market-planning capability</p> <p>Marketing-planning capability is the ability to anticipate and respond to the market environment in order to direct a firm's resources and actions in ways that align the firm with the environment and achieve the firm's financial goals.</p>	<p>We respond efficiently to the market environment by effectively directing the resources.</p>			
<p>22. Market-relating capability</p> <p>Market-relating capability is an operant resource that is formed as a result of the interaction between processes, orientation, knowledge, and skills in order to create and maintain relationships between the firm and their most valuable customer.</p>	<p>We interact between processes, orientation, knowledge, and skills so as to create relationships with the most valuable customer.</p>			

<p>23. Market-focused strategic flexibility</p> <p>Market-focused strategic flexibility is defined as a firm's intent and capabilities to generate firm-specific options for the configuration and reconfiguration of appreciably superior customer value propositions.</p>	<p>We have the flexibility to change direction and re-configure strategically in response to changes in the internal and external environment.</p>			
<p>24. Technology</p> <p>Technology is defined as a collection of practices and processes, as well as symbols that are drawn upon to serve a human purpose.</p>	<p>We collaborate with our business functions by making use of our expertise in technology.</p>			
<p>25. Organizational service culture</p> <p>Organizational service culture is defined as an organizational climate in which the goals and values of the firm are focused on service excellence.</p>	<p>Our goals and values are focused on the service excellence.</p>			
<p>26. Entrepreneurial proclivity</p> <p>Entrepreneurial proclivity is defined as the top manager's disposition to accept entrepreneurial processes, practices, and decision-making that is characterized by pro-activeness and risk taking.</p>	<p>We engage in entrepreneurial processes in our firm which is characterized by pro-activeness and risk taking.</p>			

Appendix C: Validity test results

Validity test results 1 (N - Not representative, S - Somewhat representative, V - very representative)

No.	Constructs	Responses				Validity result
		1	2	3	4	
1	Customer orientation	N	V	N	V	Invalid
2	Customer-response capability	S	V	S	S	Valid
3	Competitor orientation	S	V	V	V	Valid
4	Inter-functional coordination	V	N	S	V	Valid
5	Collaboration	N	S	V	S	Valid
6	Network competence	S	V	N	V	Valid
7	Integration	N	N	V	N	Invalid
8	Alliance competence	S	S	V	S	Valid
9	Internal market orientation	N	S	V	V	Valid
10	Logistics service orientation	N	V	V	V	Valid
11	Organizational learning capability	S	S	N	V	Valid
12	Knowledge creation capability	V	V	V	S	Valid
13	Learning platform capability	N	V	V	V	Valid
14	Market knowledge competence	S	S	V	V	Valid
15	Knowledge management competence (explicit)	S	V	S	V	Valid
16	Knowledge management competence (tacit)	S	S	S	S	Valid
17	Absorptive capacity	S	V	V	V	Valid
18	Product innovation competence	N	V	V	S	Valid
19	Price-setting capability	S	V	V	V	Valid
20	Innovativeness capability	V	V	V	N	Valid
21	Market-planning capability	N	V	S	V	Valid
22	Market-relating capability	N	V	V	S	Valid
23	Market-focused strategic flexibility	V	V	V	V	Valid
24	Technology	N	V	S	N	Invalid
25	Organizational service culture	S	V	V	S	Valid
26	Entrepreneurial proclivity	S	V	V	S	Valid

Validity test results 2 (N - Not representative, S - Somewhat representative, V - very representative)

No.	Constructs	Responses				Validity result
		1	2	3	4	
1	Customer orientation	S	S	V	S	Valid
2	Customer-response capability	V	S	S	V	Valid
3	Competitor orientation	S	V	V	V	Valid
4	Inter-functional coordination	S	S	V	V	Valid
5	Collaboration	N	V	V	V	Valid
6	Network competence	V	V	N	S	Valid
7	Integration	N	V	S	S	Valid
8	Alliance competence	V	V	S	S	Valid
9	Internal market orientation	V	V	S	S	Valid
10	Logistics service orientation	V	V	V	S	Valid
11	Organizational learning capability	V	V	V	V	Valid
12	Knowledge creation capability	V	S	V	S	Valid
13	Learning platform capability	N	V	V	S	Valid
14	Market knowledge competence	S	S	S	V	Valid
15	Knowledge management competence (explicit)	S	V	N	V	Valid
16	Knowledge management competence (tacit)	S	V	N	V	Valid
17	Absorptive capacity	N	V	V	S	Valid
18	Product innovation competence	N	V	V	V	Valid
19	Price-setting capability	S	V	V	V	Valid
20	Innovativeness capability	V	V	V	V	Valid
21	Market-planning capability	S	V	S	V	Valid
22	Market-relating capability	N	V	V	S	Valid
23	Market-focused strategic flexibility	V	V	V	V	Valid
24	Technology	S	V	V	S	Valid
25	Organizational service culture	V	S	V	V	Valid
26	Entrepreneurial proclivity	S	V	V	V	Valid

Appendix D: Survey questionnaire

We seek participation in a survey regarding key sources of competitive advantage in service firms.

Service firms face difficulties from competitors because of low barriers to entry and increased commoditization, making it harder stand out in the marketplace. Service firms however can potentially better distinguish themselves and create unique offerings, by exploiting their intangible resources (as opposed to a focus on physical goods). The first step toward better use of intangible resources, however, is to identify what they are for each firm, how they might be best used for a specific service firm and market, and combinations that improve financial performance the most. The findings will offer insights as to how firms such as yours can better position themselves to leverage their resources and improve their competitive advantage.

**This study has been designed in accordance with the requirements of Institute Ethics Committee (IEC), IIT Bombay and the Australian National Statement on Ethical Conduct. If you have any concerns, please contact any member of the study team: Dayna.Simpson@monash.edu, ttniranjan@iitb.ac.in, Raveen.Menon@monash.edu or the *Technical Officer*, Institute Ethics Committee: joyita@iitb.ac.in or *Executive Officer*, Monash University Human Research Ethics Committee (MUHREC): muhrec@monash.edu. Any collected information will be kept confidential. Any data that is used in reports or published findings will not, under any circumstances, contain names or identifying characteristics.

Survey starts here:

1. Which of the following best describes your industry?

- Accommodation and Food Services
- Administrative and Support Services
- Arts and Recreation Services
- Education and Training
- Electricity, Gas, Water and Waste Services
- Banking, Financial and Insurance Services
- Health Care and Social Assistance
- Information Media
- Consultancy, Professional, Scientific and Technical Services
- Information technology
- Rental, Hiring and Real Estate Services
- Retail/Wholesale Trade
- Transport, Postal and Warehousing
- E-commerce
- Tourism

Others (please specify) _____

2. How many employees do you have?

- <100
- 100-499
- 500-999
- 1000-9,999
- $\geq 10,000$

3. What is your role in the company?

- CEO/President/Vice President
- Senior Manager
- Manager
- Assistant Manager
- Employee

Please respond to following scenario- based questions before starting the survey in next page:

Scenario 1:

ABC is a mid-sized IT company, providing consultancy services to mainly business clients. ABC is typically first among its industry peers to market new services and rolls out new product lines each year. It offers clients a large number of different products and considers itself a ‘bespoke’ provider of services. Its products have a short life-cycle. It does, however, experience a high degree of error in demand forecasts from year to year.

Would you consider ABC a firm that provides mostly functional or innovative services?

Functional (1) – Innovative (5)

Scenario 1a:

ABC is a mid-sized IT company, providing consultancy services to mainly business clients. With limited variety of services, ABC is a market leader in providing services at low cost. Most of their services enjoy higher market share relative to peers. ABC experiences little change in their demand from year to year.

Would you consider ABC a firm that provides mostly functional or innovative services?

Functional (1) – Innovative (5)

Scenario 2:

XYZ is a company specialized in providing management consultancy to service firms. With a state-of-the-art research and development unit called the “Business Excellence Center” (BEC), XYZ provides knowledge creation services. BEC uses artificial intelligence and machine learning to frequently develop disruptive technologies to guide its operations. XYZ also provides solutions to re-configure their customers’ business processes according to frequent technological advancements.

Would you consider XYZ a firm that provides mostly functional or innovative services?

Functional (1) – Innovative (5)

Scenario 2a:

XYZ is a business process outsourcing company, providing call center services to a range of companies. XYZ’s tried and tested standard operating procedures, and reliable service delivery made them a market leader in providing low-cost services. XYZ is known for their skills pertaining to demand planning and monitoring, and they have long business relationships with their clients.

Would you consider XYZ a firm that provides mostly functional or innovative services?

Functional (1) – Innovative (5)

Items	Mean	SD
Customer Value		
<i>Please indicate your agreement with each of the following statements about your firm (1 = Strongly Disagree; 5 = Strongly Agree)</i>		
1. We aim to provide highly valued services to our customers.	4.51	0.53
2. We respond rapidly to changes in customer requirements.	4.27	0.89
3. We create new knowledge that provides value to our customers.	4.04	0.93
4. We create new products by linking competencies related to both technology and customers.	3.84	1.03
5. We adopt ideas that provide innovative services to our customers.	4.07	0.8
6. Our key processes are internally integrated and externally aligned with our most valuable customers.	4.17	0.76

Items	Mean	SD
Internal and external collaboration		
<i>Please indicate your agreement with each of the following statements about your firm (1 = Strongly Disagree; 5 = Strongly Agree)</i>		
1. Our business functions share resources internally to serve the needs of customers.	4.28	0.73
2. We ensure effective coordination between the functional areas of our firm.	4.21	0.73
3. We regularly share resources (information, people, and technology) with other members of our supply chain.	3.96	0.95
4. We are competent at managing inter-organizational relationships.	4.1	0.84
5. We share our resources with two or more firms with an aim to achieve mutually compatible goals.	3.5	1.15

Items	Mean	SD
Knowledge and learning		
<i>Please indicate your agreement with each of the following statements about your firm (1 = Strongly Disagree; 5 = Strongly Agree)</i>		
1. We are committed to understanding our employees' needs	4.25	0.84
2. We have the ability to process knowledge and modify our firm's behaviour accordingly.	4.32	0.75
3. We provide a platform for learning activities throughout our organisation.	4.08	0.96
4. We have the desire, openness and capacity to learn.	4.25	0.83
5. We are competent at standardizing knowledge (eg: procedural documentation).	4.15	0.86
6. We are competent at managing context-specific knowledge (eg: a specific knowledge about your most valuable customer).	4.21	0.86
7. We have a dynamic ability to assimilate and replicate knowledge.	4.14	0.8
8. We use technologies that contribute to value creation.	4.19	0.85
9. We engage in entrepreneurial behaviours at our firm such as being pro-active and risk taking.	3.71	1.22

Items	Mean	SD
Changes in the market		
<i>Please indicate your agreement with each of the following statements about your firm (1 = Strongly Disagree; 5 = Strongly Agree)</i>		
1. We set optimal prices for services, considering market complexity	4.07	0.83
2. We respond efficiently to our market environment by effectively directing our resources.	4.19	0.84
3. Please ignore this question and proceed directly to the next question.		
4. We re-configure in response to changes in our internal or external environment.	4.18	0.71
5. We understand our competitors' performance.	4.23	0.9
6. We integrate the market knowledge we generate.	4.26	0.8
7. Our goals focus on service excellence.	4.46	0.77

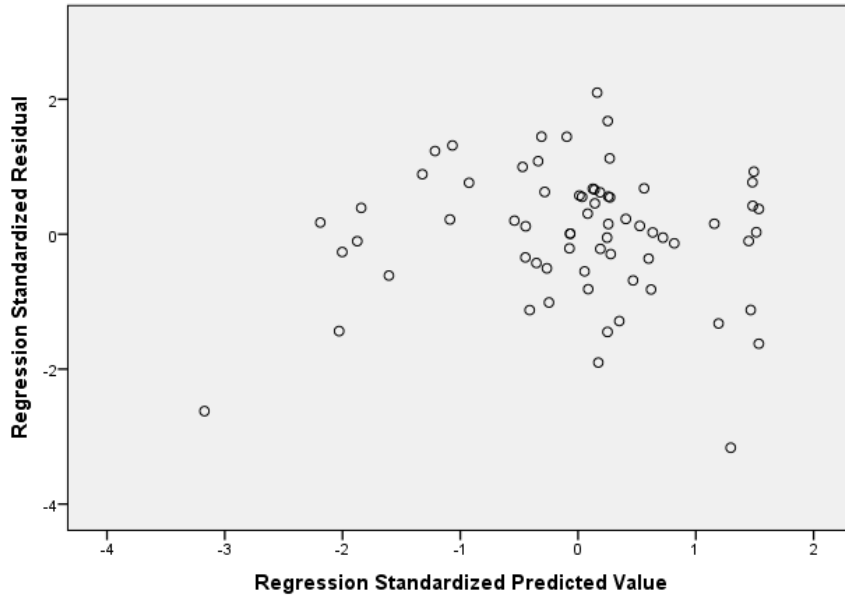
Items	Mean	SD
Strategic Priorities		
<i>Please indicate whether or not the following statements reflect the strategic priorities of your firm (1 = not important at all; 5 = extremely important):</i>		
1. Seek to improve the reliability of service delivery	4.29	0.75
2. Maintain services that can be used immediately by customers	4.16	0.84
3. Retain service capacity that can provide high quantity output	4.14	0.89
4. Respond quickly to unpredictable demand	3.99	0.99
5. Increase frequency of new service introduction	3.63	1
6. To ensure timely delivery of our services.	4.	0.8

Items	Mean	SD
Operating Environment		
<i>Please indicate your agreement with each of the following statements about your firm (1 = Strongly Disagree; 5 = Strongly Agree)</i>		
1. We promptly identify opportunities in our business environment.	4	0.85
2. We rapidly sense threats in our business environment.	3.92	0.83
3. We quickly detect changes in our business environment.	3.98	0.96
4. We receive the information we need from our suppliers.	4.01	0.92
5. We obtain the information we request from our customers.	4.24	0.77

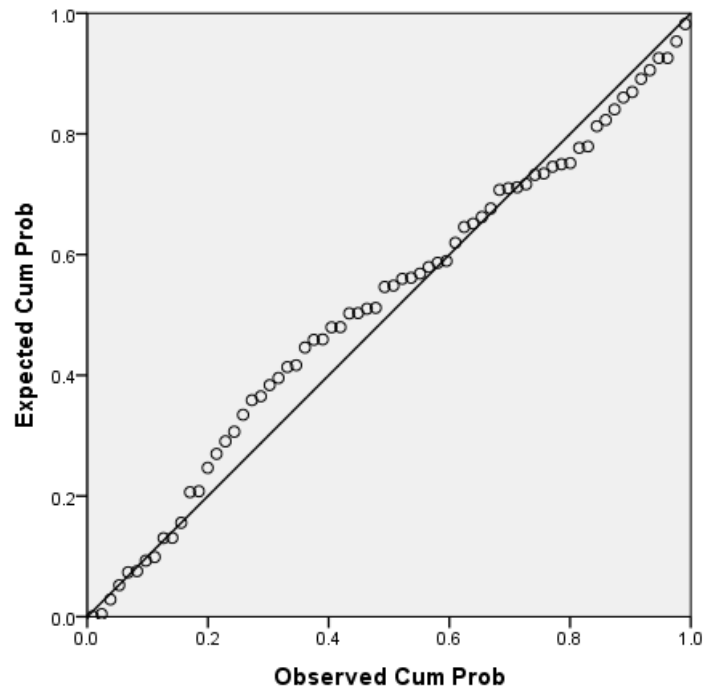
6. We make definite decisions when addressing opportunities in our business environment.	4.12	0.86
7. We make firm decisions in response to threats in our business environment.	4.11	0.76
8. We make firm decisions to deal with changes in our business environment.	4.17	0.78
9. We swiftly deal with threats in our business environment	3.95	0.92
10. We quickly respond to changes in our business environment.	4.05	0.92
11. We rapidly address opportunities in our business environment.	4.04	0.98
12. When needed, we adjust our supply chain to the extent necessary to execute our decisions.	3.94	0.86
13. We increase our short-term capacity as needed.	3.98	0.97
14. We adjust the specification of orders as requested by our customers.	4.04	0.97

Items	Mean	SD
Performance		
<i>Please evaluate your firm 's performance relative to other firms in your industry (1 = Much worse; 5 = Much better)</i>		
1. Growth in sales.	3.76	0.84
2. Growth in profit.	3.67	0.97
3. Growth in market share.	3.71	0.98
4. Return on assets (ROA).	3.64	0.89
5. Return on investments (ROI).	3.63	0.88
6. Employee turnover.	3.51	1.18
7. Customer service.	4.09	0.92
8. On time delivery of services.	3.98	0.94
9. Order fulfilment.	4.01	0.88
10. Service quality.	4.14	0.89

Appendix E: Visual analysis



Residual scatter plot (independent variables)



Normal Q-Q plots Residual scatter plot

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