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Service dominant logic: implications for postponement in service supply chains

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UNIVERSITY OF OULU ABSTRACT OF THE MASTER'S THESIS

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Abstract

Different service supply chain models and frameworks have been developed based on the models of supply chain management of product manufacturing sector. Meanwhile, postponement has been studied a lot in the areas of manufacturing supply chain management, but not much evidence of service postponement has been examined. Is it possible to utilize postponement in service supply chain management? This Master's thesis is presenting research exploring the feasibility of applying postponement strategy in managing a service supply chain.

With the service dominant logic as the basement, it is discovered that service providers should focus on assist creating customers' value-in-use, which leads to long-term and higher value-in-exchange to the service provider. Operant resources, such as knowledge on customers, must be considered critical in managing service supply chains. Value offering model is adopted as a significant adaptation to enable postponement, because it integrates both demand and supply, both customers and the provider as the service co-creators. Then it is explained in the study that how postponement can be applied to manage the service supply chain with a creative model based on the value offering theory.

The proposed framework adds to the existing knowledge on service supply chain management by exploring the applicability of postponement strategy from service dominant perspective. From this sense this study is innovative and exploratory. Practically, it suggests a service firm can utilize postponement by integrating the customer and customer's demand chain into its supply chain.

Qualitative method is considered as a reasonable and valid research method for this study. Abductive reasoning works as a strategy to conduct this research as it is appropriate for theory development. A single case study is conducted with a partner company, an international knowledge-intensive service provider providing professional consulting and engineering service. Primary empirical data is collected from semi-structured interviews. The approach of data analysis is coding and hermeneutics.

Keywords

Value co-creation, operant resources, service supply chain, value offering theory.

Additional information

This study is a part of ModuServ (Modularity in Business Services to Co-create Value within Collaborative Networks) research project in Oulu University.

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1 INTRODUCTION

1.1 Research background

Supply chain management (SCM) has been a hot topic for decades in both academics and business world. Extensive research on SCM has been done from several different perspectives: operations management, procurement, transportation and marketing etc. (Arlbjorn et al. 2011). Yet, from academic and practical standpoints, the emphasis in supply chain management is strongly inclined to product supply chain, in which tangible goods is managed as the focus from suppliers to ultimate customers (Sengupta et al. 2006). What's more, the examples, models and anecdotes used in academia tend to focus on the product manufacturing sector (Ellram et al. 2004). For example, Supply Chain Operations Reference Model developed by the Supply Chain Council and Global Supply Chain Forum Framework formed by Croxton et al. (2001) focus on the physical flow of goods among supply chain members. Comparing to the extensive research and mature understanding on SCM of goods, literature dealing with service SCM is rudimentary.

Economy has become more service and technology oriented. In practice, more and more manufacturing companies have started to be aware of and to see an increasing amount of revenue generated from service solutions instead of products (Cohen et al. 2006). Recently, service business has received considerable attention from both academics and practitioners. It is assumed that business transactions have been moving into a new era of relationship-based service business where applied knowledge and skills are being exchanged (Vargo & Lusch 2008; Levitt 1983). Different service supply chain models and frameworks are developed by several researchers for service SCM, based on the models of SCM of product manufacturing sector (Lin et al. 2009; Johnson & Mena 2008; Baltacioglu et al. 2007; Ellram et al. 2004). At the same time, specific service supply chain management tools are believed to be created to help service sector to gain competitive advantages in a fiercely competitive marketplace, considering the inherent difference between product and service supply chains (Ellram et al. 2004). It is claimed that product-based manufacturing SCM strategy, such as lean practice, postponement and speculation, may also be relevant for the service sector, which can utilize the

management innovation of product supply chain research to reduce costs, increase flexibility, shorten lead time and improve service quality (Arlbjorn et al. 2011; Johnson & Mena 2008; Baltacioglu et al. 2007; Ellram et al. 2004). However, a number of differences between services and manufacturing prevent directly transferring manufacturing logic to services. For instance, untested assumptions about what customers expect in terms of service quality provide obstacles to transferring manufacturing logic to services (Bowen & Youngdahl 1998). In a word, comparing to the abundant amount of literature on product-based SCM, very little has been studied on the application of product-based SCM strategy in service supply chains.

Postponement, with a long history of practical implications, was proposed for the first time in 1950s as the principle of reducing various marketing costs (Bucklin 1965). Since then, postponement has been studied in the areas of distribution systems (Bucklin 1965), in manufacturing processes (Yang et al. 2007), as well as in supply chain management (Boone et al. 2007). As time goes on, literature on postponement increased dramatically, which reflects the fact that customers increasingly tend to customized offerings since postponement offers visibility and flexibility to manufacturers to better fulfill customer's demand (Boone et al. 2007). Previous efforts are mainly focused on the downstream of the supply chain, the interaction between modularization and postponement or the degree of customization (Boone et al. 2007). Recently, some scholars suggest the application of postponement into services and explore the transferability of postponement in service setting (Yang et al. 2010). To date, research extending the view to service supply chain is scanty. Therefore, this study aims to extend postponement strategy into service supply chain context.

1.2 Research objective and research question

The objective of this Master's thesis is to build up a framework of applying postponement strategy in a service supply chain context. The research question is how postponement strategy can be adopted and integrated in a service supply chain. The research question can be divided into two sub-questions:

1. How service value co-creation processes can be understood in the service supply chain context?

2. Based on understanding of the first question, how an application model can be constructed for utilizing the postponement strategy?

The answer to the first sub-question tells how we can comprehend service supply chain so that postponement can be applied in a service supply chain. Based on this answer, we look into the second question. That is whether postponement can be utilized and whether it's possible to compose a model facilitating postponement application in a service supply chain. If this kind model can be composed based on theory, then empirical evidence is needed to prove that this model is also reasonable and valid in practice.

As we all know, service sector is quite broad, including miscellaneous areas and various operational contents. The service supply chain concept covers businesses dealing with finance, health care, insurance, engineering and management consulting, social services, cleaning, maintenance, education, legal service and so on. Services can be classified into three categories, i.e. mass services, service shops and professional services (Rahimnia & Moghadasian 2010). This study is focused on professional service of engineering and management consulting.

1.3 Research approach

Qualitative research method, designed to help understand people and what they say and do in social contexts, is considered appropriate for the study (Myers 2009: 5). The question "how postponement strategy can be applied in a service supply chain" is investigated within the context of B2B professional service of engineering and management consulting. Within the investigation, the researcher needs to understand the business parties' motivations, reasons, actions and beliefs, so qualitative research is the best approach for this study. The research process can be described in Figure 1. The research question is actually derived from both the existing research literature and the case company's business practice. With several meetings with the case company representatives, the case company's current operation situation is described

and identified and then a proper theory is under searching. Then the theoretical model is built up on the research literature study and the researcher's own critical and analytical judgement.

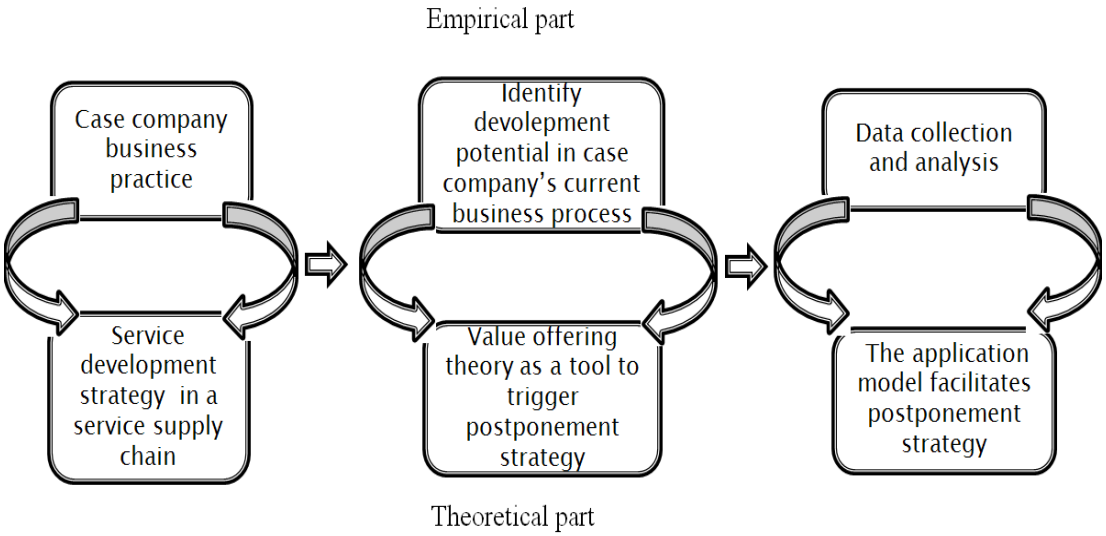

Figure 1. Research process

The case company, an international knowledge-intensive service provider providing professional consulting and engineering service in energy, urban and mobility, water and environment, offers a suitable research context where service supply chain investigation is conducted. Empirical research is conducted in a single case study to test the validity of the theoretical model. Data is collected from interviews and secondary materials such as internal documents, the case company's websites and other shared materials with the researcher. Empirical evidence is mainly gained from interviews. Fieldwork, or participant observation, could be used to obtain deep understanding of the case company, but it didn't happen during this study. Data analysis sometimes goes hand in hand with data collection, as the researcher needs to ponder the meaning of collected data and at the same time to revise the plan of following data collection (Myers 2009: 25).

1.4 Research structure

This study is organized as follows. Firstly, in the theoretical part service dominant logic is adopted to review the literature on supply chain management and service marketing. Then the nature and content of a service supply chain are recognized

through the service dominant view, which give a comprehensive understanding on service supply chain management. The links among adopted concepts are illustrated in Figure 2. Application of operant resources and value co-creation are the most important two pillars extracted from the service dominant logic. Value co-creation is presented in details in another chapter, where value co-creation process is reviewed with a service perspective and then both customer's demand chain and provider's supply chain are shortly discussed. In the next chapter, value offering theory introduced by Holmstöm et al. (1999) is mentioned with the researcher's judgement that it can work as a mediator to enable postponement strategy in a service provider's supply chain. Order penetration point (OPP) and value offering point (VOP) model conforming with value co-creation of a service supply chain are used as a crux to form a framework of postponement application model. Meanwhile, operant resources, being key element of competitive advantage and leading to learning, are emphasized as the foundation to employ value offering theory and to create an appropriate Order penetration point (OPP) and value offering point (VOP) model.

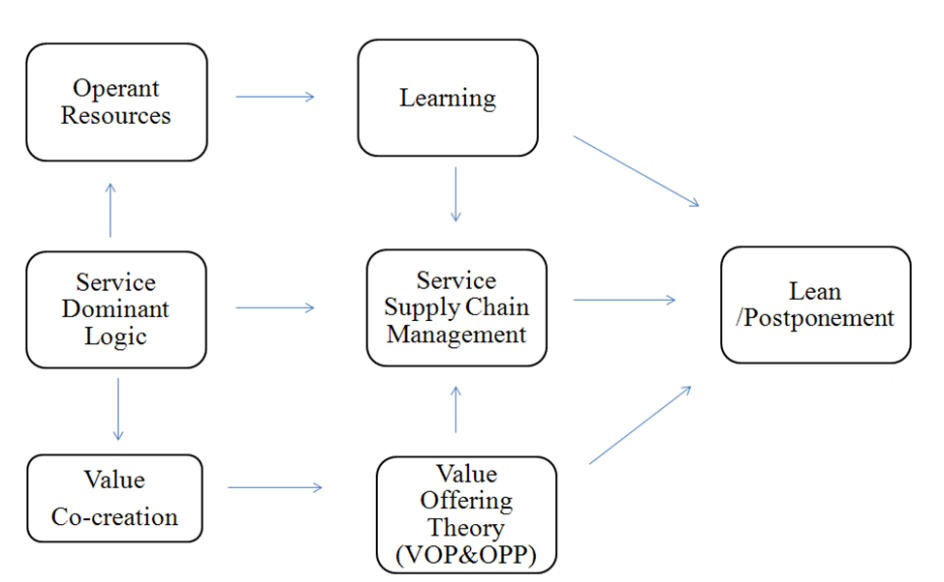

Figure 2. Links among adopted concepts

In the empirical part, order penetration point (OPP) and value offering point (VOP) are discussed and they can be utilized to facilitate customer's value-generating process, which offer value-in-exchange to service providers. But locations of order penetration point (OPP) and value offering point (VOP) are based on provider's learning about customers. So the content of learning is discovered from critical data

interpretation and analysis. The outcome of learning is an appropriately designed order penetration point (OPP) and value offering point (VOP) model, which triggers postponement application.

2 THEORETICAL BACKGROUND

To transfer the postponement concept into a service setting, it is necessary to consider the distinguishing characteristics of services (Yang et al. 2010). Hence, service characteristics are discussed firstly in this part. Yang et al. (2010) argue that many tools and methods developed for physical goods do not suit well for human and interactive services, or at least they require significant adaptation. Therefore, the theoretical part is trying to build up a framework adapting postponement concept into services.

Before carrying on with this research, it is necessary to clarify what service supply chain and service supply chain management mean. Defining the service supply chain is the precondition of interpreting the service supply chain management. Therefore, this section includes a review of the literature relevant to services, service supply chain and service supply chain management. The review also confirms that service dominant view is a relevant perspective as foundation in studying service supply chains.

2.1 Service - the application of competences

Service is defined by Vargo and Lusch (2004) as the application of competences such as knowledge and skills through deeds, processes and performances for the benefits of another entity or the entity itself. Vargo (2009) holds that the meaning of singular “service” should not be confused with the plural form “services”, which reflects a particular type of intangible outputs. “Service” in this study means the process of using one’s resources for the benefits of another entity. This is in line with the definition from Grönroos (2008): service is a process or an activity where a firm assists its customer by doing something and offering something of value. Grönroos (2006) states that the most distinguishing characteristic of service is the process nature, and the aim of the process is to assist customers’ practice. With the service provided by the provider, a customer is able to implement activities and realize his or her target of the implemented activities.

The differences between product and services are concluded as IHIP, which represents “intangibility”, “heterogeneity”, “inseparability” and “perishability” (Sampson & Froehle 2006). “Intangibility” means, comparing with tangible product, intangible services, such as knowledge and skills, cannot be possessed or stored, but can only be experienced and participated, which makes services difficult to visualize and to measure (Ellram et al. 2004). However, in most cases services can be provided directly or indirectly through tangible goods, for instance repairing and maintenance services of bicycles. Bicycle is an “appliance” of the performance of the repairing services that assists in providing benefits to the customer (Vargo & Lusch 2004). “Heterogeneity” is the observation that individual units of services tend to be unique and demand of services is variable and customized. “Inseparability”, alternatively called simultaneity, refers to that services are usually produced and consumed at the same time. “Perishability” means service capacity is time-perishable because significant elements of production cannot begin before customer inputs are present.

Service capacity is deemed by some researchers as the equivalent to inventory in a service supply chain. For instance, Ellram et al. (2004) state that buying services represents a transfer of a service provider’s capacity to its customer in the form of service. Service is human intensive and process driven, which means capacity in a service supply chain actually is the capacity of human work and business processes are the main objects of human work. Meanwhile, another nature of service needs to be considered is service is bi-directional: customers are service receivers but also a sort of suppliers for provider to work on (Niranjan & Weaver 2011). The trend of involving customers in creating services has been explored in the context of a perspective of marketing, which is well known as the service dominant view or service dominant logic (Vargo & Lusch 2004).

2.2 Service dominant view

Service dominant view opens a new era of marketing thought, because it shifts the marketing thought from a traditional goods dominant to a service dominant perspective of value creation. Traditionally, goods are deemed as the unit of exchange and the focus of value creation. Service dominant view, however, regards service as the basis for exchange and value creation. All the differences originally

proposed by Vargo (2009) between service dominant view and goods dominant view are summarized in Table 1. The roles of producer and customer have been deemed as being separate in the goods-dominant view. The relationship between them is dyadic as producer must be the provider and customer must be the receiver. The producer is supposed to produce, distribute and promote goods where value is embedded and determined by the producer (Vargo & Lusch 2004). The producer's function for value creation ends once it successfully completes delivery of products and transfer of ownership. Ng et al. (2012) argue that the reason why goods dominant view pervades contemporary business thinking is derived from the long industrial era where wealth is achieved from producing surplus goods.

But the service dominant view obscures the bound of the two roles of producer and receiver, which indicates a customer can also be the supplier of the service offerings and be the co-creator of customer's value (Vargo & Lusch 2008). This new view proposes that value of an offering is achieved in use, rather than at exchange, which fundamentally changes the relationship between providers and customers (Ng et al. 2012).

Table 1. Service dominant view and goods dominant view (Vargo 2009)

	G-D logic	**S-D logic**
Meanings of relationship	Dyadic bonds represented by trust and commitment Long-term patronage-repetitive transactions	Reciprocal, service-for-service nature of exchange Co-creation of value Complex, networked structure of the market Temporal, emergent nature of value creation Contextual nature of value determination
Normative implication	Manage customer through communication, satisfaction, etc. to maximize customer lifetime value	Collaborative nature of value determination Collaborate with customers to develop mutually beneficial value propositions Co-create value through service-for-service exchange

There are new propositions originated from the service dominant view. Table 2, originally proposed by Vargo & Lusch (2008), lists all the service dominant logic foundational premises (FP), which give a comprehensive understanding of this new perspective. The most important propositions adopted in this text are firstly foundational premise 1 (FP1): service is the fundamental basis of exchange, and service refers to application of operant resources such as knowledge and skills. We need to notice that this logic actually views resources as operand and operant resources. Operand resources are those tangible resources on which an operation is performed to produce a service, such as goods, raw materials, facilities, technology and so on; while, operant resources are used to act on operand resources, for instance skills or embedded knowledge and organizational capabilities (Grönroos 2008). FP1 is particularly relevant to knowledge-intensive professional services as this industry does not produce physical goods, but offers services mainly by employing operant resources. Physical goods or equipment are also critical because they need to be integrated with services to complete the service offering, as stated by foundational premise 3 (FP3).

Secondly, foundational premise 4 (FP4) stresses that operant resources and operant resource-based capabilities are the core of competitive advantage and value creation. Operant resources that can be employed by a provider to develop value propositions can lead to superior competitive advantage. It is consistent with the statement from Yazdanparast et al. (2010), who hold that application and management of knowledge and skills to deliver a unique, customized service is a powerful source of competitive advantage. When firms have resources that are valuable, rare, inimitable and non-substitutable, they can achieve sustainable competitive advantage by implementing fresh value-creating strategies that cannot be easily duplicated by competitors (Eisenhardt & Martin 2000). Operant resources are such resources along a service supply chain. The manipulation of various operant resources is so critical that a firm definitely needs to clarify what and how operant resources influence its competitive advantage. It is considered in this study that emphasizing the importance of operant resources is the most essential contribution offered by the service dominant logic.

Unlike the dyadic view on customers and providers in the goods dominant view, foundational premise 6 (FP6) states that value in the service business is co-created by

the service provider and the customer. And customers' value is created during the customers' value-generating process, value is not realized during the ownership transferring (Grönroos 2008). The premise for successful value co-creation is to actively involve customers into the service production processes, which implicates service business requires interaction and collaboration with the customer and customer's participation must be considered as important as the service provider in service production (Vargo & Lusch 2004; 2008). The need to understand customers' dynamic requirement and demand implies an inherent learning orientation towards customers; thus, it is not surprising that knowledge is viewed as a key operant resource leading to competitive advantage (Melancon et al. 2010).

Table 2. Service dominant logic 10 premises (Yazdanparast et al. 2010 via Vargo & Lusch 2008)

Fundamental premises (FP)	**Explanation/Justification**
FP1: service is the fundamental basis of exchange	The application of operant resources (knowledge and skills), "service" is the basis for all change. Service is exchanged for service
FP2: indirect exchange masks the fundamental basis of exchange	Goods, money and institutions mask the service-for-service nature of exchange
FP3: goods are distribution mechanisms for service provision	Goods derive their value through use – the service they provide
FP4: operant resources are the fundamental source of competitive advantage	The comparative ability to cause desired change drives competition
FP5: all economies are service economies	Service is only now becoming more apparent with increased specialization and outsourcing
FP6: the customer is always a co-creator of value	Implies that value creation is interactional
FP7: the enterprise cannot deliver value, but only offers value propositions	The firm can offer its applied resources and collaboratively create value following acceptance but cannot create value alone
FP8: a service-centered view is inherently customer oriented and relational	Service is customer determined and co-created; thus, it is inherently customer oriented and relational
FP9: all economic and social actors are resource integrator	Implies that the context of value creation is networks of networks
FP10: value is always uniquely and phenomenologically determined by the beneficiary	Value is idiosyncratic, experiential, contextual, and meaning laden

Thirdly, foundational premise 7 (FP7) means that a service provider cannot create and deliver value on its own. Service offering is not actually valuable until the customer utilizes the service in its own demand context. And the last adopted proposition is foundational premise 8 (FP8): value co-creation is customer-oriented and relational. It implicates that value co-creation is determined by customer experience, which is a key element of perceived value (Yazdanparast et al. 2010). The value co-created by a service provider is based on the customers' perceptions of the gap between the service performed by the provider and the service received by the customer (Yazdanparast et al. 2010). As the gap gets smaller, the perceived value increases. So the provider's mission is trying to increase the perceived value by curtailing the gap. At the same time, value determined by one customer is unique and may mean different value to another customer, which also indicates service is actually highly customized (Vargo & Lusch 2008).

In conclusion, from a supply process perspective, service dominant view gives us the below new perspectives about service. First of all, service is more like a value-supporting process, in line with Grönroos's (2008) observation. Besides, service as a business logic means facilitating interactive processes that support customers' value creation in their everyday practices (Grönroos 2008). Secondly, successful service actually means successfully employing operant resources. Service production process is foremost to identify and utilize relevant operant resources. Thirdly, the presence of customer is a necessary and sufficient condition to define a service process; and both provider and customer are involved in the process of service value co-creation (Sampson & Froehle 2006). Customers must be involved in service creating to provide higher value propositions which is decided and perceived from customer's perspectives. Customer's inputs to the service supply chain must be well managed. Value co-creation process is the focus of service management and is based on relevant operant resources.

Why service dominant view is adopted in this study? Firstly, it is considered in this study that this service dominant logic provides a powerful foundation to take a closer look into the process of value creation in a service supply chain, because the concept of service as the fundamental basis of exchange makes this logic an appropriate pillar to analyze any service related issues (Yazdanparast et al. 2010). Especially, it is

generally admitted that service supply chain is the entity converting resources into services and service rather than goods are deemed as the basic unit of exchange in a service supply chain. Secondly, it's argued by Lusch (2011) that movement from good dominant view to service dominant view is the move from viewing business as focused on things to actions and processes. Since a supply chain is basically built on processes converting inputs into outputs, the service dominant view is naturally a breeding ground for examining a supply chain in the service context. It is believed that this view is the most relevant perspective dedicated to this study and it will help looking for innovative ways to achieve the target of this research.

Service dominant logic has been employed in a variety of contexts such as branding, strategy, marketing, learning and innovation and consumer behavior (Yazdanparast et al. 2010). But very rare attention has been paid on exploring the service supply chain from a service dominant perspective. In this sense, this is an exploratory study.

2.3 Service supply chain management

In manufacturing supply chain, value creation is easy to conceive as it is related with the transformation of raw materials into final products. Each chain member in the manufacturing supply chain adds some value to the final product by processing the materials and information flowing from the upstream to downstream and delivers the incomplete product to the next stage of the chain (Giannakis 2011). In the context of service, however, this is not relevant because service can not be transformed, transported or inventoried in the same way as industrial goods (Giannakis 2011). This section shows how the service dominant logic clarifies supply chain issues for service.

2.3.1 Service supply chain and its nature

With the above descried distinguishing characteristics of services, a service supply chain is defined differently than a product supply chain. Most researches adopt the format of a product supply chain definition. Baltacioglu et al. (2007) define that the 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". Another interpretation from Lin et al. (2009) is that the service supply chain is "a network of suppliers, service providers, customers and other service partners that transfer resources into services or servitised products delivered to and received by the customers". The common point is that a service supply chain is built on a network of supply chain members with whom to link business processes that convert resources into services.

Some researchers attempt to align supply chain perspective with service dominant logic and view supply chains as value co-creation networks promoting knowledge growth amongst network members via resource deployment and coordination (Tokman & Beitelspacher 2011). Based on the service dominant perspective, operant resources is the fundamental source of competitive advantage and skills and knowledge based service is the fundamental unit of exchange in the entire service supply chain (Vargo & Lusch 2008). In line with the service dominant view, the service system view deems the service supply chain as a dynamic value co-creation configuration of people, technology, value propositions connecting internal and external service systems and shared information, e.g. language, laws, measures and methods (Maglio & Spohrer 2008). The two views both admit a service supply chain is a value co-creation entity. In conclusion, the following derived definition of service supply chain is grounded on above discussions. A service supply chain is a value co-creation network of the focal service provider, customers or consumers, suppliers and other related partners to promote knowledge growth and exchange amongst network members with the purpose of converting resources into services.

Service supply chain is in nature dual-directional, which is illustrated in Figure 3. The customer, the actual purchaser of a service, is the necessary and sufficient condition to define a service production process (Grönroos 2008). Because customers not only provide themselves as an input, but also provide tangible belongings, specified demand information, minds, opinions and even decisions to the service production process (Lin et al. 2009). Similarly, Martin et al. (2001) conclude that customer's participation in the service production function can be in any of the three modes: physical, intellectual or emotional. Therefore, a service has customers as primary suppliers of inputs. This nature implies that the quality of a provider's

service output will be heavily affected by the quality of the customer's inputs and participation, physically, intellectually as well as emotionally (Sampson 2000). How customer's inputs and participation can be appropriately utilized to produce higher service output and customer satisfaction? This is a question that service providers should think about. Sampson (2000) suggests that a service supply chain integrating customers can assist in solving this problem.

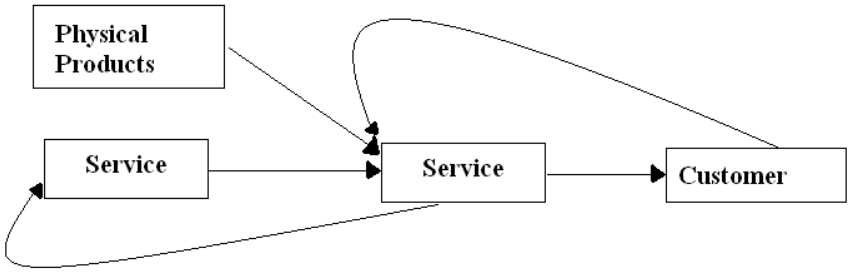

Figure 3. Duality in service supply chain (Lin et al. 2009)

2.3.2 Knowledge-intensive service supply chain

Knowledge-intensive business service companies are enterprises whose primary value-added activities consist of the accumulation, creation, or dissemination of knowledge for the purpose of developing a customized service solution to satisfy the customer's needs (Bettencourt et al. 2002). Business-to-business knowledge-intensive services such as engineering and management consulting business account for an increasing larger share of innovation and value creation (Bettencourt et al. 2002). Distinctive features of knowledge-intensive business service are complexity, expertise, competence, and demanding problem-solving activity (Martin et al. 2001). Customer demand usually is with high diversity and complexity as every single customer has its own problem to be solved (Martin et al. 2001). Given the complexity in the nature of customer's demand, there is usually a strong motivation for them to actively participate in order either to obtain intrinsic rewards or to monitor the quality of the services (Martin et al. 2001). Tasks are completed by qualified experts with a substantial fund of specific knowledge, which is based on education, experience, and special skills (Bettencourt et al. 2002).

Interaction between the service buyer and provider is the basic feature of knowledge-intensive business service production process (Wynstra et. al. 2006). The main purpose of interaction is to communicate, coordinate and adapt the activities and resources firms are allocating to and using in the relationship (Lowendahl et al. 2001). According to the interaction approach, ongoing interactions in business relationships are particularly relevant given the fact that most buyers tend to engage in a limited number of long-lasting relationships (Wynstra et. al. 2006). Consequently, the management of professional services is ordinarily built upon relationships, rather than upon transactions (Orava & Tuominen 2002). Martin et al. (2001) conclude general four stages of business-to-business consulting services.

(1) Entry and contracting;
(2) Data collection and feasibility study;
(3) Feedback and customer decision to act; and
(4) Implementation.

Knowledge-intensive professional services are process focused (Rahimnia & Moghadasian 2010). Value creation process in knowledge-intensive professional services is knowledge intensive (Lowendahl et al. 2001). The quality and productivity of business services are often highly dependent on the human resources involved in the production, delivery and consumption of those services on both sides of the relationship (Wynstra et. al. 2006). Customer's contribution to the service delivery process is integral to service success, affecting both the quality of the service outcome and customer's satisfaction. This is in conformity with the description of the service supply chain's nature. Service delivery activities among these firms are complex, unstructured, and highly customized to meet a particular client's unique needs. Customers must effectively perform a variety of roles as they serve as co-creators of the service solution. Customer co-creation roles in the partnerships are emergent, multi-faceted, and highly collaborative because clients themselves possess much of the knowledge and competence that a firm needs to successfully deliver its service solution (Bettencourt et al. 2002). In business-to-business professional service sellings, the strength of the relationship between the service firm and the client company potentially has a considerable impact on service evaluation, and each service performance is a complex process where different components are distinguished and evaluated (Lapierre 1997).

2.3.3 Service supply chain management

Ellram et al. (2004) state that SCM in service context is concerned with designing and managing supply chains, controlling assets and uncertainties to meet the needs of the customer in a cost-effective manner. Service supply chain management is the management of information, processes, capacity, service performance and funds from the earliest supplier to the ultimate customer, as defined by Ellram et al. (2004) with a modification to fit professional services. Baltacioglu et al. (2007) simplify service supply chain management is the management of information, processes, resources and service performances. They identify all needed tangible goods, labour, fund and other services procured from other firms are in the category of resources. Johnson and Mena (2008) define supply chain management for servitised products as the management of information, process, capacity (people, equipment and facilities), products, services and funds. The interpretation from Lin et al. (2009) also views information, processes, and resources as the main objects of service supply chain management.

Just as mentioned previously in this text, how to manage the value co-creation of service offerings with supply chain partners is the key task in managing a service supply chain. Hence, value co-creation still is the core of service supply chain management. Based on the above definitions, it can be summarized that service supply chain management is the management of value co-creation network through converting information, processes and resources into service performances from the earliest supplier to the ultimate customer in a service supply chain.

2.4 Operant resources in service supply chain

There is growing recognition that leveraging resources appears to be an essential precondition for securing a competitive position in the marketplace and also for creating value for the highly value-conscious customer (Ngo & O'Cass 2009). As described previously, comparing with operand resources, operant resources are typically human, organizational, informational and relational (Madhavaram & Hunt 2008). Thus, skills and knowledge possessed by employees; company cultures, competences, and routines; know-how about marketplaces, competitors, customers

and relevant technology; relationships with suppliers, customers and even competitors; all these are operant resources in service supply chain management. Operant resources are usually intangible, invisible, dynamic and infinite (Melancon et al. 2010). Richey et al. (2011) hold that companies should utilize operant resources in such a way that they can reinforce each other so that firms can increase the likelihood of achieving superior results.

Service dominant view suggests that value creation along the service supply chain is primarily based on operant resources; and knowledge possessed by employees is the most important operant resource in a provider's ability to meet customer's needs. Melancon et al. (2010) identify three areas of knowledge operant resources: knowledge on customers, knowledge of the industry and knowledge of firm practices. Knowledge of the industry is the employees' awareness of the external environment including competitors, market, trends, etc. Knowledge of firm practices means employees in the provider's firm are knowledgeable about the firm's policies, procedures and operational processes. Knowledge on customers is conceptualized as the firm employees' understanding of the firm's current and prospective customers in a competitive market environment. Knowledge on customers is positively associated with the provider's capability to deliver the value proposition that meet its customer's needs. In knowledge-intensive service industry where business is highly customized and built upon relationships, knowledge on customers is deemed as the most important one among the three knowledge operant resources.

2.5 Value co-creation in service supply chain

This section is dedicated to examine value co-creation between providers and customers. Customer's value is realized in customer's value-generating process, which is understood as value-in-use. In business practice, value-in-use is realized by customers who make use of the service offered by the provider. The service provider's role is to facilitate value realization and provider takes part in the value-creating process as value facilitator. The provider obtains value-in-exchange from its service offering. Hence, value-in-exchange is dependent on whether value-in-use is realized. Value-in-exchange derives from value-in-use. Obviously, it is more important for providers to focus on value-in-use, which leads to long-term business

success. If providers manage to facilitate customer's value-generating process effectively, the more value-in-use will be created and thus higher value-in-exchange will be generated. The creation of value-in-use is the central of value co-creation discussed in this study. (Grönroos 2006; 2008)

2.5.1 Value co-creation process

The value co-creation process can be described in this way. The provider develops a value proposition or value proposal, which is the value foundation to be used by the customer. When the customer accepts the value proposition as the value foundation during its business operations, the customer employs its own knowledge, skills and other resources into its value-generating process to achieve value fulfillment. The provider usually may not directly engage itself in the customer's value-generating process. But it is necessary to be engaged in the customer's value-generating process in order to provide customer expected and needed value proposition. Both the provider and the customer are value co-creators. (Grönroos 2006; 2008)

There are literatures on the customer's service buying process, which can be listed as six stages: specify, select and contract, order, expedite and evaluate (van der Valk & Rozemeijer 2009). Many companies seem to have neglected this aspect of ongoing interaction, and focus their attention on the initial stages of the transactional purchase process (van der Valk & Rozemeijer 2009). This study extends the view to the whole value creation process between a service supplier and a service buyer. In another word, the extent to which the service supply chain is a co-creative organization is limited to the supplier and buyer context in this study. Supplier's supplier or customer's customer is not the focus of this study.

The most distinct dissimilarity between a product and a service supply chain is the value creation process. A service is generated by a process, which differs from processes in the production of goods (Evardsson 1997). Being distinct from a product supply chain view where value and utility are embedded into the product and consumed mostly in different location than it is produced, value in a service supply chain is mostly co-created with interaction and coordination between or among the supply chain members, for example the provider and the buyer. It means the

partnership between the buyer and the provider is not a simple buy-sell transactional relationship, but a process of value co-creation with each other (Hua et al. 2011). Accordingly, competition advantage in a service business is not merely depending on the competence of the focal service provider, but based on the value proposal co-created by the entire supply chain network, through dynamic and multi-party dialogue, knowledge exchange and utilization of operant resources (Tokman & Beitelspacher 2011). Taking the global telecommunication industry business for example, clients select an infrastructure and solution provider between Nokia Siemens Networks and Ericsson by comparing the whole value proposal co-created by each supply chain, including hardware and software suppliers, after-sales service providers and other related partners. The provider that offers customers with superior service experiences gain higher value perception, which in turn results in higher level of collaborative value-creation behaviors from the clients such as loyalty, positive word of mouth and further dialogue within the supply chain members (Tokman & Beitelspacher 2011).

In fact, the above statement hints about the approach of the management of value co-creation. That is to utilize the service supply chain's operant resources optimally to provide superior customer value. However, it is stated by Vargo and Lusch (2004) that the service provider, together with its suppliers and suppliers' suppliers, can not create and/or deliver value independently, but can only offer value propositions striving to be more compelling than those of competitors and the customer is the one determining value and participating in creating value through the process of coproduction. Therefore, it is acknowledged by Tokman and Beitelspacher (2011) that the provider's capacity to absorb the information transferred from supply chain members and its ability to learn to use this information for value co-creation would be critical before value co-creation. Their opinion is in line with the statement proposed by Yazdanparast et al. (2010) who create a framework of value co-creation processes in logistics service, as shown in Figure 4.

Yazdanparast et al. (2010)'s framework consists of three phases: the learning phase, the innovation and execution phase, and the outcomes phase, as illustrated in below Figure 4. They expound that a service provider needs to gain knowledge about its customer and the first phase in the value co-creation process is learning from each

other, for both providers and customers. During the learning phase, the service provider focuses on understanding the customer and the customer focuses on collecting the service provider needed information and data through the interactions and relationship experiences between each other. From a provider's point of view, it needs to create opportunities for absorbing, involving, and integrating external knowledge resources with internal knowledge resources and apply the resultant learning to the production of services. In the next phase, the provider utilizes the knowledge acquired in the learning phase to design and implement tailored and innovative solutions that lead to value-creating service offerings. The learning achieved and innovations developed through the previous two phases influence the performance of the provider and customer in terms of quality, efficiency, effectiveness and relevancy. (Yazdanparast et al. 2010)

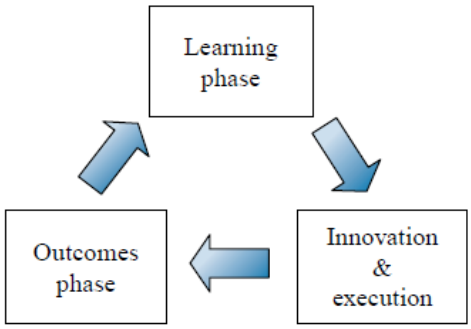

Figure 4: Value co-creation process (Yazdanparast et al. 2010)

2.5.2 Customer participation

Customer participation in service is distinct from manufacturing where it can be achieved through market research, whereby groups of potential customers provide opinions about the general products destined for future production (Yang et al. 2010). But, individual customers' roles in manufacturing are limited to the selection and consumption of the outputs, as the contribution of inputs do not specific to production for that particular customer (Sampson 2000). Customer participation, bringing uncertainty into the service supply chain, is one of the main sources of complexity and is absolutely directly related to the service quality perceived by the customer (Lin et al. 2009). Moreover, it is declared by Lin et al. (2009) that customer's input plays critical effects from service design to service receipt, as it is

the key to continuous service success. Thus, a service supply chain is unlike a product supply chain, where managing uncertainty and complexity of the customer input is not emphasized. However, it is revealed by research that the customer does not always necessarily possess the skills and knowledge they desire for value co-creation, neither has it the same level of mature understanding of the skills and knowledge as the provider does (Yazdanparast et al. 2010). After realizing the importance of customers in creating optimal service outcomes, it becomes completely clear that service providers should take steps to proactively manage their customers' behaviors (Bettencourt et al. 2002). The question proposed in service supply chain management is how customers' involvement can be better managed to facilitate the provider's value creation processes.

Managing customer participation means controlling and utilizing customer's behavior effectively during value co-creation processes. As the controller of the supply chain, the provider must know how to manage the customer participation. Disadvantageous and deleterious factors should be avoided, while favorable and beneficial factors must be promoted and encouraged to advance value co-creation progress. As a seller, the provider must be always alert and sensitive to the buyer's actions, reactions and emotions (Levitt 1983). As asserted by Yazdanparast et al. (2010), a service provider must plan and implement relationship experiences for customers that encourage active engagement of customers in designing and creating services. It is dependent on the willingness and financial ability of both parties, but also dependent on the length and nature of the relationship (Yazdanparast et al. 2010). Only when the customer considers the provider as a strategic partner with a critical role in the customer's supply chain strategy, the customer is more willing to be collaboratively and actively involved into the provider's supply chain to facilitate value co-creation processes (Yazdanparast et al. 2010).

2.5.3 Integrating demand and supply

In the service supply chain context, the term "customer's demand chain" is used to comprise all the customer's value-generating related processes necessary to understand, create, and stimulate customer demand of a service (Hilletofth 2011). "Demand chain" is just adopted to differ from the service supplier's supply chain.

Customer's demand chain might consist of processes such as prospecting, specifying the service offering, making the purchase, installing relevant equipment, employing purchased services and even customer's marketing and sales related activities, which transfers customer's demand from markets to the service provider (Holmström et al. 1999). Many supply chain specialists emphasize the importance of managing the customer's demand chain, because demands originating from the customer's demand chain are a major source of uncertainty and have a huge impact on the firm's capacity and direct impact on the supplier's supply chain (Ellram et al. 2004).

It is observed by Esper et al. (2010) that firms have invested resources to develop a core differential advantage in supply processes, but rarely in customer's demand processes, which often resulting in mismatches between demand (what customers want) and supply (what is available). Esper et al. (2010) also suggest that managing the provider's supply chain requires extensive integration between demand processes and supply processes, which is based on a foundation of value creation through intra-organizational knowledge management. Their idea emphasizes intra-organizational knowledge utilization as a precondition of demand and supply integration. The benefits of integrating demand and supply processes are helping firms prioritize and ensure fulfillment based upon the shared generation, dissemination, interpretation and application of real-time customer demand as well as ongoing supply capacity constraints (Esper et al. 2010). The next chapter discusses how demand and supply can be integrated with the tool of value offering theory.

2.6 Value offering theory

The objective of service supply chain management is to find the best supply chain for service production process (Holmstöm et al. 1999). Value offering theory in product supply chain introduced by Holmstöm et al. (1999) target at reengineering value to redesign the supply chain and also find the right value proposition for the customer. Holmstöm et al. (1999), as shown in Figure 5, concentrate on the value a provider can provide to the customer, through utilizing the concept of value offering point (VOP) and order penetration point (OPP) to link supply and demand.

The value offering point is the position in the customer's demand chain at which the customer offers its demand information to the provider and the provider accesses to customer's value-generating processes, is the linkage point of customer's demand chain and provider's supply chain (Holmström et al. 1999). Value offering point is a new concept that is proving itself useful and competent for the provider to identify ways of becoming the co-producer of customer's value (Holmström et al. 1999). Based on the above understanding on service value co-creation, this is exactly what a service provider should be capable of, that is, to gain visibility of customer's service requirements and to find ways of becoming their customer's service co-producer and value co-creator (Holmström et al. 2010). In this way, this value offering point seems to be valuable in offering customers opportunities to externalize their detailed requirements and beneficial in reducing supply-side uncertainty with improved visibility.

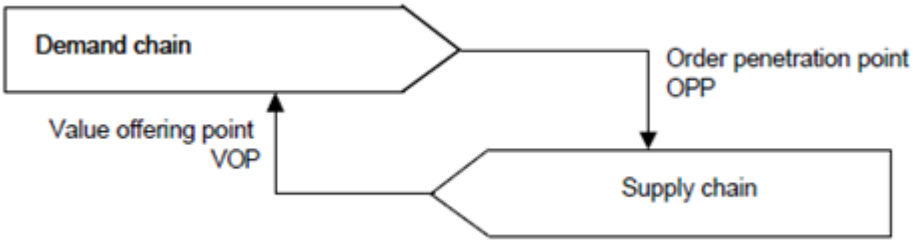

Figure 5. VOP and OPP in the demand-supply chain (Holmstöm et al. 1999)

As illustrated by Holmstöm et al. (1999), moving the VOP position changes the economics of the customer, therefore it deserves deliberation. Identifying what the customer really wants is the first step towards to an appropriate location of VOP. Extending this theory to a service supply chain, VOP represents the possible stages where service provider differentiates itself from other competitors by unfolding its competence and skillfulness to the customer and start fulfilling customer's demand in the customer's demand chain, being a co-creator of customer's value.

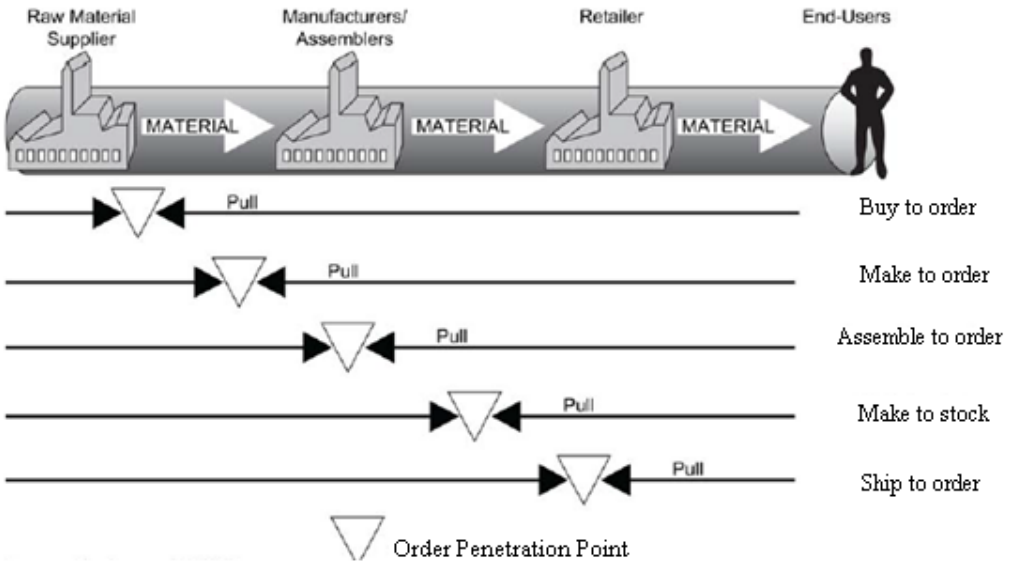

Figure 6. Order penetration point and supply strategies (Yang & Burns 2003)

Order penetration point (OPP) is not a new concept in manufacturing supply chain. It usually corresponds to the decoupling point, which represents the point where in the supply chain the customer order distinguishes forecast and order-driven activities, as shown in Figure 6 (Yang & Burns 2003). Order penetration point can be used to separate postponable activities from non-postponable activities (Yang & Burns 2003). That is why postponement strategy relates to the order penetration point theory. Order penetration point means the place where customer's demand and requirements penetrate into provider's supply chain in service context. It is the point where the provider allocates capability and resources to fulfill the specific customer requirements.

In manufacturing supply chain management, it is suggested to work on the VOP and OPP simultaneously. Moving the VOP often enables the supplier to move its order penetration and in this way to increase its operational efficiency. For example in Figure 7, when the VOP is moved from customer's purchasing phase to inventory management, the supplier gets access to demand data, which gives more time to fulfill demand and enables the OPP to be moved from the production phase to, for instance, production planning phase for achieving more responsible delivery process.

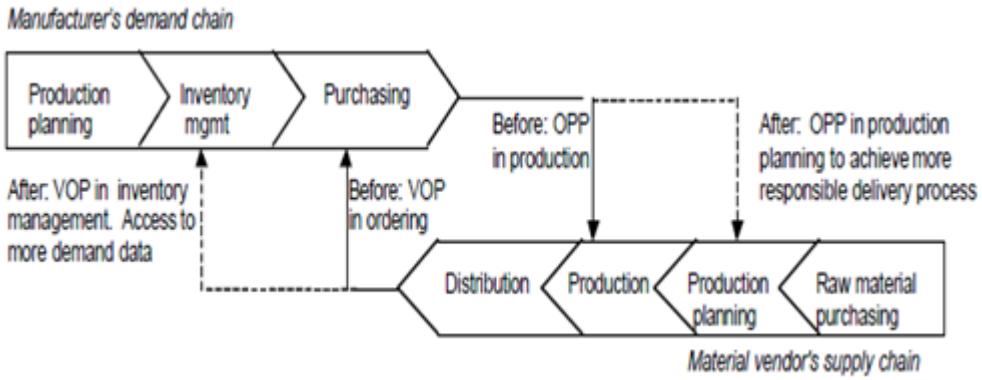

Figure 7. Movement of VOP and OPP (Kaipia et al. 2007)

To sum up, the value offering theory describes how demand and supply can be connected and managed in different phases of the supply chain. It is proposed that by using and applying a specific representation model, companies can systematically analyze, from a supply chain perspective, what value they are offering to the customers and how they can further develop their supply chain performance (Kaipia et al. 2007). Accordingly, value offering theory is in line with the value co-creation nature in service supply chains. The value offering model is considered as a reasonable tool to enable successful value co-creation and to create such a win-win approach to both parties.

2.7 Service postponement

2.7.1 Lean practice in service supply chain

How to streamline its service supply chain, offering customers something they value that competitors' supply chain does not have, is the core competence of a service provider. It is claimed by lots of researchers that product-based manufacturing SCM is also relevant for the service sector, which can utilize the management innovation of product supply chain research to reduce costs, increase flexibility, shorten lead time and improve service quality (Arlbjorn et al. 2011; Johnson & Mena 2008; Baltacioglu et al. 2007; Ellram et al. 2004). One of those management innovation approaches is lean practice. For example, Bowen & Youngdahl (1998) argue that just as lean manufacturing has reduced non-value added processes from production processes while increasing product variety and customer focus, so too has lean

production-line approach to services. Arlbjorn et al. (2011) assert that lean practices can be used to reduce costs and improve service by the public service supply chain. Piercy and Rich (2009) propose the suitability of lean methodologies such as process mapping, value understanding and problem solving in the pure service context. However, the drawback of lean approach is that it seems only to be suitable to a service supply chain in a certain environment, where service offering is standardized with relatively high volume and low service variety as well as predictable demand (Arlbjorn et al. 2011). There is little potent evidence of lean in an agile service supply chain where service is highly customized, demand is volatile and service variety is high, for instance a supply chain of engineering and management consulting service. Comparing to lean, postponement is another innovation being adopted from product supply chains to service supply chains.

2.7.2 Postponement in service supply chain

Underlying principle of postponement is based on the assumption that differentiation in time, place and form leads to higher risk, uncertainty and costs or at least there is positive relative relation between them (Pagh & Cooper 1998). Postponement in manufacturing supply chains means to retain the product in a non-committed status as long as possible and to postpone the differentiation point of a product to customer's specifications as late as possible in the supply chain (Yang et al. 2007; Pagh & Cooper 1998). The motivation is to gain better demand information by delaying customization for a particular customer or market. Thus, postponement is deemed as a natural strategic response to uncertainty and any agile requirement (Boone et al. 2007). Just as many other supply chain management approaches, such as lean, the expectation from postponement is still the same: reducing costs and uncertainty to better satisfy the customer. However, the difference between lean and postponement lies in the approach of exploiting postponement, which holds re-sequencing activities to gain more actual demand information to translate the customer's needs into a concrete product specification.

A classical production postponement example is fashion company Benetton, which is known for producing colorful sweaters (Tibben-Lembke & Bassok 2005). With difficulty in forecasting demand of sweater's color, Benetton's successful

postponement strategy is to dye products at the end of the production process when actual demand of color is known. For another example, IBM designing asynchronous transfer mode (ATM) networking switches also applies postponement in response to the uncertainty about standards and protocols, when the industry has not yet fully developed standards and protocols (Yang et al. 2004). Nowadays the concept of postponement extends from product design to the point at which the end-user obtains the product (Boone et al. 2007). Postponement was once only a strategy for differentiating a product, but it has evolved into a concept of reconfiguring the entire supply chain (Boone et al. 2007). Therefore, it is suggested by Yang et al. (2004) that companies should first consider every possible postponement opportunity along the supply chain and then balance the trade-off not from an individual player, but the whole supply chain.

Re-designing product architectures and/ or manufacturing processes are the main implementation approaches of postponement (Yang et al. 2007). A service provider may benefit from postponement through organizing an efficient supply chain together with its customers. Usually, postponed processes are most likely to be placed closer to the time and locus of consumption (Pagh & Cooper 1998). To avoid repeating work once customer is not satisfied with the outcomes, postponed activities or procedures should be carried out after receiving customer's decisions or participation, or after accessing to more information about desired services.

Researchers assert the preconditions of applying postponement are firstly uncertain demand since the strength of postponement lies in its capability of coping with uncertainties inherent in dynamic and changing markets. That is, postponement's sense is in dealing with unpredictable products, a company would gain little from postponement in an easily predictable environment. The next precondition is to anticipate the extent of variability of unpredictable products, based on the understanding that what can be well forecasted and what cannot be forecasted. The last precondition is further information must be available in the delay period, because postponement makes great sense only if the information about the customer's demand and need can be obtained accurately and quickly. Here, information does not only refer to the customer's order information, but also means the information on ongoing demand. (Yang et al. 2004)

Yang et al. (2010) explore the value that postponement might offer in service context. They argue that postponement strategy can reduce costs and shorten service delivery time as postponement enables more activities to be done in advance. They also explain that postponement can assist in re-locating the line of demand visibility to develop a more effective service operation. Nevertheless, little study has examined how postponement could be applied in practice in a service setting, particularly incorporating the characteristics of customer's contact in the service production and delivery process (Yang et al. 2010).

3 THEORETICAL FRAMEWORK

A theoretical framework of integrating demand and supply is built up in this chapter. The framework is composed from three phases: learning, innovation and outcome phases. The target of this framework is to assist service managers and organizations to create customer value and sustain competitive ability through the service production processes.

Learning in this study is defined as the processes of absorbing, integrating external and internal knowledge operant resources (Yazdanparast et al. 2010). Applying to knowledge-intensive service industry, knowledge on customer is the most essential external knowledge operant resource. In the learning phase, the service provider should proactively undertake necessary efforts to acquire and utilize knowledge on customer. Knowledge on customer includes customers' requirements and needs on the service, potential changes on demand, uncertainties and variabilities in customers' environments, customers' organizational decision making, customers' expectation, customers' demand process, customers' know-how, customers' approach of participating, possible dynamic factors as well as other operant resources influencing service production process. The goal is for a provider to learn from the customer. Except these considerations, to carve out an efficient service supply chain responding to customer's service requirements, a company needs to decide in its supply chain which processes will be modular, standard or customizable, what the customer's role is in each process and how value is co-created in each process; who or which organization is in charge of each process, what activities are conducted based on forecast and what are implemented until customer's specification becomes available and clear. These can be included into internal knowledge operant resources, which helps establish the capability of developing value proposition to meet customer needs (Melancon et al. 2010). Actually this phase is for gathering and storing sufficient knowledge to enter into next phase, for avoiding lead to undesirable service outcomes. That is why this phase is of particular interest.

The second phase is called innovation with the objective of applying the learning from the previous phase (Yazdanparast et al. 2010). The learning on customers leads to service innovation which means shaping a win-win VOP&OPP model pleasing

both parties. In this phase managers are confronting with decisions on locating value offering point (VOP) and order penetration point (OPP). Figure 8 illustrates the process of shaping a win-win model. Once one or several possible position(s) of value offering point appear based on the conducted learning, the provider should start deciding the location of value offering point points. Where value offering point(s) is/are located is most likely to influence the provider-customer relationships (Holmstöm et al. 1999). It should be considered that at what point(s) in the supply chain value offering point provides the optimal overall benefits to both provider and customer. A service provider should ponder below questions carefully before setting value offering point. How and at what stage the customer should provide information to the provider in order to get a certain value delivered in time? Does the customer need to specify all details of requirements at a single point of time (Yang & Burns 2003)? Is it necessary to place several points of value offering point and what's the relevance between them?

Figure 8. How to shape a VOP&OPP model

The positioning of value offering point helps locating the order penetration point, which is the point where customer's decisions or decisive participation penetrates in the supply chain. The tricky question is how the appropriate order penetration point can be determined for a specific service offering. It is deemed that how to position order penetration point is a crucial decision, as it shapes the landscape of the entire supply chain (Yang & Burns 2003). It is important to consider whether all tasks behind the order penetration point are closely related to the customer's participation or decision (Yang & Burns 2003). If not, then can they be moved before the order penetration point. Alternatively, it can also be pondered that if part of or all tasks before the order penetration point can be moved after it. By doing so, the supply chain is redesigned or restructured in the way that the postponement calls for resources being allocated to the appropriate location to satisfy customer's demands better (Yang & Burns 2003).

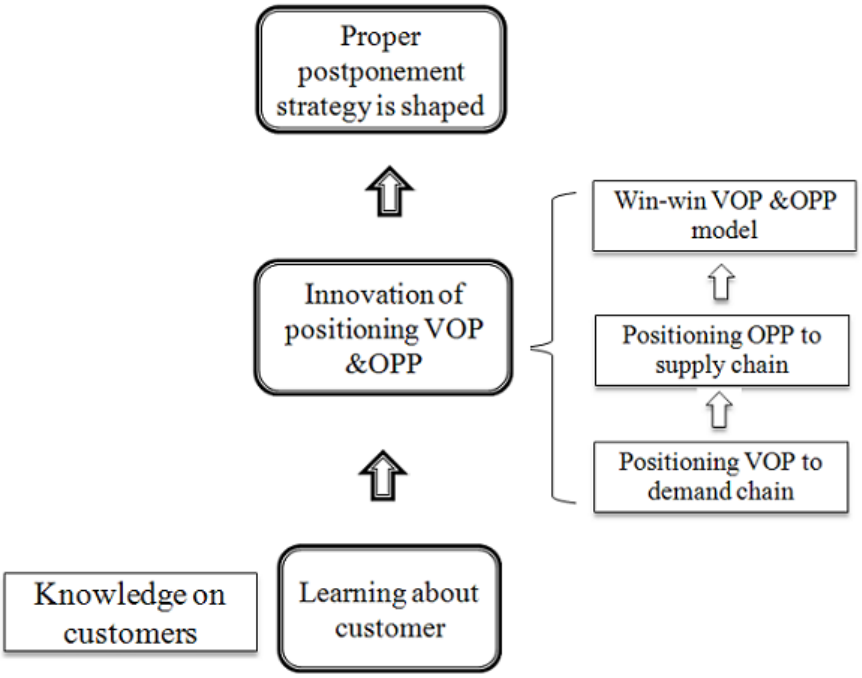

Figure 9. Preliminary application model of postponement strategy

Finally, the model shaped by integrating VOP and OPP positioning shape the postponement strategy. Value offering point location in the customer's demand chain give hints for the order penetration point location in the supplier's supply chain, based on which the most proper postponement strategy can be singled out. Whether there is only order penetration point or several order penetration points along the service supply chain, whether strategy is "planning to customer's approve" or "engineering to customer's final investment decision", all is decided by the real and actual customer's case and how provider integrate its own supply chain and customer's demand chain. The application model in Figure 9 incorporates three steps explaining how value co-creation processes with customers leads to application of postponement theory in service context. It illustrates how a service provider can utilize knowledge operant resources to co-create value with customers to achieve advantages.

4 RESEARCH METHOD

4.1 Methodology

Qualitative research, concerned with interpretation and understanding of social phenomenon, is usually used to study a particular subject in depth in social, cultural or political aspects of people and organizations (Myers 2009: 9). In this study, the purpose is to find out a solution of how postponement concept can be applied in a service supply chain. The theoretical framework is firstly constructed. Then, empirical support is needed to understand the framework in reality and to strengthen the reliability and validity of the theoretical framework. Therefore, qualitative method is considered as a reasonable and valid research method for this study. Especially, qualitative method is suitable for this exploratory study. This research topic is new and there is not much previously published research on this topic.

Ontology and epistemology are key concepts in the philosophy of social sciences. Ontology concerns the ideas about the existence of and relationship between people, society and the world in general. Epistemology, in scientific research, defines and gives structures to what kind of scientific knowledge is available, what are the limits for that knowledge. In another word, epistemology defines how knowledge can be produced and argued for. Lots of qualitative approaches are based on ontological and epistemological assumption in which reality is understood as subjective and pertains to existing knowledge and cognition. (Eriksson & Kovalainen 2008: 12-17)

There are three philosophical assumptions for qualitative research based on the underlying research epistemology: positivist, interpretive and critical. This study is based on interpretivism. Interpretive researchers assume that access to reality is only through social constructions such as language, shared meanings and instruments, and they focus on meaning in context and attempt to understand phenomena through the meanings that people assign to them. In interpretivism, a good theory is one that helps the researcher to understand the meanings and intentions of the people being studied. (Myers 2009: 36-41)

Abductive reasoning is used as a strategy to conduct this research as it is appropriate for theory development in logistics and supply chain management. The purpose of abduction is to understand the new phenomenon and to suggest new theory in the form of new propositions. The process is more like a "back and forth" movement between theory and empirical study, as it emphasizes the search for suitable theories to an empirical observation. In this case, the theories are adopted prudently based on the careful and iterative consideration of empirical issues. The constructed framework is a new model which needs to be verified. In another word, if the constructed framework is found to be valid and reliable through the empirical study, it contributes to the theory development of service supply chain management. Comparing to abduction, deductive research is considered as the most suitable for testing existing theories, not creating new science, because it follows a conscious direction from a general law to a specific case. Inductive research, on the contrary, reasons from a specific case or a collection of observations to general theory. It is appropriate for new theory creation, but not suitable for this case. In conclusion, abductive reasoning is selected as the most appropriate approach for this study. (Kovacs & Spens 2005; Dubois & Gadde 2002)

Case study is used as research method to find empirical data in this study. Case study is suitable in the exploratory phase of a research topic to discover the relevant features, factors or issues that might apply in other similar situations (Myers 2009: 72). Such is the case in this study. A defining feature of case study research is that it focuses on asking "how" and "why" questions (Myers 2009: 73). And that is also fitting with the purpose of this research. Case study can take positivist, interpretive or critical forms. Interpretive case study is adopted in this study, which means the researcher attempts to understand phenomena through the meanings that case company people assign to the researcher. Quality of case study is defined in terms of plausibility of the narrative and the overall argument (Myers 2009: 78). The criteria of selecting the single case company is the case company should display sufficient empirical evidence relating to knowledge-intensive service supply chain, where value co-creation, customer input and participation and operant resources play significant roles to business performance.

4.2 Data Collection

A variety of approaches can be adopted in qualitative research. Approaches for data collection in this case study include direct observation, interviews, group discussions and documentary analysis.

Table 3: Five individual interviews in the case company

Interviewee	Position/ Role	Date
Regional Director	Coordination in project marketing and in R&D	20.3.2012
Department Manager	Construction management	20.3.2012
Business Development Manager	Business development in minerals processing	21.3.2012
Regional Manager	Local project services	22.3.2012
Quality Manager	Quality development	28.3.2012

Interviews to the five individuals from the case company were conducted in semi-structured type. Table 3 shows the five individual interviews in the case company. Each interview lasted around 90 minutes. An interview guide listing all topics was used to guide the interviewees. Time to time, there were new questions emerging during the conversation. One interview lasting for 90 minutes was done with one management representative from a customer company, which is a water chemistry firm. All interviews were taped, so the exact words said by the interviewees can be reviewed. But short notes were also added during the interviews to use it as a guide in interview transcription and analysis. The recorded interviews were transcribed into texts for studying and analyzing. Useful information was scattered among the interviews, which requires dedication to interpret, assemble and make sense of it. During transcription work and reading process, own observations, criticism and conclusions were added into the transcription.

Other data were collected from using documents, such as the case company's web pages, written materials, documented files and figures. They assisted to build a richer picture than just interviews used. Of most interest is they gave a large number of

useful background information, which helped to organize interview questions and analyze obtained answers.

4.3 Data analysis approach

The approach of data analysis was coding, which is an interpretive technique organizing and interpreting the collected data. It helped to reduce the amount of data, identifying themes (Myers 2009: 167). For example, firstly interview data was classified into several categories with the codes like “leaning”, “VOP”, “OPP”, and then data in each category again was grouped with sub-codes like “communication” “partnership” and so on. By doing in this way, the links among those concepts, themes and statements can be identified.

Another adopted approach was hermeneutics focusing on understanding the meaning of a text (Myers 2009: 181-183). Actually hermeneutics is both a philosophy and a specific mode of analysis, and it has been used to analyze qualitative data in various business disciplines such as in marketing (Myers 2009: 181-183). For instance, in this study hermeneutics was used to understand the case company’s supply processes and customers’ general investment processes through written materials. The impact of uncertainties in service context and the importance of service specification were also conceived through hermeneutics. It is important in this study that hermeneutics provides a useful tool for comprehending the empirical data and transcribing practical business into abstract vision.

5 EMPIRICAL RESEARCH

5.1 Case company introduction

The case company is a global consulting and engineering service provider dedicated to balanced sustainability and responsible business fields of energy, industry, transportation, water, environment and real estate. It has a comprehensive network around the world, with local offices in around fifty countries and regions. Its net sales in 2011 were EUR 796 million and the company's shares are quoted on NASDAQ OMX Helsinki. Demand for consulting engineering services is driven by economic cycles, demand and price development of various commodities and the overall need to develop infrastructure. Energy, transportation, water, environment and real estate constitute the main customer interface where the aim is to proactively recognize the multiple investment related challenges the clients face and to develop value added services to solve them. The core services, namely, management consulting, total solutions and design and supervision lay the foundation for offering clients competitive, value-added solutions.

The research is conducted with one of the case company's branch offices located in Finland. The branch office belongs to the industry business group providing technical consulting, engineering, project management, implementation services, and long-term co-operation and maintenance services for industrial clients worldwide. This local branch, with approximately 170 experts, possesses expertise on construction and building engineering design, process industries and project management and offers a wide range of entire project life cycle services. For instance, construction engineering design service includes building design, preparation, implementation, deployment and maintenance. Building engineering design service ensures building conditions meet expectations by carrying out effective HVAC (heating, ventilation, air conditioning), automation, electrical and telecommunications supervision in both commercial and industrial applications. Industrial engineering serves the metals, mining and wood processing and chemical processes industry where preliminary design, safety and licensing issues can also be covered by its technical consulting services. The branch office operates based on service projects deriving from customers' investment projects, which means its

operations to a certain extent rely on customer's investment processes. A project may last from one year to several years, with different kinds of uncertainties in different phases of the project, such as technological changes, increasing regulations, changeable schedules, demand flexibility, partners, safety demand as well as revamping. Therefore, risk assessment is always required in all projects.

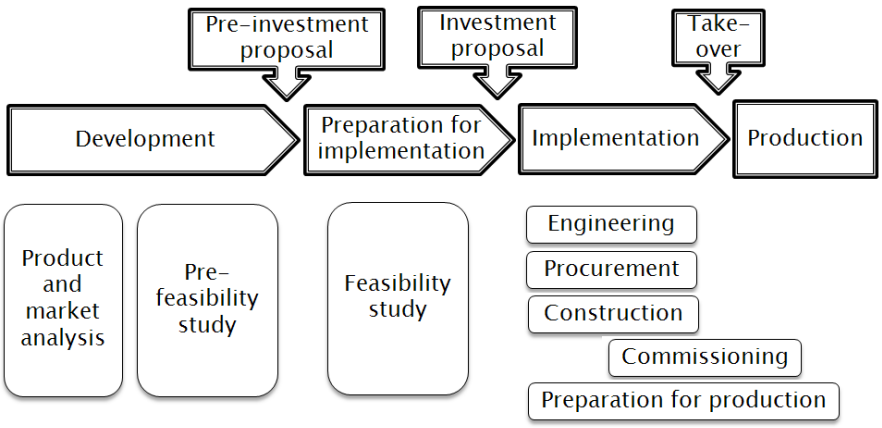

Figure 10. Project implementation process

Service project implementation is shown in Figure 10. A project can be divided into four phases: development phase, phase of preparation for implementation, implementation phase and production phase. General consulting for product and market analysis happens in the beginning of project development phase when a customer enquires service tendering, and then service scope and content will be clarified and systematic study work will be done in the pre-feasibility study. Pre-investment proposal describing opportunities and risks for customer is the objective of this first phase. A feasibility study is supposed to be carried out after customer's commitment on the pre-investment proposal. This is the stage where technical and commercial solutions are selected, all needed information and data are collected, and schedules ensuring targets will also be reached in time. The outcome of this stage is an investment proposal delivered to the customer for its decision making. The project enters into implementation stage once the customer confirms on the investment proposal. Take-over is the sign of the end of implementation, which means the customer finally can start its operations. Transfer of responsibility from the provider's team to the customer's team must be planned well ahead to ensure timely start-up of operations.

5.2 Customers' demand chain

Customers' investment outline is made up of several phases and gating points, as illustrated in Figure 11. Phases are sets of activities to carry out the project work and to create data and information for conclusions and decisions making at the gating point. Gating points are key decision and review points between phases. They are project evaluation and prioritization points. Each gate has a list of deliverables, such as reports, studies or information items, which are required for effective management decisions. The deliverables for each gate become the objectives of the phase activities. The purpose of gate keeping is to move promising projects forward, to commit and allocate resources for next phase and to stop non-promising projects. Usually each investigation area such as market, technology, finance, human resource, legal issues will undergo all needed phases, to ensure customers' resources allocated in an optimal way, to ensure continuous process improvement in each area through measurement at review gates and duly follow-up.

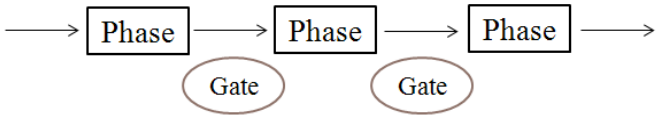

Figure 11. Customers' process outline

Customers' demand chain showing in Figure 12 displays general phases of customers' investment procedures. It emphasizes the sequence of actions and the importance of different components. Each phase is composed by several discrete customer processes. Phase one is the assessment of the proposed project and verification of the strategic compliance and the market need. The focus is often on market and technology evaluation, as well as preliminary evaluation of risks. The output of this phase is a feasibility study, with which managers are able to make commitment for the next phase. Phase two is for defining the investment project, with an output of preliminary investment proposal which makes possible for managers to give allowance for detailed planning. With the commitment project moves to the next phase, that is development. The target is to prepare detailed plans to launch for implementing the project. This includes business plans, market evaluations, detailed project engineering. This phase should yield a final investment

proposal which makes possible for authorized organization to decide implementation. Then the final phase is to implement the project as approved, and then follow up the project.

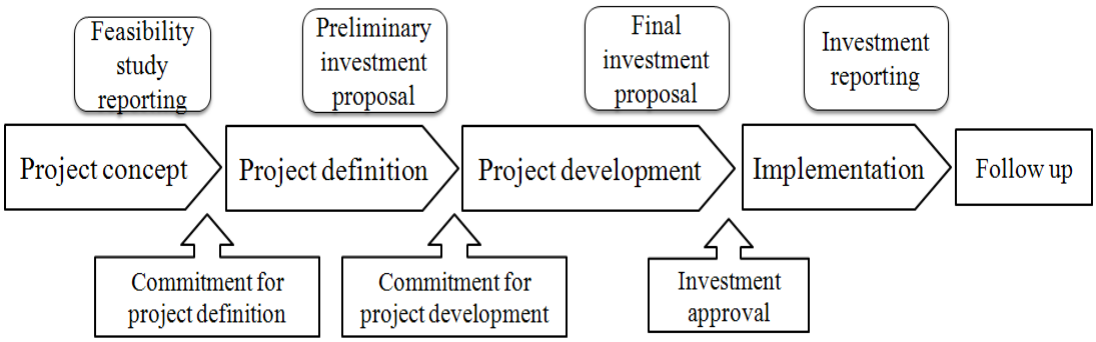

Figure 12. Customers' demand chain

The process of a service project, integrated with both provider's and customer's processes can be illustrated by the below Figure 13. It can be observed that the case company's service supply chain is intertwined with the customer's demand chain. The provider supports the customer operating a variety of activities to fulfill customer's target. In detail, there are usually three output points needed in the customer's demand chain: feasibility study, preliminary investment proposal and final investment proposal. These three output documents are required for project evaluation, effective management decisions and commitment. Those gating points in the customer's demand chain are actually also gating processes in the provider's supply chain, which means the provider needs to pass through those gating points with customer's evaluation, decisions and commitments.

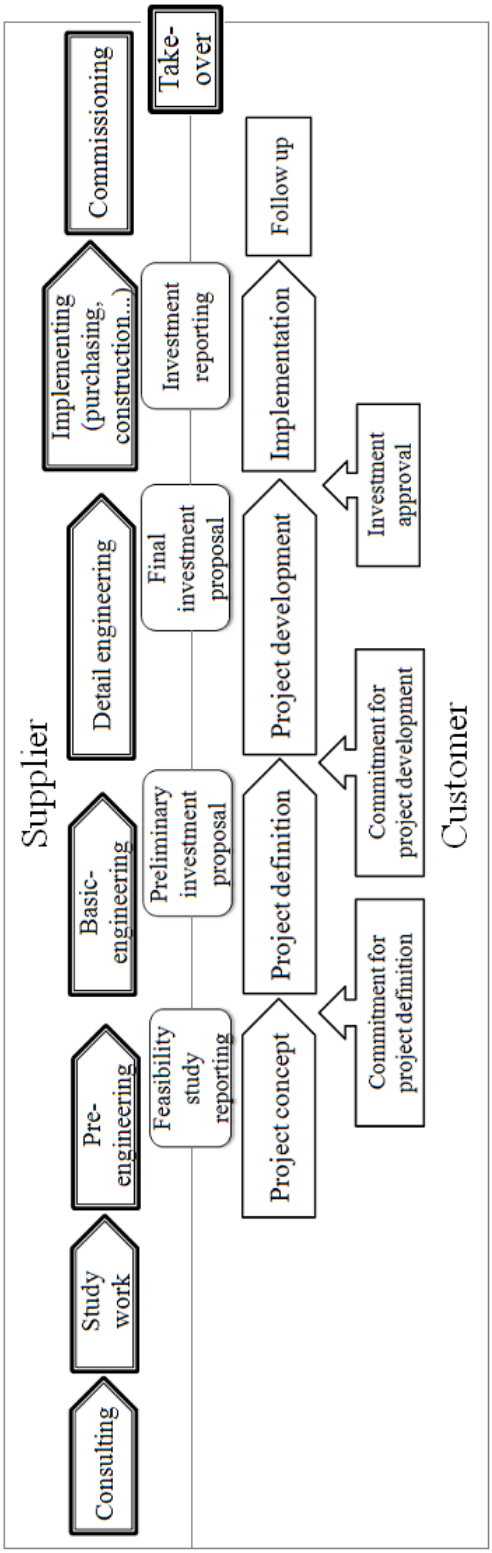

Figure 13. A service project integrating both the supplier and the customer

5.3 Value offering model

5.3.1 Value offering point

Value offering point's (VOP) definition in Holmström (et al 1999) is quite abstract and uncommon concept to practical business. That's why VOP is substituted in the interviews as the word "connection point" where provider could access to its customers' demand. In this case company, VOP represents the points where it distinguishes itself from other engineering and consulting service providers by showing its expertise and competence to the customer and fulfills customer's requirements in various stages of the customer's investment process. Such VOP points can be identified in customer's investment process. The case company makes it known that it is essential to their business to find out those VOP points where they could figure out ways of offering value to its customer and satisfying its customers. If the provider is considered less satisfactory than its competitors, the provider lost its competitiveness. Dissatisfied customers are less likely to return and revenues will go down in the long run.

> "There are those points where we need to show how good we are. Once clients have that kind of feelings that we cannot offer what they want, they will wonder who will be the next company to fulfill their demand. ---We need to find out any innovation or idea in systems and process to offer added value to customer. Basically, the point is where we need to create added value to clients. When we compete with another company, usually we compete with them in price. The lower price usually will win." (Quality Manager)

The most essential possible locations of VOP, stated by the case company, are in the customer's planning phase and the customer's proposal evaluation phases. The case company wants to be involved in the customer's planning phase for comprehensive initial data collection and also for exerting influence to customer's project, with the final purpose of creating a value proposition that the customer can achieve optimal value fulfillment. It is always favorable if a service provider can be involved into the customer's project process as early as possible. But things do not happen always in this way practically. From customer's side, they select a service provider for a project based on the initial plan of service offering, in which expertise and competence should be described clearly to convince the customer. Early involvement

creates an excellent opportunity to access to needed customer information for convincing them, to start influencing customer's decision making and to establish ties for further customer involvement. Therefore, customer's planning phases is the first critical phase for creating customer value.

> "The first (connection) point would be in the customer's planning phases. The most important one is the planning phase, where we are invited into their project discussion. So in some cases, we are willing but we are not invited. Some cases we are invited. --- It means we have to be there also in the bidding and configuration phases as well. That's somehow we can influence to the customer." (Regional Director)

> "They (provider) need to make us convinced that I believe they can do the project. If we are buying a green field plan from them, they need to show that they can take care of everything what is needed in this project. They are describing their own expertise and offerings to us." (Customer)

On the other hand, customer's evaluation on the provider's service proposals defines the whole value foundation in the service offering that the customer is going to use. Customer's evaluation also impacts to the following processes in several stages. After enquiring for an offer, the customer expects to find the best proposal with an optimal value proposition. The customer does not possess much idea or knowledge on how the provider could create better value for them, but just looks for this kind supplier who can supply the best service fitting them best. It indicates that the service provider should proactively look for possible value offering points.

> "Then in the evaluation phase, when the customer evaluates our proposal and finds out that's the winning proposal or finds out this proposal fits them best, before making final decision." (Regional Director)

> "We are asking offerings, then compare the offerings. We just make an agreement and follow up the agreement, fulfill the agreement and make conclusion and get the permit to invoice." (Customer)

5.3.2 Order penetration point

Order penetration point (OPP) in the interviews is interpreted as the point where and when the case company obtain a certain decision or evaluation from customer to carry on the remaining part of the service offering. As observed in this case company,

unlike in a pure manufacturing supply chain, there are more than one order penetration points along its service supply chain. In practice, whenever customer's decision or approval is needed, there is always such a decision point working as a gate along its chain of process. Only with the decision or approve from customer, service production process could carry on. If customer is not able to offer a decision on one of the provider's proposals or enquire in a certain stage of the service supply chain, it will impact to the process and schedule of the following stages. Both provider and customer suffer with disappointment, if decision point cannot be realized. For instance, customer's late decision would cause human resources and work capacity exhausted in vain for a certain period. For another example, customer's re-decided decision would bring about repeated work with extra workload. Usually both customer and provider may be obliged to bear higher costs and prolonged schedule. It means provider needs to re-allocate human resource to the certain customer, which indicates human resources most probably need to be re-arranged for other customers. If the final service delivered is not in line with the customer's expectation, it will harm the case firm's future business opportunity, which can be deemed as opportunity costs.

> "When we do forward, we have usually connection points with customers before any major decisions. We have regular meetings (with customer) to follow up what's going on." (Regional Director)

> "There are many checking points internally and externally in each phase, just to check that we have done right things at the right time before we go on. Where are those points, it depends on the project plan. Those points are must in the scope of this project. We need client approve before we move on. --- Those checking points are internally and externally are very critical ones. It means that it's very important that we do all those things in a planned way to avoid double work." (Department Manager)

> "..It's very annoying if there are too much re-allocation for different customers. It ways take costs, some time to postpone some other projects. I would say that this a very good topic, but the answer is we do not have any solution. Living in uncertainty and re-allocation is normal nowadays." (Department Manager)

Order penetration point is playing a pivotal role in allocating resources so that a service provider must utilize all available resources to achieve it. Locating OPP points means the provider should know how and what activities and procedures can

be sequenced and what activities can be performed until receipt of more detailed customers' information, inputs and decisions. To optimize outcomes with limited resources is the common principle in both manufacturing and non-manufacturing processes. The case company desires to allocate experts and work capacity, as early as possible and as accurately as possible, to a customer, which means the buyer is required to be dedicated to offering accurate decision and information in time per the supplier's request along the value co-creation process, no matter what kind of market environment and buyer's situation. Order penetration points should then be agreed with the customer, who is supposed to give a duly decision to enable provider's work for the following process. Both customer and provider should respect decided decision points or evaluation points by completing own duty, based on the time schedule agreed in service specification or contract.

> "We have nominated experts to different customer's processes in the very beginning. But how to allocate those resources is a question. We only have limited amount of experts, we want to allocate our experts as early as possible. We can allocate those human resources only after when we get an order. But depending again market situation, client situation, if it's that kind client, we know they are going to buy our services at last for this project we are planning for in the pre engineering phase. This project will go on, and will get a positive investment decision, they will need our services, then we start to pre-allocate, do we have those experts, but we can't keep our people just waiting for the project, we cannot do anything to the storage. Experts who knows the clients well will prioritize when the clients wants and needs. Those resources are really limited. We cannot allocate it until we know we get the decision." (Department Manager)

5.3.3 Carving out a VOP & OPP model

Based on aforementioned, possible service VOP points can be identified in the customer's demand chain and OPP points can also be placed in provider's service supply process. Thus, it is demonstrated that VOP & OPP model can also be applicable in a service supply chain, such as in this case company's operation. How the case company can design such a VOP & OPP model which facilitating increasing knowledge - the fundamental source of competitive advantage.

Firstly, we have to make it clear what is needed to build up an appropriate model. In practice, just as the below statement from the customer representative, the customer

is not actually interested in the service or provider's service production process, but in how service can be utilized for its own value creation. It is advocated by Grönroos (2008) that it is not customer's task to get chance to be involved in the provider's processes, but the provider should proactively look for opportunities to engage itself with its customers' value-generating processes. This is completely in line with the service dominant logic introduced in the beginning of this paper. That is the case company should focus on the customer's value-in-use, which leads to long-term business success. The case company should focus on understanding its customer's practices and investment process where the service offering is used. Taking this as the starting-point, the case company can firstly put focus on comprehending and learning the processes where customer's value-in-use is generated. Only by doing so, the provider is able to provide customers with value-facilitating services as input resources into its customer's value-generating processes (Grönroos 2008). Therefore, to design such a VOP & OPP model is about identifying VOP points based on learning about customers and their demand chains, is about designing appropriate supply process and workflow in its own supply chain.

> "Jump to the other side, it's up to provider how to do the project, how to define the process, and how to convince the buyer. --- I am not interested in how they are doing the job. In a green field plan, not many our people know what is needed for this project, but we don't jump into the provider's process. It's up to them how to fulfill the contract, what to do and how the process is. We are evaluating provider's work, and see who can do the best." (Customer)

Secondly, both the customer and the provider recognize that the reason behind the failure of realizing order penetration points is unsuccessful customer decision making, which is derived from a variety of uncertainties, both subjective and objective uncertainties. These statements give a strong ground to the case company that studying risk and grasping opportunities are always needed, which can be achieved through a comprehensive learning.

> "If the client is not sure about economic, market, local trends, it might tight out client's hands, they are not going to make this order, they will postpone their decision. If they are not familiar with those uncertainties, it means it also postpone our work. It means the whole chain will be postponed, for us, some cases, we have to re-allocate our people who are only for this project for a certain time. Then we have to re-allocate our people a lot." (Department Manager)

> "..Client decision is sometimes very difficult to do, as those are big decisions, technical solution for the smelting plant. It's challengeable for everybody to make it, both client and provider, among difficult solutions." (Business Development Manager)

> "For engineering, it's not very easy to define the whole thing. Changes and risks are very common in engineering work. It sometimes depends on commercial things in the contract, we need to know what kind of changes are big enough to change the negotiation." (Customer)

Consequently, analyzing, avoiding both subjective and objective uncertainties and grasping opportunities to facilitate value-co-creation are the targets of learning. Just as the case company states, the target of any innovation in the operation is to get work done as soon as possible, as cheap as possible, and as good quality as possible. To realize this goal, design of a VOP & OPP innovation model is contingent on the provider's operant knowledge of what it should do, how and why it should do, because knowledge is the fundamental source of competitive advantage (Yazdanparast et al. 2010). The provider needs to incorporate the knowledge learned about the customer into its operation processes. Learning concerned on gathering value co-creation relevant knowledge will be discussed in the next section.

> "In side of our range, we can decide where the checking point is and how many those checking points will be. ---The target is the work should be done as soon as possible, as cheap as possible, and as good quality as possible. In every project, time is money. The earlier, the better. To keep in schedule." (Department Manager)

5.4 Learning

This part is examining what should be learned during learning phase to achieve the target of utilizing pieces of or fragmented knowledge on customer.

5.4.1 Mutual understanding

First of all, understanding customers means being aware of customers' unique attributes of requirements, to know their special needs and reason behind it, in order to provide what exactly they expect from the provider. Understanding customers

also means seeing customers' behavior during the business cooperation and interaction, and to respond as customers expect.

> "..If customer is a junior mining company, they do not have so much cash, everything has to be made as cheap as possible. OK, when we offer a solution, we know we have to make upgrades more frequent so that we could invest more in the early phase to avoid maintenance costs in the operation phase. So balancing that is one of the issues. Balance limited investment budget and operations budget. For instance, if customers do not have that money at the beginning, you need to wait until customers sell more and get more money and then you can upgrade or make the site better." (Regional Director)

Secondly, to understanding the customer's demand chain and decision making process is also needed to figure out how customers impact to the provider's supply process. Holding such information in hand, the provider can design more flexible supply process to itself, plan and control the whole supply chain with flexibility and initiative. Each customer, as business buyer, has its own business practice and unique demand chain. However, obtaining such information from the buyer is not that simple. If the buyer is a complete stranger, there is likely to be a concern on the buyer with regard to how much he or she can trust the supplier. It means that the buyer may choose not to offer information that he or she considers to be sensitive or as commercial secrets.

> "Customer demand process varies, it depends on different clients. We need to understand customer's demand. It means we need to know the background information. ---I think it would be good if we have good cooperation with the clients." (Regional Manager)

> "I think we need more knowledge about the customer. It's not so easy to get information from a big company, it's easier and get it from small and middle size company. In many cases, we have an understanding of the customer's processes. It makes our work easier." (Regional Manager)

> "We always need customer's decision all the time. A lot of decision points are needed in project. Decision is the one gating us moving to the next stage. We must know the decision process of our client. Normally, we know what their decision processes are. It's normal that client tells their decision processes." (Regional Manager)

Additionally, mutual understanding means two-way understanding. It is reciprocal. With achieved mutual understanding, the customer and provider could reach a higher level of cooperation with visions of possible industry uncertainties and risks, technology advances, process improvement possibilities (Yazdanparast et al. 2010). The provider needs to get the customers understand the provider's enquiries, suggestions, behaviors and requests, make the customers understand what they need to do and how they complete the necessary participation. Only when mutual understanding is triggered, is it possible to improve interactions, build mutual trust and reach the common goals.

> "Customer's wants and needs are different. Some case, customer wants it, but they don't understand that they actually don't need it. We have to work with the client to get them know what is important and what is not. That's we have something to do with the supply chain." (Regional Director)

> "Both provider and customer need to understand each other's schedule, background, the quality of the work.---Sometimes, clients understand the impact of their behavior to us, sometime, clients don't understand at all. It depends on clients' experience." (Business Development Manager)

> "We have different clients, some understand you, it makes our job easier, sometimes, client does not see what you have done, it makes our work very difficult." (Business Development Manager)

Both the service buyer and the service provider are living in an environment of uncertainty, which means risk in a service project is inevitable. Hence, uncertainty and risks should be identified and understood well by both parties. The purpose is assessing the potential exposure to uncertainties and determining how to best avoid the negative economic impact from those uncertainties. Actually, managing risk is an elemental part of the customer's investment process from pre-investment to execution. Risk management is required at each stage of the investment process. Since risk and uncertainties are mostly related to customers, it adds more emphasis on understanding customers. The service provider should nail down what risks and uncertainties actually are, how they might impact to the service production process and how negative impact can be avoided.

> "Uncertainties are that we never know what the uncertainties are in our client's processes. Is there any local or political reason that might end our work. Those things are mainly not in our hand, for example, economic

situation has changed rapidly, all the investment stopped. --- That's one of the tasks, this is risk management as well, to find out what are the uncertainties. Where and in which stages? We might have risks in each stages. More or less, they are customer related." (Department Manager)

"Uncertainties in a project are technological changes, increasing regulations, unstable products, faster schedules, flexibility demand, partners, safety demand and revamping. ---The uncertainty increases, when one or more of the following factors are new or under continuous change: product, markets, technology, process, competitors, competitive situation, business environment, new culture etc." (Department Manager)

"In this industry, very well combined processes with customer may deal with uncertainty and risk well. It would be interesting to find out that we should think about in this way, what kind of uncertainty might be, then in tendering phase, we can find out together with clients that some uncertainty we don't care, we leave them out and we focus on those things that we are able to do.
--- Both parties are aware of those uncertainties, until they are not uncertainties any more. We have to find out these uncertainties. It's about risk management and assessment." (Department Manager)

5.4.2 Clarifying service specification

No matter what kind of professional service, it is firstly needed to clarify the service specification which defines the scope and content of service required, the target or criteria of the service as well as other relevant issues of the required service.

"In the purchasing process, first we need some kind specification of what we are purchasing. In engineering environment, it's difficult to get the specification, as the problem is you just don't get enough specification or you can not specify the range of the content and make the purchase request." (Customer)

"The biggest thing is managing project supply chain, the biggest thing is managing changes. The one managing the changes will manage everything. We are willing to make changes per the clients' request, as many times as they need. So very clear scope definition must be agreed and written in the contract. What is in the scope and what is not in the scope? If we are asked to do the things which are out of the scope, (we should know) what and how we can do, how many time we are going to changes and who is going to pay for the extra work." (Quality Manager)

"..(without the service scope) then we cannot make our service offering, we cannot make proposal before we know what the customer is expecting from us. We need to decide the scope or what is the edge." (Quality Manager)

The above statement from the customer side indicates that even though the customer's role is buyer, a customer may not be able to articulate exactly what his or her required service is. Not merely customer or provider can complete the service specification on its own, but both parties have to be involved to achieve a clarified and decent service specification pleasing both customer and provider. During this service specification phase, both parties make clear the expectations and schedule from each other and achieve an agreement on service quality, service content and processes.

> "No matter what kind service scope client is purchasing, the most important thing is in this phase we clarify very clearly what the scope of our work is and what the needed data from the clients are, when they are going to deliver it so that we can do our work." (Department Manager)

> "It's very common that our sales people usually say that we can do everything, as they are eager to make a deal. For sales people, they have different view as the project people. What we can offer does not exactly fit with what the clients need. We need to let them understand some part of their need is not within out range, but when sales people promise to clients "we do everything", we do not recognize that what they need is not exactly the same as what we are going to offer. The impact is that we won't get payment for the extra work, as clients claim that the extra does belong to that scope. Basically, we should manage this issue very well. The restriction should be set clearly in the contract." (Quality Manager)

> "When request a tender, starting here means you have to start to think right now that is this service that our client needs, is this really something we can provide. It's a waste of time if you are not able to do it, do you have resource, capability to do it. This is the starting point." (Department Manager)

From the case company's point of view, they must be aware of its own capacity and ability before making any promise and also must adequately know the true expectation of the customer. Incomplete picture of the customer's entire expectation or its own service offering might lead to awkward situation that both customer and provider feel losing something in the business and feel dissatisfied to each other. Thus, a clearly defined service specification is the start of an orchestrated flawless service performance.

5.4.3 Managing customers' inputs and participation

Customers usually have a different view on its' role in the service production process. From the interviewed customer's point of view, its demand process relating to the provider is merely a purchasing process.

> "From our point of view, the business process of the service buyer in the service production system is just a purchasing process. Nothing else. It's just one item we are purchasing. In the purchasing process, first we need some kind specification of what we are purchasing. In engineering environment, it's difficult to get the specification. But it's still a purchasing process." (Customer)

The customer can be allowed to view itself as a purchaser in the service production process. However, from the provider's point of view, the service production is not that simple as producing a product per a purchase order. Customer is not just the receiver but also the supplier of needed information and data, the decision maker driving the service production process. Firstly, customer's role before service delivery is sharing needed information and initial data, facilitating start-up of service project and fluent workflow, promoting provider's understanding on the service requirement, and leading to satisfied service solution and higher value proposition.

> "That would be ideal situation that we have more fluent work, in many cases, most challenge thing is to get all the needed data. --- It means that again, depending on the customer, are they able to give us the initial data that we can start our work." (Department Manager)

> "For example, in one case, we need to collect the information from client for a certain time schedule. They haven't realized that we need the data in a certain phase, so those data has been missing for our study in that certain phase." (Business Development Manager)

Secondly, customer's role among the service production is decision making. The case company views clearly the decisive role of customer's decision during the service production process, as service cannot carry on without customer's decision and customer's decision decides whether continue, postpone or discontinue the service production process. Customer's decision making is the key to continuous service success. The case company managers regard customer's decision point as the milestones. Thus, it is also very important to support customer's decision making.

> "Customer decision making is one part of our process, and impact of our project schedule. We cannot proceed our projects forward, without client's decision. In some cases, it takes 3 months to get the decision from the customer. Our resources cannot be used, we cannot start our work, we have then very limited left time to us. If customer does not make the decision on time, then it's very difficult situation for us, because we still keep our people in the project." (Business Development Manager)

> "Everybody involved in the project know the points of decision making and be aware of the importance of those points, decision point is the milestones, everybody should be aware of those milestones. The solution is in a higher level to push them and make them understand that how critical those decision making points are." (Business Development Manager)

This observation is in line with the statement from Lin et al. (2009), who declare that service supply chain's nature is bidirectional as customer plays a role as supplier providing themselves as an input or provide tangible belongs and specified demand information to the service provider. Comparing to manufacturing supply chain, a manufacturer replies on customer selection of outputs, payment for outputs, and occasional feedback but production is not dependent upon inputs from individual customers (Sampson & Froehle 2006).

It can be decided by the provider what customer's inputs are and how customer participates in the service production. Per the customer's opinion, provider should take a leading role in involving customer into the service production. This opinion is consistent with the statement in the theoretical part that provider should take the leadership role in the value co-creation process. The provider should clarify customers' roles and responsibilities in relation to the service provider during the service production process.

> "Participation is necessary. Intense of participation is decided by the provider, who can invite buyer to take part in the engineering. The amount of participation depends on the provider." (Customer)

Martin et al. (2001) points out that a service customer can participate in the specification, co-production and on-going production of the service offering, and even in the marketing and selling of the service to others. What a provider needs to do is completely employ the role of customer, which means requesting exactly the timing and content of participation from customer including customer's physical

presence, tangible belongings or property and needed information and data. The management in the provider's team needs to plan all these issues when the project is started, because customer participation creates opportunities for value co-creation. If customer does not have high interests in the participation, the provider's management team should consider how to motivate customer's participation.

5.4.4 Facilitating open communication

Just as illustrated previously, learning is the first stage of value co-creation. A service provider needs to understand customer's requirement and expectation before any value can be co-created. At the same time, the customer needs to gain an understanding about its supplier before it can participate the value co-creation processes. Successful projects are defined by customers not only in terms of effective solutions, but also in terms of costs and timing of project deliverables. All these require open and effective communication. Per the case company staff's experience, inefficient communication is the major obstacle preventing efficient project management, especially in customer's decision making process. They state the root cause is that both the provider and the buyer are lack of enough understanding on each other. Actually, both customer and provider are expecting more open communication.

> "Communication, like open discussion, make some examples to show to each other and see what's each other's understanding on the same issue, can promote the understanding of our service project demand." (Customer)

> "We have different clients, some understand you, it makes our job easier, sometimes, client does not see what you have done, it makes our work very difficult." (Business Development Manager)

Communication facilitates understanding of each other's point of view, expectations, and requirements in service business. Communication helps to remove confusion, avoid chaos and clear problems. It is also the basement of a close business relationship. This is especially true when the nature of the service production is interactive, complex and customized. Open communication facilitates customer's decision making in its investment process, which in turn drives on provider's supply process forward. Both customer and provider benefit from open communication.

> "Communication in project management is very important, like face-to-face discussions, meetings, how many and what kind of meetings can be held with the clients, who are the decision makers, what are the critical items or processes, what have been done, what will be done next, what is missing. Very open and face-to-face discussion, regular meetings via web, works well. Decision making process is much easier to do, if communication is done well. You cannot communicate too much, always more communication is needed. --- Need to promote effective communication within and outside the company's project, as effective communication assists in reducing the time and cost spent in the project. " (Business Development Manager)

Understanding customers more deeply than competitors is critical to customer satisfaction and loyalty. Therefore, open communication is always appreciated and needed in service business to achieve optimal results from complete understanding. But the question is how to facilitate forthcoming, honest and clear information sharing between the service provider and buyer (Bettencourt et al. 2002). An optimal interface would assist on this issue. An appropriate buyer-provider interface is needed to formulize a common interaction pattern in terms of objectives, capabilities, representatives and tasks, involved at both the buyer and the provider firm (Wynstra et. al. 2006). With this interface, a member from the provider firm knows in the customer firm to who he or she can address specific tasks and behaviors during each service production phase. This kind interface is supposed to contribute to the quality of the result delivered to customer.

> "..The information flow is very huge that in some cases we need different types of interfaces structures for different clients and projects. An appropriate interface structure can facilitate the inter-company communication." (Quality Manager)

> "In some international case, clients may have different understanding of time, the point is we have to make each other understand the differences and then we can live with it. What needs to be done for the decision making, and how decision making may influence the future actions." (Business Development Manager)

Internal communication within the provider's team is essential in the team play, since involved disciplines and sectors are various, participated people are numerous and possible changes and risks are always existing. Communication creates opportunities for managers to absorb, involve and integrate external knowledge resources with internal knowledge resource and apply them to production of services.

> "Project manager is the one being responsible for the whole project. He needs to collect those change issues. We have so many disciplines, no project manager is so versatile in very discipline. So it depends on how he will manage the whole project team. How he will keep the team meeting and communication in the project. He needs also to know what the costs impact will be if changes are coming. So internal communication within the project is a core issue." (Quality Manager)

5.4.5 Building trust and partnership

Tasks are completed by qualified experts with a substantial fund of specific knowledge, which is based on education, experience, and special skills. B2B professional service is built upon relationships, rather than upon transactions (Orava & Tuominen 2002). Customer's trust is the foundation of a successful service partnership. Trust is important to both the supplier and the customer.

> "The most important thing is we have the customer's trust. The customer know that we know how things work, they do not have to know everything. Someone in the customer's side negotiation must have the understanding that the person can make a decision based on the facts and possibilities. Then the customer has to make a decision from the available options, it's not necessary to make customer know everything. The key thing is trust, the customer must trust us." (Regional Director)

> "When project didn't go smoothly, we continue on following up to make sure it goes on smoothly. Trust is important. If you don't trust engineering company, then you cannot get what you want." (Customer)

Trust is built up on people who are completing various tasks in the service project. Engineering service is mostly based on partnership, which is built upon trust between each other. From the customer's point of view, people who are completing the engineering tasks are the key elements in the service business. The competent staff is the element convincing the customer. Thus, human resource is still the key resource for a service provider, just as the customer representative states as below. Reference is the tool to build trust and start a relationship with the customer, and also it is the tool to keep and develop partnership. Therefore, it is always worthwhile to prepare a good reference list proving that the provider has competent human resource for the requested service content.

> "Usually we have this people and this people for this project. We show that they have experience for this task for long time and when everything comes down to the personal level, the company is just virtual and abstract, it should be person level where trust can be built up." (Regional Director)

> "Usually it is the business line who builds up the trust, also business people and sales people build relationship and trust. Someone has to be door opener. The most suitable person for the door opener, for mining sector is different than real estates, we have to select the right person based on his or her relation and experience with clients. In real estate, the options are 2 or 3 persons. After opening up the discussion, then we can bring more people with the specific knowledge into the case who has deep experience." (Regional Director)

> "In consulting and engineering business, people are the key elements, in most cases, the reference list is the most important. Reference list shows what and how people have done before. What kind people are listed for the project. The process description is not the most important thing, but their competency is the thing to convince that they have good people to do the job. It's more important for a provider to show that they have the capability and resources to do the job. We care that provider has those good engineers doing the works. (We care) who are those people, what they have done earlier. Have those people previously done this kind job. Service people are the most important thing. It does not matter which company service people are working." (Customer)

> "Most engineering is based on partnership. ---After working with the provider, then we are on the same boat. Trust is everything." (Customer)

In service relationship, the service provider enters into a responsibility relationship with respect to providing the service while the service customer enters into a corresponding ownership relationship. Both service providers and service customers enter into various service interventions with respect to the service target, for the purpose of utilizing service proposal, and in order to do so they must enter into service relationships with each other. (Clarke & Nilsson 2008)

However, it is necessary for managers to pay attention to the background of a relationship. If the customer organization perceives the offered services are merely means to achieve cost savings, the role of the provider organization will be limited to operational service (Yazdanparast et al. 2010). But when the customer organization considers the provider a strategic partner with a critical role in customer's supply chain strategy, the relationships are more strategic and collaborative (Yazdanparast et al. 2010).

In conclusion, the knowledge on customers can be gathered from the five approaches, shown in the below diagram of Figure 14.

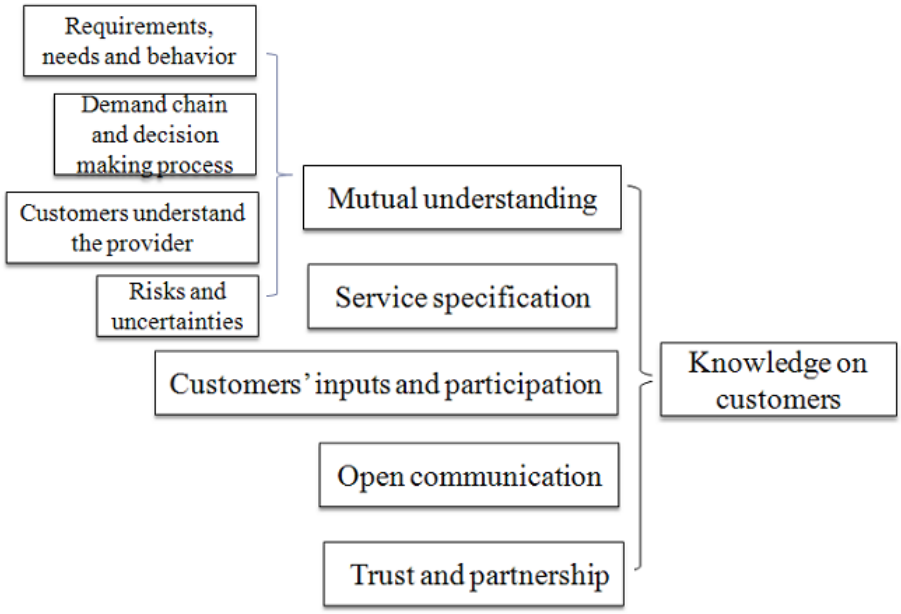

Figure 14. Knowledge on customers

5.5 From learning to innovation

With the knowledge gathered in the learning phase, the provider needs to incorporate that knowledge into its innovation phase of carving out a VOP & OPP model. There is no "one size fits all" VOP & OPP model. The VOP and OPP locations are always decided based on the actual situation of each project. However, we can sort out several VOP & OPP models and classify different types of customers who can be put together and apply to a certain type of VOP & OPP model. For instance, if a chemical process industry buyer's investment process possesses similar features as the previous customer to whom service is efficiently delivered with a certain type of VOP & OPP model, and also this buyer demands the same kind of technical and commercial performance, then the same type of VOP & OPP model can be a reference for carving out the best VOP & OPP model for the new buyer. This could help in expediting the project moving forward and avoiding non-necessary work and resource allocation.

> "There are many check points internally and externally in each phase, just to check that we have done right things at the right time before we go on. Where are those points, it depends on each project plan. Those points are must in the scope of this project. We need client approve before we move on." (Department Manager)

In the case company's view, engineering and project management tasks' nature is sequential so that to avoid repeating work is the key to improve the service efficiency. VOP & OPP model's benefits are not just at identifying the suitable points of value offering and increasing customer perceived value, but also at improving the service supply chain itself. In this sense, an appropriately carved VOP & OPP model plays an essential role in planning and sharpening workflow. Benetton manufacturing case tells dye can be done after jointing the parts because they found out that is in the most efficient sequence (Yang et al. 2010). Similarly, a service provider needs to get to know the customer's real demand sequence and content in investment process and be clear about what repeating work can be removed in its own processes with a good reason.

> "The engineering work is like this, you put some input and get some output. It must go step by step. You cannot jump some processes without doing the necessary steps, we need some basic data from the previous steps. It's very important that we divide every single engineering disciple into pieces, then you cannot start that phase unless this phase is finished. If we ignore it, we start a process earlier than the previous steps, we just waste time and then we have to do it again." (Department Manager)

> "Those checking points are internally and externally are very critical ones. It means that it's very important that we do all those things in a planned way to avoid double work." (Department Manager)

6 CONCLUSION AND DISCUSSION

The research question is how postponement strategy can be adopted in a service supply chain. This research answers to this question successfully. Firstly, the theoretical part explains clearly how service value co-creation processes can be conceived in the service supply chain context. With the service dominant logic, it is confirmed that service providers should focus on assist creating customers' value-in-use, which leads to long-term and higher value-in-exchange to the service provider. Customers' value-in-use is mostly co-created based on employment of operant resources through interaction and coordination between the customer's demand chain and the provider's supply chain. Operant resources which impacts heavily to value co-creation must be considered critical in managing service supply chains, especially in knowledge-intensive supply chain management. That is why the postponement application model should incorporate the issue on identifying and utilizing relevant operant resources, as it is the pre-condition for converting various resources into co-created value. It is called learning in this study. Operant resources mainly mean knowledge on customers for knowledge-intensive services, as under the purpose of utilizing postponement concept in service supply chain management.

Secondly, with understanding on value co-creation, we know that a tool integrating both customers and providers into value co-creation process is needed so that postponement strategy is possible to be realized in value co-creating service context. The tool used in this study is value offering model, which enable customers' demand and suppliers' supply be connected. Hence, the two sections of learning and value offering model shape the basic frame of the postponement strategy application model. In this way, the theoretical part gives an outline to answer to the other research question - how an application model can be constructed for utilizing the postponement strategy.

The empirical evidence proves that possible service VOP points can be identified in the case customer's demand chain and OPP points can also be placed in the case provider's service supply chain. Therefore, value offering theory and the model derived from the theory are valid to managing a service supply chain, such as in this case company's context. To design such an appropriate VOP & OPP model is

concerned on identifying VOP points based on learning about customers and their demand chain, is concerned on designing appropriate supply process and workflow through placing OPP points in the provider's service supply chain. The focus is on increasing the number of process steps and activities to be completed in advance before the customer's decision or evaluation arriving to enable smooth workflow, preventing increasing costs and prolonging service delivery time. To reach the goal, gathering relevant knowledge on customers in learning phase includes below five approaches, which promote eliminating both uncertainties and risks and also grasping value-co-creation opportunities.

(1) Mutual understanding,
Being aware of customers' requirements, needs and behavior;
Understand customers' demand chain and decision making process;
Make customers understand the provider;
Identify uncertainty and risks.

(2) Clarifying service specification

(3) Managing customers' inputs and participation

(4) Facilitating open communication

(5) Building trust and partnership

The whole application model of postponement strategy is shown in below Figure 15. This model incorporates two essential components, learning phase and innovation phase. Learning is the ability to integrate and utilize pieces of or fragmented knowledge (Yazdanparast et al. 2010). It is admitted by Flint et al. (2008) that supply chain learning will lead to innovation. As it is critical for a firm to incorporate the learning gained about the customer into business actions with the customer and to create a competency based on what is learned (Flint et al. 2008). It is proposed by Yazdanparast et al. (2010) that higher level of knowledge gained through learning will lead to higher levels of asset specificities of the value-creating activities, which lead to the higher quality of solution implementation or service delivered. The ultimate purpose of learning customer is to help the provider identify what and how the provider's processes indeed create value to the customer, what processes can work as supporting links and how processes and functions can be connected and aligned to achieve overall objectives (Tokman & Beitelspacher 2011). In the innovation phase, the higher the level of customer knowledge used in the services

innovation process, the higher the possibility of success of the carved VOP&OPP model.

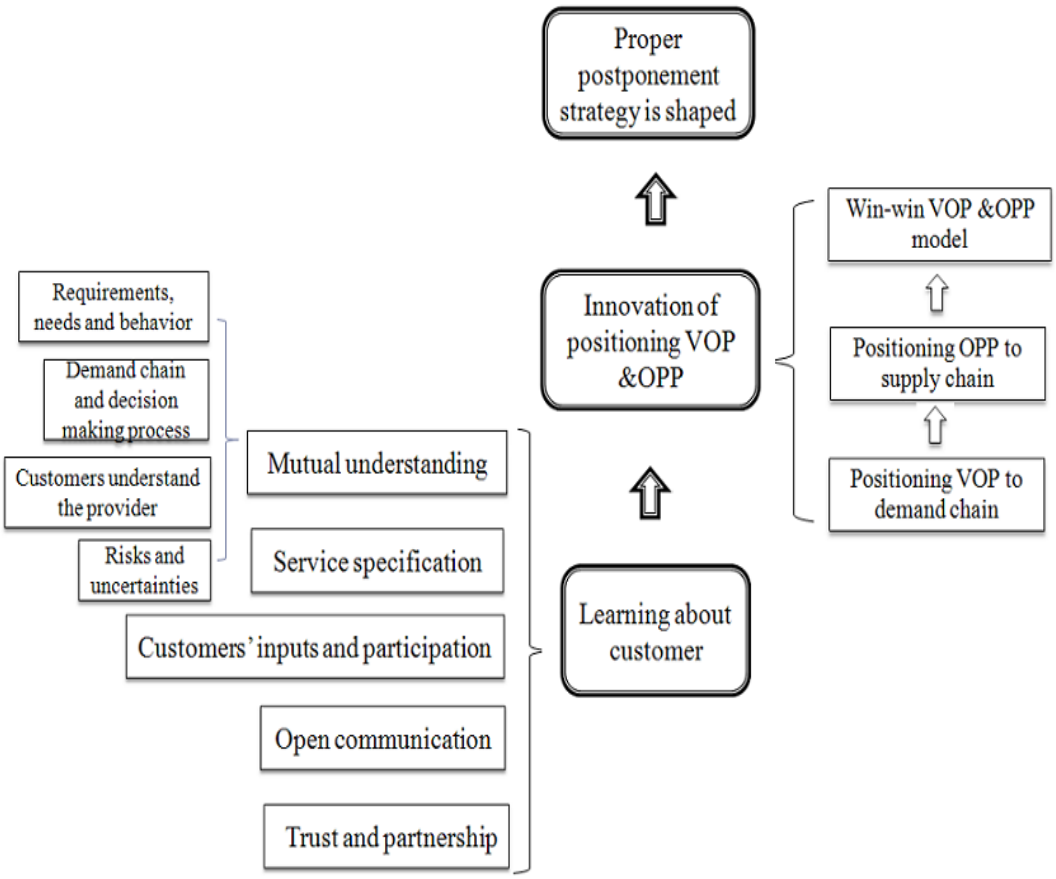

Figure 15. Application model of postponement strategy

Different VOP&OPP models can form different postponement strategies by positioning VOP and OPP at different stages along the chain, as illustrated in Figure 16. In strategy 1, provider's visibility on customer's requirements is restricted to the customer's purchase orders, because the customer's demand chain beyond the phase of service purchasing is not visible to the provider. This combination is actually a typical transactional service business, where the provider's only operation target is to deliver service offering per the customer's purchase order. And the customer's input to provider's supply chain is just limited to placing a purchase order.

In strategy 2, provider is involved into customer's project development processes where specific customer demand and requirements information can be accessed earlier than in the case of strategy 1 and provider could have chance to allocate

service production related resources in an efficient way based on the accessed information. The challenge is positioning company's resources to fulfill the specific customer demand and requirements from customer's project development processes.

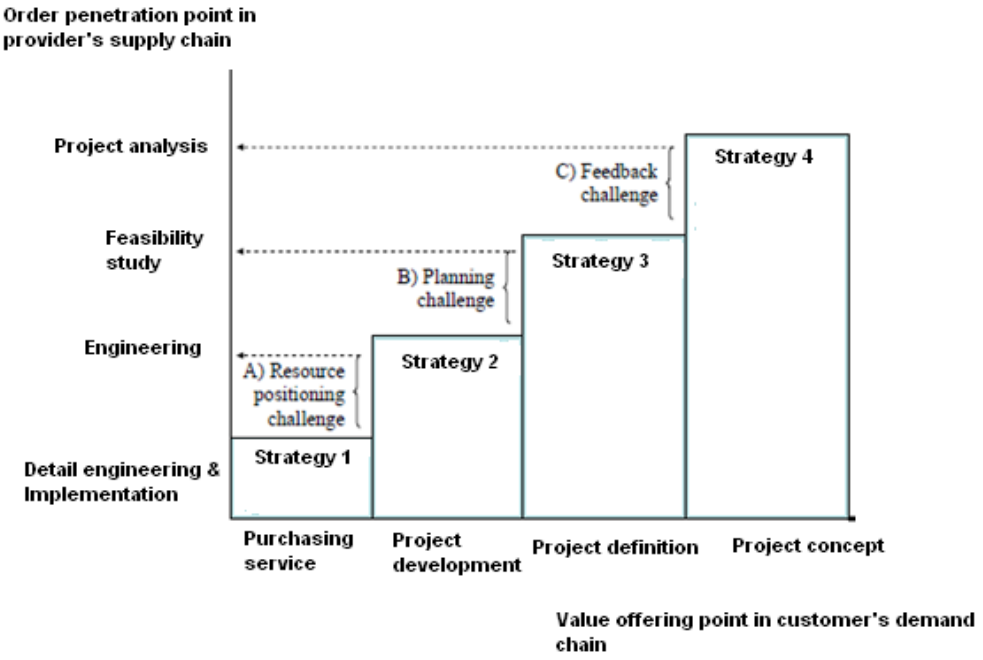

Figure 16. Different VOP&OPP models and strategies (Adapted from Holmström et al. 2010)

In strategy 3, moving the value offering point to project definition phase enables the provider to move order penetration point down to its service supply chain and stretch for demand visibility for resource planning and supply solution design. The challenge is how to plan resource along the service supply chain according to visible demand and requirements information.

In strategy 4, provider has visibility to customer's demand chain from initiating a project concept to placing a purchase order so that provider is able to develop the most efficient and effective supply chain strategy for the specific customer. The challenge relates to responsive feedback and collaborative cooperation between provider's and customer's organizations. Customers from different industries have different distinctiveness in their demand chains. Through analyzing the distinctiveness for each type of customers and theirs demand chains, the most appropriate supply chain strategy can be designed for different types of customer's demand chains. There must be more alternatives than what shown in Figure 16. The

trade-off and costs within each strategy should be pondered prudently when selecting the best match for each customer's demand chain.

6.1 Theoretical contribution

With the participation of customers and intensive knowledge-based elements into the service supply chain, we may not view service supply chain in product-oriented way, but need to take a new perception to understand the very peculiarity of the service supply chain. First of all, a stream of literature is centered around one of the most distinctive features of services – process (Yang et al. 2010). Process perspective has been the center of service management. For example, Ellram et al. (2004) view a service as the transfer of capacity from a supplier to a customer. Influenced by Ellram et al. (2004), Giannakis (2011) conceptualizes a service supply chain based on the product SCOR (supply chain operations reference) process: plan, source, make, delivery and return, which standardizes service processes. He perceives the service design and delivery processes as adding value to the final service offering. Comparing to previous research on service management, this paper also perceives service design and delivery processes as value-adding process, but put focus on value-in-use in customer's demand chain. That means all processes are concerned on creating value-in-use to customers. That is viewing provider as the supplier of value proposition which assisting creating value-in-use to customers. That is why customer is the focus of value co-creation and customer is also the center of service supply chain management. All in all, service is a process, a customer-focused process, not a provider-focused process.

It is generally considered that product based supply chain management principles are not directly suitable for managing service supply chains (Edvardsson et al. 2005). Very little has been written on transferability and applicability of postponement to a service setting (Yang et al. 2010). As Van Hoek (2001) suggests, postponement can be a potential tool for streamlining service industries where service production and consumption coincide. This study proved how postponement can be applied to manage the service supply chain with a creative model based on the theory of VOP (Value Offering Point) and OPP (Order Penetration Point). The proposed framework adds to the existing knowledge on service supply chain management by exploring the

applicability of postponement strategy from service dominant perspective. This study provides contribution on how to adapt postponement concept to service operations. From this sense this study is innovative and exploratory.

VOP&OPP model was adopted as a significant adaptation. This is also creative, because VOP&OPP model had not been used in studying B2B knowledge-intensive service supply chain previously. It suggests how a company can integrate the customer and customer's demand chain into its supply chain or, alternatively, how a company moves from viewing the customer as the destination of service offering to someone co-creating value with (Lusch 2011). It was proved in this study that value offering theory is applicable in B2B professional business based on service dominant logic. The service offering provided by the provider is expanded to including provider-customer interactions. The VOP&OPP model was demonstrated to be eligible in B2B knowledge-intensive service context where it facilitates the provider to collaborate with customers to develop reciprocally beneficial value propositions. Once Clarke and Nilsson (2008) said that if a unified approach could be developed to understand services, interventions, and relationships this would be a significant service innovation. This VOP&OPP model is just such a unified approach that develops understanding on service production processes, interactions and relationships between customers and providers.

Just as Holmstöm et al. (1999) explain in value offering theory, a service provider should extend its view to customer's demand chain and should view the customer's demand chain and its own supply chain being equally important. They consider that provider is the customer's co-producer of value. Therefore, grasping own supply chain is not enough, a service provider should be familiar with its customer's processes and demand chain, which affects its own supply chain operation and performance. As Holmström et al. (1999) suggest, a company must abandon the perspective that each supply chain member performs a distinct value adding task, and instead regard both suppliers and customer as potential co-creator of value. This is the core of this value offering theory. This is also the core of transferring manufacturing supply chain management innovation into service supply chain management.

6.2 Managerial implications

Nowadays, much of the research published in academic business journals is often seen as being too theoretical and of little practical relevance to business practice (Myers 2009: 13-14). But it is pursued in this research that results can be adopted in business practice with operational implications.

“Value” is the most essential keyword for the case company. It’s considered seriously in the case company that how resources and information can be used to “add value” or increase “added value” for customers. Managers have seen that value can only be defined by customers. Since customer evolves from a merely receiver to a source of business co-designer and value co-creator both to the firm and to themselves (Ng et al. 2012). It is worthy to change the angle of viewing a business in the case company. That is to change the angle of “goods supply chain” into the angle of “service supply chain”.

Meanwhile, the case company needs an approach to manage uncertainty and complexity of the customer input and behaviors in order to enhance the customer experience. And the approach is supposed to positively impact the company’s profitability. First of all, it is suggested that a company should develop such a customer centered environment that promotes a deeper understanding of value co-creation among its service supply chain. Externally, not only the company but also suppliers and other external parties put the customer’s value-in-use in the focus place and respond to the customer’s dynamic requirements agilely. In such an environment, managers will find new ways of creating customer’s value and developing operation strategies when they engage customers to learn together from each other, to build trust on each other and to share interests and business goals.

Moreover, people involved in a customer project from various specialized areas should have a clear picture of how their company is related to their customer, and how they connect with other departments and functions. More precisely, they should see how their work links to their customer’s business and processes and also know how they work as a team to meet the customer’s requirements. Only when this is

achieved in an organization, it is possible to design combined processes and fluent workflow with customers to against risks and uncertainties.

A service supply chain is intricate as a whole, a customer's demand chain may sound complex as well, but it does not necessarily mean service supply chain managers cannot control it. What should be done with priority in controlling a service business is to identify and address customers related operant resources. Knowledge on customers is deemed as the most important knowledge operant resources of service value co-creation. Knowledge on customers can be gained through clarifying service specification; know-how on customers' requirements, needs and behavior; know-how on customers' demand chain and decision making process; supporting customers understanding the provider; facilitating open communication; assessing uncertainty and risks; building trust and partnership as well as managing customers' inputs and participation. The empirical data from the case customer company suggests that the customer can and is willing to help the provider more deeply to produce the service offerings. Customer as an important entity is responding and learning entity. Only by engaging customer in a co-creation experience, is the provider likely to gain knowledge about what the customer truly demands (Yazdanparast et al. 2010). All in all, it is critical for service supply chain managers to utilize and optimize operant resources. Specifically, ability of utilizing knowledge on customers as well as other knowledge operant resources can be a measure of assessing service supply chain managers' performance.

This study has shown that postponement strategy can be developed to improve service performance in B2B professional service supply chain. In order to utilize postponement concept in professional service, a service provider should carefully identify the processes through which the customer creates value in its businesses (Hirvonen & Helander 2001). It indicates that managers need to accept process-based management principles in service innovation. The process paradigm implies a new way of looking at organizations based on the processes they perform rather than on the functional units, divisions or departments they are divided into.

6.3 Evaluation of the study

Reliability and validity are conventional tools to verify scientific research, particularly for quantitative research (Golafshani 2003). The criteria for evaluating trustworthiness of qualitative research are credibility, transferability, dependability and confirmability (Halldorsson & Aastrup 2003; Jackson et al. 2007). The four factors have been taken into consideration during designing, analyzing and writing up phases in this study.

Firstly, credibility measures the extent to which the results appear to be acceptable comparing to the reality (Gummesson 2000: 213). This research possesses credibility through correct data collecting approaches, correctly comprehending and honestly interpreting views of interviewees. Especially, empirical data are collected and analyzed from direct observation, interviews, group discussions and documentary analysis, which support triangulation from multiple sources of evidence. Interviewees' comments, observations of the interview setting and contextual factors are noted. Data analysis and interpretation are all supported by collected data from the case company.

Secondly, transferability is the extent to which the results can be made with general claims about the reality, which means generalization across contexts (Halldorsson & Aastrup 2003). In addressing transferability, the researcher attempts to give a comprehensive description of the contextual factors, such as the case company's supply chain, the case company's business environments, processes in a service project and the customer's demand chain, which support generalizing the findings in similar knowledge-intensive service context.

Dependability is the third dimension, which means how reliable the results are (Jackson et al. 2007). To increase the dependability, the researcher has made herself familiar with existing theory and concepts from both marketing and supply chain management, the case company's relevant business operation and target research direction before the research question is decided. The research design and research implementation are carried out under the ModuServ-research group's guidance. Especially, two professors and one supervisor from the case company management

follow up the progress of this research, which enhance the dependability of this research.

Confirmability means that the findings represent the results of the inquiry and not the researcher's biases (Halldorsson & Aastrup 2003). The preliminary model built in the theoretical part is more like a hypotheses based on theoretical study and the case company's practical operation. But the following process of this study is under criticism, with pondering whether the preliminary model reflects to the actual results what is targeted at. Interview topics and questions are carefully pondered in order to get the intended empirical evidence. They are then reviewed by the case company representative and a research supervisor. All data during this research with the case company is collected and analyzed carefully. Especially, collected interview data is triangulated with the written documentary materials gathered from the case company. The purpose is to criticize data from different angles (Myers 2009: 9-10). Interview data is found out to be largely consistent with the documentary materials from written text. Within this case company's study, two professors who bring their own experiences and perspectives take part in meetings with the case company's representatives. Hence, the researcher's biases are limited and confirmability is secured as much as possible.

Last but not least, this study attempts to develop a new model of managing service supply chains by combining service marketing theory and supply chain management theory together. It contains several set of theories from disciplines of both marketing and supply chain management, like service dominant view, value co-creation, postponement, value offering theory and so on. It naturally increases challenge of combining them into an integrated entity to form a theoretical framework. It is worth to mention that this study does meet the goal of the whole study with flying colors.

6.4 Suggestions for future research

This research is explorative in nature, and more empirical data, from similar research settings, are needed to further validate the application model of postponement strategy. For example, the result of applying this model in similar companies may

provide criticized reviews and further development to this model. More study can be done on testing this model in other engineering and consulting firms.

However, there is necessary to mention that scheduled focus group meeting with the case company's key representatives was not hold, which might have given different empirical data than those gained from individual interviews. Therefore, focus group meeting can be recommended for coming study with the case company. Moreover, deeper investigation can be gained if researchers use fieldwork or participant observation for further study. This study is limited to one Finnish company and the involved company only represents one industry. It would be interesting to see whether there are new findings from another service industry, such as health care sector. This study is just a starting point. The theoretical model may need refining to become a robust model which applying to other business service context.

Future work can study other matches of value offering points and order penetration points forming VOP&OPP models which mean different postponement strategies to the service provider. Trade-off between value and costs can be examined for each VOP&OPP model to make the service provider see both opportunities and risks on each postponement strategy. Only when a specific VOP&OPP model demonstrates that actual value can indeed be created to customers, could companies understand why and when this certain application model might be profitable.

Future study can also extend view into the effects of different operant resources along the service supply chain. Researchers can study how different operant resources impact into the service supply chain performance and how operant resources should be utilized to reinforce each other's positive effects. Only when this issue is clarified, can we be aware of how a firm can modify and apply operant resources to achieve and maintain superior service supply chain performance. Further, more empirical research can be focused on a company's capability and ability to convert operant resources within a service supply chain.

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