Matching value propositions with varied customer needs: The role of service modularity

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Abstract

Organizations seek to manage varied customer segments using varied value propositions. The ability of a knowledge-intensive business service (KIBS) provider to formulate value propositions into attractive offerings to varied customers becomes a competitive advantage. In this specific business based on often highly abstract service offerings, this requires the provider to have a clear overview of its knowledge and resources and how these can be configured to obtain the desired customization of services. Hence, the purpose of this paper is to investigate how a KIBS provider can match value propositions with varied customer needs utilizing service modularity. To accomplish this purpose, a qualitative multiple case study is organized around five projects allowing within-case and cross-case comparisons. Our findings describe how through the configuration of knowledge and resources a sustainable competitive advantage is created through creating the right kind of value propositions for varied customers with the help of modularity. Understanding gained through this research helps KIBS organisations in their efforts to increase organizational effectiveness through modular services.

Keywords: Value proposition; Modularity; Knowledge-intensive business services; Business-to-business services

1. Introduction

Recent decades have seen tremendous developments in technology, which have resulted in changes in competitive dynamics and the role of knowledge creation in society. Knowledge-intensive business services (KIBS) especially have contributed to the growth in value added and in employment (European Commission, 2014). KIBS refer to organizations that rely strongly on professional knowledge or expertise related to a specific discipline or a functional domain (Den Hertog, 2000), including traditional professional services (P-KIBS) and technology-based services (T-KIBS). In addition to their direct economic impact, KIBS shape competitiveness of organizations and are a key to innovation and economic development (Zenker, Muller & Hollanders, 2015). Based on their ability to bring together knowledge and resources to address complex challenges, KIBS providers face unique opportunities for facilitating value creation through advanced services. On the other hand, there are challenges too; KIBS typically have a high level of process complexity, that is, a high degree of interaction and interdependence between the operational capabilities required to deliver a service (Coltman & Devinney, 2013), a challenge, which is solvable with help of modularity.

A central aspect of the value creation of KIBS revolves around their ability to formulate VPs tailored to customer requirements (Frow & Payne, 2011). The ability of a KIBS provider to formulate and articulate VPs to customers becomes a competitive advantage. This requires the provider to have a clear overview of its own knowledge base and resources, and how these can be configured to obtain the desired customization of services, where modularity has a key role.

VPs generally include claims about benefits and savings to the customer and if the supplier does not demonstrate its claims, the customer will likely dismiss it as marketing puffery. Under pressure to keep operating costs down and knowing that

customers are often price sensitive, many service providers are expending great effort to formulate convincing VPs to help their customers to understand the superior value of their offerings (Anderson et al., 2006).

The ability to tailor service offerings according to individual customer needs and deliver these efficiently is particularly challenging for organizations delivering KIBS (Aarikka-Stenroos & Jaakkola, 2012). In order to address this challenge, the principles of modularity play an important role in allowing effective delivery of customized services to customers (Storbacka et al., 2013). Managing interfaces and configuring knowledge and resources within organizations facilitates the creation of the right kind of VPs for different customers. Service providers seek to manage different customer segments by using different VPs (Kowalkowski, 2011), and modularity can help in these efforts.

Although "VP" has become a popular term in business markets, there is no agreement on what makes a VP persuasive (Anderson, Narus, & Van Rossum, 2006) or how the configuration of resources can help organizations to formulate VPs (Smith, Maull, & Ng, 2014). Moreover, while the modularity of operational resources is critical for the ability to customize service delivery, the literature is relatively vague on how modularity can be used in the process of developing VPs.

Hence, the research question of our study is: *How service modularity helps to formulate value propositions matching with varied customer needs in KIBS?*

The paper is structured as follows. First, we review the extant literature related to the research question: value propositions and service modularity. Second, based on the synthesis of the literature review, a theoretical framework is developed. Third, we present our research methodology for empirical data collection and analysis. Finally, we present our findings and discuss how our findings contribute to the literature.

2. Literature review

2.1 Value propositions

Value propositions (VPs) are "reciprocal promises of value, operating to and from suppliers and customers seeking an equitable exchange" (Pires, Dean & Rehman, 2015, p. 926). Developing VP is about formulating and articulating what the customers' value into offerings. VP is typically described in the design of service provision (Mathieu, 2001) including services as fundamental value-added activities, and it often places less emphasis on the product as a part of the offering (Oliva & Kallenberg, 2003; Baines et al., 2009).

Building on Pawar et al.'s (2009) work, Smith et al. (2014) consider value propositions in terms of how resources are optimally configured within the VP to co-create value with customers. They identify four nested VPs that enable the co-creation of value with customers: outcome, availability, recovery, and asset. Furthermore, they show that changes in VPs modify the core offerings; in light of this, organizations should consider how to organize their resources and staff competencies in relation to the specific skills they bring in delivering the VPs.

The formation of VPs cannot be understood as a transaction of knowledge between service providers and customers; instead, it is a co-creative practice of reciprocal knowledge exchange between resource-integrating actors (Kowalkowski, Ridell, Röndell, & Sörhammar, 2012). According to Paswan et al. (2009), there is a "strong association between service innovation, the organization's role as the innovator of the service value proposition and the customer's role as the co-creator of service value" (p. 520). Although VPs can be described as reciprocal promises co-created usually between two counter-parties, they do not always have to be limited to dyadic, two-way promises of value (Frow & Payne, 2011).

Ballantyne et al. (2011) position reciprocal VPs as a communication practice that brings exchange activities, relationship development, and knowledge renewal closer together. According to Kowalkowski (2011), the understanding of which value to emphasize and when to emphasize it in the VP process requires knowledge not only of the provider's own organizational structure and capabilities but also of the customer's organization, its value creation dynamics and purchasing practices. In addition, the nature of customer-provider interactions influences value creation potential and VP emphasis.

Service operations management emphasizes the need to bundle goods and services to customers, the ways to align operational capabilities with customer needs, focusing on performance objectives (e.g., cost, quality, delivery, and flexibility), and the configuration of operational capabilities to create and capture value (Coltman & Devinney, 2013). In service-centric operations such as KIBS, order-winning criteria are often related to the relationship shared with the customers. In service-focused operations, a VP tends to focus on the delivery of a functional result, where order-winning criteria include the feature, cost, quality conformance, and delivery of services (Baines et al., 2009, p. 505).

Voss and Hsuan (2009) illustrate that the development of innovative services prevents imitation in the short run. They further show that organizations need to develop new services in order to stay competitive, and replication of these innovative services across service families will enable service providers to gain economies of scale through customization, mix-and-matching of service offerings, and reuse. Modularity helps achieve customized service cost-effectively to offer novel and innovative customer services by combining previously unrelated capabilities and new problem-

solving approaches based on co-specialized assets (Coltman & Devinney, 2013, p. 558). Modularity will be discussed in more detail in the next chapter.

2.2 Service architecture and modularity

We look at the configuration of the resources through the lenses of modularity (c.f., Baldwin & Clark, 2000) as a concept for managing complexity (Simon, 1962) and the configuration of operational resources to formulate VPs. Modularity concerns design as well as production and use (Chung, Han & Sohn, 2012) and impact innovation within and across organizations (Bouncken, Pesch & Gudergan, 2015). A modular system is characterized by interdependencies between the modules of the system, which allows for greater flexibility while keeping down the cost of the system (Garud & Kumaraswamy, 1995; Sanchez & Mahoney, 1996). Modularity is therefore closely related to the ability to customize solutions within product architectures and, recently, within services (Voss & Hsuan, 2009; Bask, Lipponen, Rajahonka, & Tinnilä, 2010; de Blok, Meijboom, Luijkx, Schols, & Schroeder, 2014). A modular service platform including service, process, and organizational and customer interface dimensions within organizations can be used to create value in business services (Pekkarinen & Ulkuniemi, 2008). One way for a service provider to address the challenges of providing heterogeneous solutions effectively on a large scale is to design services from service architectures. Voss and Hsuan (2009) define service architecture as "the way that the functionalities of the service system are decomposed into individual functional elements to provide the overall services delivered by the system" (p. 546). Service architectures can be designed to be either modular or integral and can be conceptualized as consisting of service modules, components, and interfaces.

In order to achieve modular service architecture, the specification of interfaces is particularly important. Interfaces define how modules interact and are critical in ensuring functionality at the system level. Achieving modularity requires that interfaces are standardized to create a loosely coupled architecture enabling the recombination of modules. Standardizing the interfaces involves specifying in advance how the modules of the system will interact (Baldwin & Clark, 2000). As noted by de Blok et al. (2014), interfaces in services are different from their counterparts in manufacturing; this fact has implications for the design of service architecture. Examples of interfaces in services include planning rules, customer meetings, and organizational arrangements, and they can serve both the purposes of variety creation and of coherence in service delivery (de Blok et al., 2014).

The second important element of the service architecture is service components (e.g., resources), which can be standardized to achieve efficiency or can be uniquely designed by the service provider in order to address the specific needs of the customers. Designing unique components is an important innovation capability, but it is not the only way of achieving customization. Standardizing the interfaces of the architecture enables the recombination of standardized components as a way of creating variety. Increasing the modularity level of the architecture therefore involves standardizing components and enabling the replication of unique components across multiple service families (Voss & Hsuan, 2009). In the context of KIBS, we consider the components of the architecture to be the internal and external resources that the service provider combines in order to deliver its services. Internal resources include people and documented knowledge as well as information and communication technology (ICT) systems. For people, we distinguish between experts and novices, whereas

documentation and ICT systems can be either standardized or uniquely designed by the organization. External resources include the organization's network of suppliers.

As noted by Amara, Landry, & Doloreux (2009), "The core competence of KIBS resides in their capability to combine, in a new unique body of knowledge, codified scientific and technical knowledge, with tacit knowledge based on extensive experience" (p. 407) by identifying knowledge in an organization's external environment and transforming that knowledge into a representation that can be used by the organization (Holsapple, 2015).

Innovation is hence particularly important in the context of KIBS, and service delivery often involves solving the unique problems of individual customers. The aim of achieving innovation and efficiency simultaneously suggests the importance of modularity in the context of KIBS. This can be seen within the consulting industry, in which modularization seems to imply a shift in business models from integrated solution shops to modular providers (Christensen, Wang, & Bever, 2013).

Organisations sometimes lack the tacit knowledge necessary to perform the tasks within the process at a satisfactory level (Massingham & Holaibi, 2017). Management can play a significant role in supporting knowledge sharing (Al Saifi, Dillon & McQueen, 2016), since perceived fairness and capability of the organization's policies and practices play an important role in terms of reinforcing employees' organizational commitment (Vanhala et al., 2016). While professional services are often generated from expert-embedded and even tacit knowledge, which is hard to transfer, implementing modularity may offer one way to facilitate knowledge sharing related to service offerings, organizational processes, and practices (Nätti et al., 2017). In addition, modularity can be a way of tailoring solutions to the individual customer based on needs and capabilities (Davies et al., 2007). Modularity in essence allows the

customer to make choices of service configurations or enables the service provider to customize the solution to fit the implied needs of the customer (Voss & Hsuan, 2009).

2.3 Theory synthesis

Service providers help customers understand the superior value of their offerings through VPs (Anderson et al., 2006) and seek to manage different customer segments by using different VPs (Kowalkowski, 2011). Configuring knowledge and resources within organizations can facilitate the formulation of the right kind of VPs for different customers. We look at the configuration of the resources through the lenses of modularity (Baldwin & Clark, 2000). Delivering KIBS often involves solving unique problems of individual customers, and modularity can be a way of tailoring services to customers (Davies et al., 2007).

In figure 1 the theoretical framework of this study is presented. Figure 1 includes the key themes that will be used in analyzing the empirical data based on the theory of this study. In service modularity we consider the components of the service architecture to be the internal and external resources that the service provider configures to deliver its services. Internal resources include people (experts and novice), documented knowledge, and IT tools (standardized or uniquely designed). External resources include the network of suppliers. KIBS providers combine internal and external resources in order to deliver their services and matching VPs with the individual customer needs with different emphasis concerning quality, time and cost advantages.

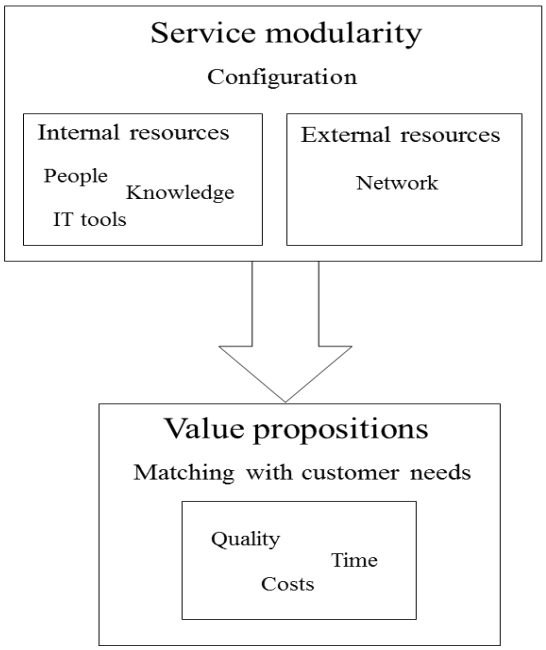

Figure 1. The role of service modularity in matching value propositions with varied customer needs.

3. Methodology

3.1 Research design

In this chapter the research design of this study is presented. The purpose of research design is to make the link between the empirical data and the research question and the conclusions transparent. We employ a multiple case study as a research strategy, since it allows cross-case analysis to be used for richer theory building, as the research phenomenon is complex (Gummesson, 2008), takes place within rich context (Johnston, Leach & Liu, 1999), and the theoretical knowledge is rather scarce (Bonoma, 1985).

As a research design, this study utilizes an exploratory case study, which is validated by the fact that there are clear gaps in the literature concerning the research question. In addition, to answer the research question, this study examines a large empirical data-set and looks for potential relations between the themes.

This study concerns one large KIBS provider, where we had 26 narrative interviews and five project cases. We used multiple sources of evidence to validate the findings

such as documentation in addition to interviewing the key informants and customer organizations concerning each project.

All of the interviewees had been involved in either planning or execution phase of the project or in both phases. We utilized also peer review and data triangulation to strengthen validity. Through a large amount of qualitative data, we show the theoretical relationships of our research phenomenon and how and why these relationships happen in real life. Through using multiple cases the findings can be generalized beyond the immediate case study.

3.2 The case organization

The case organization is a global KIBS provider offering customized engineering and consulting services to business customers and operating mainly on a project basis. The case organization manages multifaceted and complicated projects in various sectors. The services are rendered either individually or as a complete package, taking care of various technical, economic, administrative, and safety-related tasks.

As mentioned the main data consists of 26 narrative interviews that were conducted in Finland from February to May 2013. The interviews included selected representatives of the KIBS provider and its customers, 16 with the case organization and 10 representatives of four of its customers. The customers are engaged in metal, chemicals, water, and security businesses. The data is organized around five projects with different characteristics, allowing for within-case and cross-case comparisons. The perspectives of both the service provider and its customers provide complementary information concerning the phenomenon as a whole. The empirical data was also supplemented with other data sources such as meetings, observations, brochures, and workshops, which

serve as a means of "perceptual triangulation" and provide a fuller picture of the phenomenon (Bonoma, 1985; Perry, 1998).

3.3 Data collection

Narrative interviews were conducted as a primary data collection method. The interviews were conducted based on open-ended questions, since this method did not limit the interviewee responses, and it enabled the emergence of unexpected issues.

To ensure triangulation, each interview was recorded, which was used to check the notes afterwards, and more than one interviewee per case organization was interviewed. The names of the organizations as well as the interviewees were agreed to remain confidential. Table 1 summarizes the details of the narrative interviews and interviewees.

Table 1. The narrative interviews.

Role	Business type	Interviewee	Time	Duration
Service provider	KIBS (Engineering)	Head of the unit	11.2.2013	57 min
		Engineer	18.4.2013	1 h
		Manager	29.3.2013	1h 13 min
		Head of department	18.4.2013	53 min
		Engineer	18.4.2013	58 min
		Head of department	19.4.2013	40 min
		Manager	19.4.2013	47 min
		Manager	27.3.2013	56 min
		Head of department	13.3.2013	83 min
		Engineer	18.3.2013	1 h 3 min
		Engineer	18.3.2013	1h 5 min
		Manager	5.3.2013	1 h
		Engineer	6.3.2013	1 h 4 min
		Manager	11.2.2013	50 min
		Manager	13.2.2013	48 min
		Engineer	16.3.2013	57 min
Customer 1	Metal	Manager	13.5.2013	36 min
		Head of department	13.5.2013	39 min
Customer 2	Chemical	Site manager	13.3.2013	1h 1 min
		Buyer	13.3.2013	52 min
		Manager	13.3.2013	1h 20 min
Customer 3	Water	Manager	18.3.2013	37 min
		Head of organization	16.4.2013	45 min
		Engineer	19.4.2013	1h 2 min
Customer 4	Security	CEO	24.4.2013	1 h 43 min
		Manager	24.4.2013	(joint interview)

3.4 Description of the cases

The empirical data consists of five different projects conducted by the case organization with four of its customers. The projects with customer 1 and customer 2 represent unique and complex projects, while the projects with customer 3 and customer 4 are more standardized in nature. The range of projects provides the basis for a fruitful analysis to convey the most comprehensive view.

Case 1: This project concerned the construction of large underground warehouse facilities in the mine. This was a two-year project, from January 2011 to January 2013, involving 40 persons from different organizational units of the case organization.

Case 2: This project concerned building up the warehouse for rubble, concentrators, and a crushing plant in a mine. The project lasted from January 2011 until January 2013 involving 20 persons from the case organization.

Case 3: This project concerned modernizing a dam from pre-made concrete elements. The project involved three to four people from November 2011 until May 2012.

Case 4: This project concerned planning a water supply in a suburban area, and involved two persons from the case organization.

Case 5: This project concerned the renewal of pumps and the isolation of sanitary waters in an industrial area. The project took place from October 2011 to March 2013 including five smaller projects involving three persons from one unit of the case organization.

3.5 Data analysis

The analysis started by transcribing the recorded interviews, resulting in 230 pages of transcript altogether. Thereafter, the transcripts were carefully read multiple times in

order to gain good overall understanding. Next, both within-case and cross-case analysis were performed by thematic coding. Within-case and cross-case analyses were carried out simultaneously as the analysis proceeded from complex cases to simple cases. Complex cases include experienced professionals, expert knowledge, and uniquely designed IT tools. Simple cases include novices, documented knowledge, and standardized IT tools.

The themes of figure 1 guided the analysis. In within-case analysis, the five projects were divided to specific chunks of texts, which shed light on the topic under study based on the pre-determined themes. From the perspective of value propositions we were looking for risks related to costs and time, and quality dimensions. From the perspective of service modularity we were looking for themes related to people, knowledge, IT tools and network. Thereafter, the cross-case analysis helped us to identify major similarities and differences between different project cases. In the cross-case analysis, differences and similarities between the polar (complex and simple) cases were compared. By comparing extreme cases enabled examining the topic further to ensure an appropriate understanding on how modularity through configuring knowledge and resources helps to formulate value propositions matching with individual customer needs.

Next, the chain of evidence was made as transparent as possible by proving authentic quotations from the empirical data to justify the conclusions of the cross-case analysis. The codes were identified through systematic coding and the selected codes describe best the different characteristics of the polar cases. The empirical data was supplemented with the data collected from secondary sources, including web pages, brochures, meetings and workshops, which were compared with the preliminary

findings. The NVivo software was utilized to assist in organizing the empirical data. In the next chapter, the key findings are described in detail.

4. Findings

4.1 Complex projects

Case 1: The mine project (Customer 1)

This project was unique and tailored to the construction of large underground warehouse facilities in the mine. The project came through a tender. The case organization and the customer had a long-term relationship, but this was their first project in mining. This project demanded unique expertise and knowledge, since it took place in demanding conditions in addition to having safety issues, project management, and scheduling as the main challenges. The case organization needed to take into account how to supply necessary equipment to the mine and schedule everything beforehand. The project was supported with complex IT tools, since everything needed to proceed logically; many tasks could not be done simultaneously. The case organization emphasized IT tools in internal knowledge transfer and making tacit knowledge more explicit.

"First we do pre-study for the project to provide some estimate of the costs, so that the customer knows roughly how much the project will cost, and then can make a decision that we proceed to the implementation of the project" *Head of department*

This project was expensive, but the customer was satisfied with the quality, and everything was done on schedule. Reasons for the technical successes were good project management, communication and cooperation, and weekly meetings ensured that everyone shared the same understanding of the project. Another reason was that the service provider had know-how on how to successfully configure knowledge and resources (service modules) in its internal (different units) and external networks.

"We can offer [a] wide variety of services to the customer and we can take care of everything, so that the customer only has to contact one person and we can take care of everything after that." *Manager*

In this project service modularity helped to formulate value proposition that matched with individual customer needs and enabled the provider to win the tender. This project demanded unique expertise and knowledge from the case organization's different units. The internal modules included the different experts, units, organizational routines, and IT tools of the case organization. External resources included the constructor and other actors in the network of the case organization. Interfaces where these internal and external modules (resources) could be configured lay at the project management level and between different modules. Although the project was expensive, the provider met time limits and quality expectations of the customer concerning its value propositions.

Case 2: The concentrator project (Customer 1)

This complex project came through as a tender. The case organization was not involved in the construction phase, but it planned the project and provided consulting and support when needed. The complexity of this project involved a combination of many issues. For example, the service provider needed to be ready 24 hours a day to pick up the phone in case of an alarm; if there were 200 men working during the night and things went wrong, there would be huge losses per hour.

"In the early phase there is much more planning and design, but when the project is further along it is more about making changes, problem solving and negotiating." *Engineer*

Delays were avoided due to the huge financial risks. The schedule was very tight, and there were some small problems with the delivery times of elements. The project barely stayed on schedule, but the customer was satisfied with the quality. Knowledge sharing was emphasized in the project through constant planning meetings and interactions with the customer. The customer emphasized that successful cooperation created a good basis for planning future projects with the service provider. Organization and person

related references also played a huge role. If personnel with references were changed, it would make selling the project much more difficult.

"[The] project manager needs to take care of the entity. In planning everyone cannot begin simultaneously, it is rather a process where you need information from another. And that process needs to go logically. --- Internal processes need to be fit. Everyone needs to understand his/her own role in the process. --- Trust is most important between us and the customer and inside our organization. *Service provider*

In this project service modularity helped to formulate value proposition that matched with individual customer needs and enabled the provider to win the tender. This project demanded unique expertise and knowledge from the case organization's different units. This project included risk of huge financial losses and the schedule was very tight. The project barely stayed on schedule, but the customer was satisfied with the quality through project management, cooperation and knowledge transfer and utilizing service modularity in formulating and executing its value proposition.

Case 3: The dam project (Customer 2)

The project was awarded to the service provider through personal connections due to the long-term relationship it shared with Customer 2. This project was expensive, and there were huge financial risks in case of delay or failure. Therefore, the selection of a good constructor was important, and this was decided by the customer. The customer knew and trusted the contractor because of its experience, and the constructor knew the circumstances of this site very well. They had done similar projects before and had the right kind of equipment.

"The module is the person and the modular cost is the unit price. --- Our projects aren't that big that it would be beneficial for us to have competitive biddings, it is easier to take the familiar organization with familiar persons who can get into their work quickly --- And with familiar persons we know their reputation and it is quite safe. --- In addition to trust, although they (the case organization) have a little more expensive hour prices, we believe that we save that amount in time." *Customer 2*

Because of the tight schedule, the service provider used pre-made concrete elements, which caused challenges concerning logistics, storage and timing. A few weeks before

the 14-day shutdown of water in the dam, the service provider had a meeting with the customer and the constructor where they went through all the issues including safety, schedule, supply of equipment, and unexpected issues and checked who did what, in which order and with which equipment. The constructor worked 24 hours a day during the shutdown. The service provider monitored the work, and the customer monitored safety issues such as safety fences, lifting elements, etc. The project stayed on schedule and on budget, and the customer was satisfied. The project succeeded because of good planning, the anticipation of risks, the choice of a good constructor, and good cooperation internally and between the constructor and the customer; there were no uncontrollable surprises such as heavy rains. Efforts and time in planning enabled an innovative solution concerning the implementation of this project.

"We try to be as close to the customer as we can and know their processes and needs and that's why we are involved pretty often in their big investments, it isn't that complicated business idea. We can offer broad scale of offerings since we have broad network, we recognize the needs and we know where we can get help providing it. We can give the service offering to the customer on a tray." *Head of the unit*

In this project long-term relationship and ability to implement its value propositions according to customer needs, and enabled the provider to be awarded with the project. Modularity enabled combining resources such as specific knowledge. In complex cases, references and reputation were essential. On the other hand, if the project failed, there would be a risk that the relationship with the customer could end. Putting effort into a long-term relationship is crucial in order to be awarded a stream of projects.

4.2 Simple projects

Case 4: The water supply project (Customer 3)

This project concerned planning a water supply in a suburban area. The service provider got the project by winning the tender. It planned the project, but it was not involved in the construction phase.

"If an organization can cooperate well and have information tools to enable the work, it (the project) goes well and at its best we get the most competent persons to work for us no matter from which organizations they come." *Customer 3*

Although the project was a success, the challenges came from the industrial context and from the project's large size. There were some misunderstandings concerning defining the content of the project and the amount of extra work. However, the customer was satisfied with the quality of cooperation.

"About value propositions, when we go and present our excellence to the customers --- it is good to ask, what the benefit is for the customer since they can get it (service) anywhere. --- To sense the customer's needs, that is the challenge. That is the added value because --- we cannot compete with price against small actors." *Head of the unit*

In this project service modularity helped to formulate value proposition that matched with individual customer needs and enabled the provider to win the tender. The water supply project was a simple project and demanded more standardized knowledge and expertise. The challenges in this project came from the industrial context and from the project's large size. The customer was satisfied with the project, and especially the quality of cooperation helped the provider to implement its value proposition.

Case 5: The waste water project (Customer 4)

This project concerned the renewal of pumps and the isolation of sanitary waters in an industrial area. Customer 4 was a new customer, but the project came through personal contacts. In terms of people expertise, this project did not demand expert knowledge. However, the customer expected that the service provider had the basic knowledge of the most critical issues prioritized by the customer.

"Certain issues you need to decide quite fast and sometimes with incomplete information. It requires certain competence and courage to say face-to-face opinion with incomplete information. --- Because we trust that they know their field better than us. That's why we use them or any organization to tell us their view so that we can make informed decision why we want certain issue to be done certain way." *Customer 4*

The special features of the industrial context and safety issues needed to be taken into account in planning. The overall customer experience was positive despite of a few misunderstandings concerning invoicing and communication.

"It is difficult, because certain persons are involved in different projects and when we get a new project, we need to find another person. --- The customer might get frustrated if a service providing organization always sends a new person who doesn't know anything and the customer has to tell everything from scratch." *Head of department*

In this project the provider to be awarded with the project through personal relationships, which increased the customer's trust in the provider's ability to implement its value proposition. The customer was satisfied especially the quality of planning and having know-how on industrial context and its requirement, which helped the provider to implement its value proposition. In both the complex and simple projects, having previous successful projects allowed the stream of future projects in most cases. Although the case organization had higher prices than those of competitors, the customers recognized that the costs did not come from prices but from hours worked. Good references and reputation increased trust and mattered in both the complex and standard cases. Marketing was more emphasized in the case of the simple projects.

4.3 Synthesis of the analysis

The complex cases (cases 1–3) emphasized interfaces such as people and knowledge and skills. The simple cases (cases 4 and 5) emphasized more standardized modules and the importance of processes. When it came to value propositions, complex projects seemed to emphasize more quality and time, whereas simple projects seemed to emphasize cost advantages.

Case 1 came through a tender. This project demanded unique expertise and everything needed to be scheduled beforehand. The project was supported with complex

IT tools in internal knowledge transfer and making tacit knowledge more explicit. The customer was satisfied with the quality, and everything was done on schedule. Reasons for the success were good project management, communication, and know-how on how to successfully configure knowledge and resources (service modules) in its internal (different units) and external networks.

Case 2 also came through as a tender. There was risk of huge financial losses due to very tight schedule. The project barely stayed on schedule, but the customer was satisfied with the quality. Knowledge sharing was emphasized in the project through constant planning meetings and interaction with the customer. The role of internal knowledge sharing was emphasized in both of these complex projects.

Case 3 was awarded to the service provider through personal connections. There were huge financial risks in case of delay or failure. The project stayed on schedule and on budget, and the customer was satisfied. The project succeeded because of good planning and communication, the anticipation of risks, and the choice of a good constructor. Similar to other complex projects, trust and long-term relationships were emphasized. In complex cases, references and reputation were essential.

Case 4 came through a tender. Although the project was a success, the challenges came from the industrial context and from the project's large size. The customer was satisfied with the quality of cooperation. The water supply project was a simple project and demanded more standardized knowledge and expertise.

Case 5 came through personal contacts. The project demanded more standardized knowledge and expertise. The special features of the industrial context and safety issues needed to be taken into account in planning. The overall customer experience was positive.

5. Discussion

According to the findings of this study, configuring knowledge as well as internal and external (i.e., network) resources helped to formulate the right kind of value propositions for different customers, which helps to create a sustainable competitive advantage.

The selected polar projects were different in many ways, but they still share similarities both within the complex projects and within the simple projects. The case organization actively configured its internal and external resources (i.e., its network) to formulate value propositions matching with individual customer needs. Table 2 summarizes our analysis of the five cases.

Table 2. Results of the analysis.

Key concepts	**Value propositions**			**Service modularity**			
Themes in analysis	Costs	Time	Quality	People	Knowledge	IT tools	Network
Case 1		X	X		X		
Case 2		X	X		X		
Case 3		X	X	X	X		X
Case 4	X					X	
Case 5	X			X		X	

In service modularity we consider the components of the service architecture to be the internal and external resources that the service provider configures to deliver its services. Internal resources include people (experts and novice), documented knowledge, and IT tools (standardized or uniquely designed). External resources include the network of suppliers. KIBS providers combine internal and external resources in order to deliver their services and matching VPs with the individual customer needs with different emphasis concerning quality, time and cost advantages. Interfaces where these internal and external modules (resources) could be configured lay at the project management level and between different modules.

The complex cases (cases 1–3) emphasized interfaces such as people and knowledge and skills. The simple cases (cases 4 and 5) emphasized more standardized modules and the importance of processes. When it came to value propositions, complex projects seemed to emphasize more quality and time, whereas simple projects seemed to emphasize cost advantages. Good references and reputation increased trust and mattered in both the complex and standard cases. Marketing was more emphasized in the case of the simple projects.

Managing interfaces and configuring knowledge also increased organizational effectiveness through modular services. Our findings also indicate the importance of knowledge management and knowledge transfer in the organization, where the unique tacit knowledge of experienced experts could be made more explicit modules, for instance, through various IT tools and mentoring, which makes the configuring of different knowledge and resource modules much easier.

As a complex project requires a great deal of know-how, there is a constant pressure to stay on schedule. In a more standard project, complexity comes from taking everything into account such as the size and the specific rules and requirements of the industrial area. Our findings indicate that features that the customer valued the most from the KIBS provider's VPs were commitment, customer-orientation, interaction, planning know-how, and technical implementation, but also location, neutrality in terms of competition, and the overall concept of the service provider. In complex projects, it is important to emphasize perceived service quality and reducing perception of potential risks related to time savings in VPs, whereas in simple projects, emphasizing reducing perception of potential risks related to cost advantages is more important.

According to our findings, in the case of new customers, it is crucial to find out whether the customer was satisfied and whether the service provider understood what

the customer wanted. Our findings indicate that no matter how complex or simple a project was, it was necessary to take care of marketing and sales and to make appointments with the customers. It was also crucial to articulate the VP to the customers in addition to having successful projects and good references.

Our findings revealed that customers were involved in the creation of services mostly in the early phase. The service provider managed the rest of the value creation process after gaining enough knowledge about the project, and it took care of configuring the knowledge and resources for the project. The service providing organization wanted to act as an orchestrator of knowledge and resources by playing an intermediary role in configuring resources from different units of the service provider's organization and contractors. Modularity itself was quite invisible to the customers, who noticed modularity only in the service provider's ability to deliver a large number of services tailored to fit their needs. Categorizing stakeholders can help identify more clearly the network of important interconnecting relationships.

Providers offering engineering consulting, for instance, can play a key role in shaping value co-creation by drawing on their extensive knowledge and resources in assisting their customers in developing advanced services. While developing services that address the complexities facing their customers, KIBS providers simultaneously have to manage the challenges of such complexities. Addressing complex challenges typically requires the potential for customization according to individual customer needs. In achieving such customization, KIBS providers face the dilemma of investing in capabilities that allow them to quickly identify needs and develop new knowledge or to efficiently package and recombine existing knowledge to meet the needs of individual customers.

The role of the service provider is to serve as a value facilitator. By providing customers with value-facilitating goods and services, the service provider is indirectly involved in the customers' value creation. Proactive dialogue can increase a customer's willingness to engage in future collaboration with the provider, which fosters the future awareness of opportunities for formulating value propositions matching with individual customer needs.

6. Theoretical and managerial implications, limitation and future research

Our study adds to the knowledge on how VPs can be formulated through configuration of knowledge and resources to satisfy demanding business customers. The importance of the co-creation of value has been emphasized (Smith et al., 2014), and service modularity could promote this by enabling customization by customers (Pekkarinen & Ulkuniemi, 2008; Bask et al., 2010). However, we found that customization in the configuration of services was primarily done by the provider, based on experiences and sensing of the customers' specific problems. The service provider utilized the modular architecture to configure resources to construct VPs through which customers were persuaded of the service provider's reliability for ensuring efficient delivery.

The literature on SDL makes a valid point by emphasizing the role of the customer in the co-creation of value (Vargo & Lusch, 2008). While maintaining that value is co-created, this paper attempts to add to the literature by pointing toward the important role of the provider in configuring resources and knowledge to formulate VPs. While the customer is involved in the process, importantly, much of the configuration occurs on the provider side, with an emphasis on sensing customer requirements and efficiently matching these with the provider's own resources.

The paper brings context-specific knowledge not only from a provider's perspective, but it includes customers across five projects through which we show the process of combining resources and knowledge, and how the role of the modularity of these depends on the nature of the project.

The generalizability and representativeness of the empirical data might be limited by the fact that the empirical data was collected in one country making it difficult to generalize the findings to other geographical contexts. In addition, collecting empirical data only from an engineering service provider and its customers create similar challenges concerning generalizability and representativeness.

Further studies should be conducted in different fields of KIBS or completely other service or manufacturing sectors or B-to-C markets to extract differences and similarities with respect to the topic.

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