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Innovative capabilities in international professional service firms:
enabling trade-offs between past, present, and future service provision

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**INNOVATIVE CAPABILITIES IN INTERNATIONAL PROFESSIONAL SERVICE
FIRMS: ENABLING TRADE-OFFS BETWEEN PAST, PRESENT AND FUTURE
SERVICE PROVISION**

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ABSTRACT

This study examines the relationship between service provision and innovation in international professional service firms (IPSFs). Through an extended study in one IPSF, we find that innovation stems from the provision of services in the past and present. Different service provisions offer different learning opportunities which influence the modification, renewal, and creation of service concepts, service processes, technologies, and relationships. In order to take advantage of the learning opportunities, certain operational and dynamics capabilities are identified as important. With regard to operational capabilities, *understanding customer needs*, *internal learning*, *formalization*, *external and relational learning*, *integration*, and *commercialization* are identified as important capabilities. Further, two dynamic capabilities driving innovation are identified: *learning and knowledge accumulation* and *scaling and expanding the service portfolio*. The learning and knowledge accumulation capability is grounded in the efficient provision of standardized-provided services. By providing these services, insights into customer's needs are gained, specialized expertise is developed, and reputation and legitimacy for solving novel and complex problems increase. The scaling and expanding capability enables the IPSF to develop customized-co-produced services into standardized-provided services over time with global outreach. Our study shows that careful management of the service portfolio is of utmost strategic importance for the sustainable competitive advantage of IPSFs.

INTRODUCTION

This study explores the relationship between service provision and innovation in international professional service firms (IPSFs). The globalization of professional service firms (PSFs) has increased in recent years (Brock and Powell 2005; Faulconbridge 2008; Muzio and Faulconbridge 2013; Segal-Horn and Dean 2007; Winch 2008; Winch 2014). Despite PSFs' increasing importance in the global economy, there is little understanding of how these firms innovate. For instance, Tether and Tajer (2008) investigated modes of innovation that dominate in different industries. For large financial and business services—which belongs to the IPSF category—relatively little (21 per cent) variance in innovation could be explained by the specified innovation modes (i.e. product-research, process-technologies, and organizational-cooperation). In other words, 79 per cent of the innovation did not fit into any of these modes. Further, Brady and Davies (2004) expose how capabilities are built based on learning and experience accumulated from past and current projects, and how this learning may influence economies of repetition and the development of new business lines in project-based organizations. However, they do not reveal the antecedents of this learning, and the capabilities leveraging the learning are only studied in relation to development of new lines of businesses (Brady and Davies 2004; Davies and Brady 2000).

Professional services belong to the business service sector (Von Nordenflycht 2010). Current studies of business service innovation identify that most innovation stems from the everyday service provision and is accumulated through “learning-by-doing” (e.g. Brady and Davies 2004; Davies and Brady 2000; Grabher 2004; Lyons, Chatman, and Joyce 2007; Løwendahl, Revang, and Fosstenløykken 2001; Starbuck 1992). Amara, Landry, and Doloreux

(2009) therefore suggest that attention should be paid to the use of knowledge embedded in daily service provision. Further, external actors such as clients and partners co-produce the services together with the service provider (e.g. Bettencourt, Ostrom, Brown, and Roundtree 2002; Chen, Tsou, and Huang 2009; Harris and Ogbonna 2008; Skjølsvik, Løwendahl, Kvålshaugen, and Fosstenløyken 2007; Toivonen and Tuominen 2009), and services and service technologies are often modified, created, and extended in the service provision process. This is described as an ad-hoc mode of innovation (Vence and Trigo 2009). However, current knowledge on business service innovation has not revealed the relationship between service provision types and innovation antecedents. We have also incomplete understanding of the capabilities needed to leverage learning and experiences accumulated in everyday project work. Although we understand the strategic, organizational, and managerial issues of IPSFs, we still lack knowledge about how these firms innovate. Hence, we have two research questions for this study. How do activities in different types of services contribute to innovation in IPSFs? And, what capabilities leverage innovation in these firms?

The point of departure is theorizing how IPSFs operate and develop (e.g. Breunig, Kvålshaugen, and Hydle 2014; Brock, Powell, and Hinings 2007; Brock 2012; Faulconbridge 2006, 2008; Gardner, Anand, and Morris 2008; Hitt, Bierman, Uhlenbruck, and Shimizu 2006; Muzio and Faulconbridge 2013; Segal-Horn and Dean 2011; Winch 2008). In order to understand how learning accumulated from everyday service provision is leveraged into innovations, we build on the capability literature (e.g. Brady and Davies 2004; Davies and Brady 2000; Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece, and Winter 2007; Helfat and Peteraf 2009; Helfat and Winter 2011; Teece 2007). Through an extensive 7-year study of one IPSF,

Verco (a pseudonym), we had unusual research access that enabled us to observe the relationship between service provision and innovation over time.

This study has two contributions. First, we expose that different types of service provision entail different sources of innovation. Second, we expose the dynamics within and between the different service types and identify capabilities that leverage and drive innovation in IPSFs. We identify six operational capabilities: understanding customer needs, formalization, internal learning, external and relational learning, integration, and commercialization capabilities, and two dynamic capabilities: the capability for learning and knowledge accumulation and the capability for scaling and expanding the service portfolio. Our study shows that careful management of the service portfolio is of utmost strategic importance for the sustainable competitive advantage of IPSFs.

INNOVATION IN PROFESSIONAL SERVICE FIRMS

Gronroos explains that services are “processes consisting of a series of activities where a number of different types of resources are used in direct interaction with a customer, so that a solution is found to a customer’s problem” (2000: 48). Innovation in relation to services is thus introducing new activities or performing the activities differently so that these activities change existing services, introduce new services (service concepts), or change the way services are provided (change and development of the customer interface, service provision systems, and service technologies) (Den Hertog 2000; Miles 2008). Thus, innovation in IPSFs include product, process, delivery, market, and organization innovations (e.g. Amara et al. 2009; Miles 2004; Tether and Tajar 2008). The innovation process is mainly characterized as a search-and-

learning process (Sundbo 1997), and is dominated by an ad-hoc mode of innovation (Vence and Trigo 2009). Thus, the operations of IPSFs influence how they innovate. Factors such as co-creation, knowledge from customers, global knowledge sourcing, innovation partnerships and technological development (OECD 2009) have been identified as drivers of business service innovation.

The nature of innovation in IPSFs

The changing nature of PSFs is driven by institutional forces such as industry regulations, technological developments, and increased globalization (Brock and Powell 2005; Brock 2006; Brock 2012; Greenwood and Empson 2003; Kipping and Kirkpatrick 2013) which offer new opportunities for search and learning processes in IPSFs. For instance, by pursuing a transnational strategy, IPSFs get opportunities for global knowledge sourcing, and technological innovations through providing globally integrated services (Breunig et al. 2014; Muzio and Faulconbridge 2013; Segal-Horn and Dean 2011). The strategies IPSFs pursue for internationalization vary. Identified growth strategies are following current customers to new markets (Brock and Powell 2005; Contractor, Kundu, and Chin-Chun 2003; Segal-Horn and Dean 2007; Spar 1997; Winch 2008), bidding for international contracts (Winch 2008; Winch 2014), and expanding into new markets through mergers and acquisitions (Aronsen 2007; Muzio and Faulconbridge 2013). These strategies provide opportunities for co-creation and developing international partnerships, and thus enable innovation in IPSFs (Brady and Davies 2004; Davies and Brady 2000; Hitt et al. 2006).

Further, IPSFs have a portfolio of services (Breunig et al. 2014; Brock and Powell 2005; Faulconbridge 2006; Morgan and Quack 2005; Muzio and Faulconbridge 2013; Segal-Horn and Dean 2011), which provide various sources for learning that may lead to different types of idea generation and innovation. Two dimensions are often used to explain the variety of business services: *the degree of customization* and *the degree of customer interaction* in the provision of services (e.g. Consoli and Elche-Hortelano 2010; Hansen, Nohria, and Tierney 1999; Larsson and Bowen 1989; Løwendahl 1997; Maister 1993; Ramírez 1999; Schmenner 1986). The degree of customization influences the extent to which the service can be codified and delivered independently of specific people and locations (Hansen et al. 1999; Løwendahl 1997; Maister 1993). Customization means that the provided service meets a customer's specific needs. The method of standardization is used to reduce or eliminate customized, one-time, and seldom-used processes that introduce variability while potentially adding costs and quality problems. The degree of customization influences the nature of the service concept—namely, the extent to which professional services can be commoditized (Hansen et al. 1999). The degree of customization also influences the service provision by determining both the extent to which production and consumption occur simultaneously as well as the customer's ability to assess service quality before delivery (Løwendahl 1997; Maister 1993).

The degree of customer interaction is related to how involved the customer is in the service provision. According to the literature, the quality of services is evaluated in the “moment of truth” (Normann 1984), and services are co-produced by the customer and the service provider (Amara et al. 2009; Bettencourt et al. 2002; Ordanini and Pasini 2008). This explanation, however, is a simplified picture of service provision (Breunig et al. 2014).

Sometimes, services are created in collaboration with the customer, and the consumption and provision go hand-in-hand. Other times, the customer is not involved in the service production at all. In such cases, the service provider receives orders from the customer and delivers the requested output. Ramírez (1999) outlined different types of customer interactions: (i) sequential value creation, in which one task is performed after the other; (ii) sequential value creation with feedback loops (e.g. module-based orders, measurement-based orders, and tailor-made orders); (iii) simultaneous presence, in which the service is made with the customer, or the customer participates in the value-creation process; and (iv) intermediary presence, in which one provider serves as an intermediary between two parties. All of these forms of customer interaction are observed in professional service provision (e.g. Amara et al. 2009; Breunig et al. 2014). However, there is currently no coherent and jointly established understanding of the varieties of professional services in the existing literature. Given that IPSFs have a portfolio of services, we explore variations in service provision activities across types of services and their influence on innovation in IPSFs.

Innovation activities and capabilities

Davies and Brady (2000) identify that learning and integration capabilities are important when a project-based organization wants to expand into new areas of business. These capabilities enable linkages between different learning paths and levels (strategic, project, and function) of the organization. Further, the business-like governance structure and formal networks of these firms may enable the diffusion of innovations developed in one part of the company to another (Brock et al. 2007; Brock 2012; Faulconbridge, Beaverstock, Muzio, and Taylor 2008; Segal-

Horn and Dean 2011). In order to enable such transfer, certain types of capabilities need to be present (Brock 2012).

The practice perspective (Schatzki, Knorr Cetina, and Von Savigny 2001) is helpful in identifying the activities comprising the service provision. Schatzki (2012) underlines that human activities are not predetermined, but that activities have new starts and directions that may be unexpected. These changes in directions or new starts of activities are what we identify as innovation in the service provision. The practice perspective's emphasis on work level activities is particularly helpful in linking individual performance to organizational level change and capabilities (Smets, Morris, and Greenwood 2012). The activities comprise practices, and these practices form constellations, which together expose the capabilities involved. We explore how services and service processes are developed, renewed and changed through the constellations of altered or new practices. The enablers of innovation are various capabilities.

We base our understanding of operational and dynamic capabilities in the capability literature (Helfat et al. 2007; Helfat and Peteraf 2009; Helfat and Winter 2011; Teece, Pisano, and Shuen 1997). Capabilities in general are understood as a firm's abilities to integrate, build and reconfigure internal assets and competencies so that they are able to perform distinctive activities (Teece, Pisano & Shuen, 1997). Operational capabilities are understood as the capacities that enable "a firm to perform an activity on an on-going basis using more or less the same techniques on the same scale to support existing products and services for the same customer population" (Helfat and Winter 2011: 1244). "A dynamic capability is the capacity of an organization to purposefully create, extend, or modify its resource base" (Helfat et al. 2007: 4).

Thus, capabilities may enhance both renewal (exploration) and modification (exploitation) of service concepts, customer interfaces, service provision systems, and service technologies.

Operational and dynamic capabilities are linked to how services provided in the past and present influence the services that will be provided in the future (Kaplan and Orlikowski 2013; Løwendahl et al. 2001; Pavitt 1984; Skjølsvik et al. 2007). To leverage the learning accumulated from previous and current service provision, IPSFs need particular types of operational and dynamic capabilities. The capability literature, however, identifies that it is difficult to distinguish between operational and dynamic capabilities as change always is occurring to some extent (Helfat and Winter 2011). Thus, we investigate both operational and dynamic capabilities in our study. By focusing on the everyday activities forming the service provision, the operational capabilities from the constellations of practices will be exposed. Further, by identifying the modification, renewal and changes amid the activities, the dynamic capabilities will be exposed.

RESEARCH DESIGN AND METHODOLOGY

Our aim is to contribute to theory development on the relationship between service provision and innovation in IPSFs by identifying service provision activities contributing to innovation and identification of the capabilities enabling innovation.

Case selection

We conducted an in-depth study of innovation in one IPSF – Verco. The case firm was selected based on several criteria. First, the firm had to be an IPSF. Verco is an international

engineering service firm that provides expert engineering and technical services in a multinational context. Head-quartered in Norway, Verco has 300 offices in 100 countries with approximately 9,000 employees representing about 85 nationalities. The firm provides classification and consulting services to companies associated with the energy, maritime, healthcare, and food industries. Verco's vision is to "make the world safer" by applying expert knowledge, mostly from engineering professionals, to help reduce risk and "safeguard life, property, and the environment" (Verco's Annual Report 2011). Verco's customers request high-quality services wherever the customer is located or moving to. The firm renders services through collaborations among experts embedded within the social and physical environments of several locations.

Second, the IPSF we chose had to be successful in renewing its business over time, i.e. have relevant innovative capabilities. Verco experiences fierce competition in its markets. However, the firm has been in business for more than 150 years, providing international services almost from the start. Over time, Verco has shown stable economic performance and has developed and renewed its services internationally. When oil and gas production started in Norway in the late 1960s, Verco began to offer safety services to the oil and gas industry. Today, this service provision is one of Verco's major business areas.

Third, the IPSF we chose should provide a wide spectrum of services, ranging from standardized to customized and various degrees of customer interaction. Many of these services should be both within the same category and across categories. This pre-requisite is needed so that we can apply a replication logic among similar types of services (Eisenhardt and Graebner 2007). For instance, for its customers in the maritime industry, Verco provides classification

services related to ships and mobile offshore units; certification services for materials and components, technical, safety, and business risk; environmental advisory services; training and competence-related services; and software.

Fourth, as we were primarily interested in the relationship between innovation and the firm's everyday activities in service provision, we wanted to rule out the possibility that exogenous factors caused a need for innovation. Therefore, we investigated a period in which the firm's organizational structure, performance, and management were stable, and there were no major external phenomena, such as large acquisitions, to explain why innovation occurred.

Data collection

Data were collected from 2003 to 2011 through several studies within the case firm. We began our study in 2003 by becoming familiar with the research setting. We had a few interviews and discussions with management with a broad focus (Alvesson and Kärreman 2007). The overall focus was on the development of effective and efficient service provision within the organization. We studied service provision, knowledge sharing, underlying processes and procedures, learning, innovation, management, and ICT use. We employed a mixed-methods approach (Denzin 1970) consisting of interviews, document and report studies, and participant observations at the firm. A data collection overview is found in Appendix 1. When studying service provision, we enquired into the activities performed, the tools used, the types of problems professionals solve, the actors involved in the various types of services, and the actors' interaction. As innovation in business services is a cumulative process, it is important to relate past happenings with those of the future (e.g. Chen et al. 2009; Kaplan and Orlikowski 2013;

Pavitt 1984; Vence and Trigo 2009). For this reason, we followed Verco over time (Pettigrew 1990). Thus, we assumed that identifying the types of provided services would be an intermediate step of theory development for understanding innovation in IPSFs.

We interviewed and observed employees with different roles in the service provision, including senior engineers (providing services with customer contact), junior engineers (providing services with mentoring from senior engineers and managers), project managers (in charge of large customer projects), administrative personnel (involved with project administration), headquarters' top management (involved in global strategic projects and operations), and regional managers (involved in regional and local decision making). To mitigate the risk of proximity to the data (Johnson, Langley, and Whittington 2007) we focused on multiple data sources, multiple researchers, multiple methods, and reflexivity (Alvesson and Sköldbberg 2000). At least two researchers conducted the interviews, collected documents, and observed meetings. Other researchers who did not participate in the primary data collection were involved as discussion partners in the interpretation of data, thus providing an outsider's view.

Coding and analysis

Engaging with the empirical material and extant research helped us frame our findings resulting in the research questions that emerged over time. Our research process is in line with “mystery construction”, understood as abductive theory development, consisting of applying a theory, being surprised by the empirical phenomena, and articulating a new theory to resolve the surprise—addressed through reflexivity, sensitive constructions, and interpretive repertoires (Alvesson and Kärreman 2007: 1269).

We progressed our data analysis in several stages. First, we wrote case stories every 6 months, employing the thick description mode of analysis (Geertz 1973). We conducted presentations of the case stories to top management and different groups at Verco to validate the data's veracity and to enhance the trustworthiness of the analysis (Lincoln and Guba 1985). Next, we imported the data into NVivo for coding. Specifically, we looked at the different types of services provided, iterating among in-depth analyses between the empirical material and theory (Alvesson and Kärreman 2007). Following Alvesson and Kärreman (2007), our empirical findings led to surprises and puzzles in relation to existing theory and our understanding, driving further analysis and theorizing (Agar 1996). Surprises and puzzles are important since they lead to breakdowns in current understanding when empirical findings cannot be explained by existing theory (Alvesson and Kärreman 2007: 1270).

The first puzzle involved the theory that one type of service provision dominates in a PSF (Hansen et al. 1999; Løwendahl 1997; Maister 1993). We identified many different service types of equal importance, ranging from very standardized to highly customized, within the firm. Using the existing theoretical understanding of degree of customization and customer interaction, we identified four generic types of services which we labelled as standardized-provided, standardized-co-produced, customized-provided, and customized-co-produced (Figure 1).

Insert Figure 1 here

We encountered a second puzzle when observing which activities influenced how IPSFs innovate. As shown in Figure 2, we identified the *sources* of and the *activities* leading to innovation (first-order categories), the *operational capabilities* that enabled the firm to take advantage of these innovative ideas (second-order themes), and the *context* for innovation (aggregate dimensions) in the different service provision types. This was done by comparing information from multiple professionals over time and from different locations (Glaser and Strauss 1967). We coded the professionals' explanations of innovative learning sources from everyday activities in service provision in their words as first-order categories (Nag, Corley, and Gioia 2007). The operational capabilities that enable Verco to take advantage of innovative ideas were researcher-induced concepts that we labelled second-order themes (Nag et al. 2007). These second-order themes also used the labels from some of the professionals, however these represent emerging theoretical concepts that are more abstract than first-order categories. The second-order themes were assembled in overarching dimensions to gain a theoretical framework that linked the professionals' explanations of how they performed service innovation (see Figure 2 and Appendix 2 for representative quotes).

A third puzzle was related to the dynamics within and between the different service types in relation to the life cycle of service provision. In Verco, we observed that the service provision life cycle for learning and knowledge accumulation went in the opposite direction than previously identified (Maister 1993; Mintzberg, Otis, Shamis, and Waters 1988; Winch and Schneider 1993). We identified a second dynamic capability, scaling and expanding the service portfolio, which developed in the same way as the current theory on PSFs suggests—namely, from expertise via experience to efficiency.

Finally, we presented and discussed the coding schemes, results, and conceptual framework with three panels of executives working with innovation in business services. These panels were organized explicitly for this study. The goal of this step was to provide validation by allowing outsiders to go through the data and challenge the emerging themes and codes. The final framework was presented and discussed with management at Verco to ensure that our coding and interpretation fit their understanding of innovation in the firm.

TYPES OF SERVICE PROVISION AND INNOVATION IN IPSFS

Based on the two categories described in the theory section (degrees of customization and customer interaction), we classified service provision in the case firm into four types: standardized-provided, standardized-co-produced, customized-provided, and customized-co-produced (Figure 1). Within each of the four service types, innovation emerged from different sources (inside/outside the organization) and certain capabilities were more accentuated within each service type in relation to the other types of service provision (Figure 2). These findings are explained below.

Insert Figure 2 here

Standardized-provided services

Standardized-provided services involve little customer interaction. They are adaptations of ready-made solutions that fit customer specifications. Much of the content and sequence of the work activities are predetermined, and the methods and processes are highly developed. Coordination may be substantial because of dependencies among sets of standardized activities (e.g. among various steps in the testing and certification of electronics equipment). Services of this type are most similar to traditional manufacturing services with well-known programmatic approaches to solving problems. The types of problems or challenges and the types of methods employed to solve problems are clear. The service provision is standardized, and the outcome is known and defined before the service is provided.

One example of standardized-provided services in Verco is their classification service for ships and offshore installations. Classification is a comprehensive verification service in which a unit is verified to meet a set of requirements (e.g. rules and standards established by a classification society) during its design, construction, and operation. The classification process generally entails three steps: (i) setting standards (classification rules), (ii) verifying compliance with standards, and (iii) documenting compliance with standards. The classification service needs to be standardized because ships and offshore installations are inspected at given intervals over time and by many people. In addition, a well-functioning document system is of major importance when providing the classification service since it is important to document the status of the ship/offshore installation at various time periods. This documentation is also important for Verco because they are liable if the inspection should have revealed deficits that lead to accidents.

An external source of innovation in standardized-provided services is the development of new standards and requirements. An example from our case firm concerns the new requirements with regard to CO₂ emissions for ships. These requirements led Verco to develop a new classification service for ships, using liquefied natural gas (LNG) as fuel. Safety inspections for this type of ship differ from those for ships that use crude oil as fuel. Importantly, Verco was involved in developing this new standard.

The case firm has invested substantially in the development of advanced ICT systems to support and ensure the standardization of provided services. Verco's main ICT system, called Vercolus, stores all available information about the ships and offshore installations being classified. Verco prioritizes the streamlining of service provision and the sharing of established work practices across the organization for standardized-provided services. These capabilities ensure that services of the same quality are provided at different locations. For instance, Verco has checklists of the different rules and standards which its surveyors use when (re)classifying ships and offshore installations. Furthermore, Verco makes major investments in professional training to ensure that its employees have similar levels of knowledge and deliver services according to standardized procedures. Verco developed an online training program called Verco's Survey Simulator to ensure that all of its surveyors perform the classification service in the same manner. Thus, in standardized-provided services, the service provider's internal organization is the main source behind innovation. The innovative activities are connected to the firm's efforts to renew and streamline service processes, to develop working methods and support ICT systems, and to train personnel. As such, innovations mainly take place in the service technologies and processes.

Standardized–co-produced services

Standardized–co-produced services involve high degrees of customer interaction and standardization. When providing such services, the service provider emphasizes understanding and helping particular customer groups. Rather than focusing on professional competences, the firm mostly considers its target customer groups and the scopes of services offered. Although the knowledge used to provide the service may be quite standardized, the value added for the customer is that the service provider knows the customer's company very well and has strong personal relationships with its personnel. Customer interactions mostly occur at the beginning and end of the service process. Service provision is often conducted as a predefined process; the outcome is usually known and pre-defined, but the specific problem is different for each customer.

One example of standardized–co-produced services in Verco is a service called hull integrity management (HIM). Verco offers offshore classification for mobile offshore units (MOUs), which are used for the exploration and production of oil and gas. Safety requirements are set by operating companies and local regulatory authorities. Verco inspects the MOUs regularly and checks the facilities according to predefined standards. In addition to the traditional classification service, Verco offers the HIM service. Customers can access reports from the MOUs' surveyors through an extranet application. Each time a surveyor classifies an MOU, the surveyor conducts a detailed analysis of the vessel. The report only contains information related to the standards' requirements. However, during the inspection, the surveyor may identify sites of future installation problems (e.g. corrosion). Through the extranet, the customer can access

this type of information. This precautionary approach prevents the installation from needing to be shut down for emergency maintenance and can save the customer a lot of money.

In providing standardized–co-produced services, the service provider is an in-house consultant who delivers various services to the same customer. The service provider typically knows the customer’s business very well and is called upon when the customer needs advice or help to solve problems. Innovation comes from collaborating and interacting with customers, understanding the customers’ needs, and applying new technology to make the customer interface more efficient. For example, the idea to develop the HIM service came from previous experiences with delivering classification services, as well as from understanding customers’ needs to maintain their MOUs in order to prevent their installations from shutting down. Innovative activities in standardized–co-produced services include streamlining the customer interaction; renewing tools, methods, and systems to improve the customer interface; and training the customer to handle the new interface. This case illustrates that standardized–co-produced service innovations occur through interactions with the customer and through the introduction, development, and changes of tools and methods used in the customer interface.

Customized-provided services

Typically, customized-provided services involve little customer interaction in the provision of service. The service provider is likely to be solving unique and complex problems. The customer does not participate in the service provision because of a lack of competence and/or time restrictions. The service is often related to receiving expert advice for a specific problem from the service provider. Thus, the type of problem is known, but the specific issue is

new and needs customization. Problems could include the application of new regulations or technical specifications related to specific tasks. Thus, the service provision involves customization for the specific problem without a great deal of customer contact.

One example of customized-provided services in Verco is the risk-based verification (RBV) service, which is provided for field developments, pipelines, risers, subsea facilities, and process systems. Verification is an independent procedure used to check that a product, service, or system meets requirements and specifications, and that it fulfils its intended purpose. RBV is a structured method that ensures a systematic process. The RBV service uses risk and cost/benefit analyses to strike a balance between technical and operational issues and between safety and costs. This approach ensures an appropriate focus on high-risk elements, making verification less subjective or arbitrary. Verco initiated RBV on the basis of the experiences and networks developed while delivering standardized-provided services (i.e. classification services). As a third-party service provider and an independent actor, Verco has legitimacy to provide verification services. Professionals from Verco are hired as specialists to verify risk management systems for their customers. During the development of the underlying methodologies for its RBV services, Verco collaborated with many world-leading educational institutions and other professionals in similar IPSFs. Verco contributed to knowledge transfer regarding risk management systems by training professionals in the maritime and energy industries.

Sources of innovation in customized-provided services include market and network relationships, as well as organizational processes streamlining knowledge, especially by ICT. It is important to understand market development changes in the industries where customized-provided services are offered. Further, the service provider needs to remain at the forefront of the

expertise area. Such knowledge is gained by participating in various external professional networks. The firm's effectiveness and efficiency in service provision are often of major importance for the customer. Thus, developing advanced ICT systems that enhance communication with the customer and partners is an oft-seen innovation in this type of service provision. Consequently, innovative activities in customized-provided services include renewing underlying technologies, exchanging and developing professional experience internally and externally, and taking advantage of new emerging market opportunities. Technology development, cooperation with external partners, and internal collaboration among professionals are the dominant innovations in customized-provided services.

Customized–co-produced services

Customized–co-produced services are typically highly customized by relying on a personalized knowledge management strategy. They are created and delivered in close contact with the customer. The service function is to solve a novel problem without following a clear method. Customers are often motivated to participate actively in the service provision to obtain intrinsic rewards or monitor service quality. Thus, there is close interaction with the customer throughout the entire process of service provision, whereby the service supplier and customer may learn from one another. The service provider's professionals are usually skilful and have both explicit and implicit knowledge relevant to the problem area. Such experience is difficult to codify because it is customized, experience-based, and complex.

One example of customized–co-produced services in Verco is risk management regarding gas leakages. Providing this service requires expert knowledge and high interaction with the

customer. At the same time, there is no possibility for standardization because all plants have different locations (e.g. on land, at sea, in the desert).

In customized–co-produced services, the main sources of innovation are novel problem solving in response to the customer’s requests, learning-by-doing when solving complex and unique problems, collaboration among the service provider, customer, and other external partners, and the service provider’s abilities to access specialized knowledge. Innovative activities include co-creating and sharing knowledge with partners and customers, as well as accessing and recruiting specialists that can help the service provider in novel problem solving. Another important factor is the service firm’s belief that it is capable of solving the novel problem, even though it has not met the same difficulty before. The change and renewal of provided services often stem immediately from the problem at hand, as well as from the activities of and interactions among the customer, partners, and team as they try to solve the problem.

Operational capabilities for innovation in IPSFs

Certain operational capabilities appear critical to improving and developing ongoing service provision in IPSFs. For standardized-provided services, innovations primarily occur in service processes based on internal learning and technologies through the capability of formalizing service provision. Standardized–co-produced services are developed by innovating in customer relationships. Important capabilities for making this happen are understanding of customer needs and formalization capabilities. Innovation in customized-provided services primarily happens through professional networks and service technologies, and external and relational learning, integration, and formalization capabilities are identified as leverages of

learning from service provision. For customized–co-produced services, innovation happens by developing new service provision; external and relational learning, commercialization and integration are identified as leverages of learning in service provision. Below we explain more in-depth the relationship between learning in service provision and the capabilities needed for leveraging learning in order to repeatedly perform the same activities over time delivering the same service to the same customers.

For standardized-provided and standardized co-produced services, the findings expose that innovations are closely connected to ICT systems (service processes and technologies). Thus, *formalization capability* to streamline and formalize work processes and customer relationships in service provision are of major importance. In Verco, they developed a project portal for this purpose:

“The purpose of the new portal is to integrate these systems – and have one reference, maintenance and retrieval point for all this data. In order to meet the objective stated in the ambitious Verco strategy, there is a need to standardize work procedures and systems used in all Verco locations around the globe. The strategy involves a repair revenue increase and global growth over the next 7 years” (One of the top managers).

This capability concerns the ability to map activities in the service provision process and integrate these into formal processes that can be supported by, or be an integral part of, ICT. Our study shows that innovations in ICT systems are imperative particularly for standardized-provided services.

We expose that co-production is an important source of innovation in IPSFs, including co-production with external actors such as customers, partners, and professionals. The key

operational capabilities in the co-production process are *external and relational, internal learning, and integration* of the learning into the existing activities in the IPSF. For instance, related to innovation in customer relationships in standardized co-produced services, the following was explained: “...*plus supporting the needs of the new CSM [customer support manager] –role. The project managers think they are the most important, because that is production, but in the future the role of CSM is going to be lifted up. Very important to manage the customer relationship*” (One of the top managers). Although external actors are acknowledged as important for innovation in services, their differing role in service innovation has not been exposed. Our findings demonstrate that external actors have different influences on innovation in IPSFs. Specifically, in customized–co-produced services, the customer interaction activities in solving novel problems lead to innovation in service provision. In contrast, when customer interaction is the *source* of innovation, the innovation is *in* the relationship with the customer, as illustrated in standardized–co-produced services. Meanwhile, external professionals and their networks play key roles for innovation, especially for customized–provided services.

Our findings also expose that new service concepts often come from customized-co-produced services. These innovations are similar to R&D-based innovation. People working with these innovations are characterized as “explorers” because they combine their expertise with a strong focus on understanding the customer’s specific needs. The *external and relational learning capability* is particularly important in order to create a new service. To integrate the new service with the existing service portfolio and to sell it to the market, *integration and commercialization capabilities* are important.

DYNAMICS AMONG THE DIFFERENT TYPES OF PROVIDED SERVICES AND INNOVATION

The above findings indicate that the different types of services are not provided entirely independently from each other. Although different, the services have spill-over effects and trade-offs that impact how the services are developed and improved. We label these spill-over effects and trade-offs *dynamic capabilities* because they contribute to the IPSF's capacity for repeatedly performing services above a threshold level of performance and for creating, modifying, and extending their resource base (Grant 1996; Helfat et al. 2007). The two dynamic capabilities observed in Verco are *learning and knowledge accumulation* and *scaling and expanding the service portfolio*.

Insert Figure 3 here

The *learning and knowledge accumulation capability* relates to how learning in one type of service provision lead to the development of another type of service. This capability helps the IPSF to sense opportunities (Teece 2007) based on the services they provide through scanning, creation, learning, and interpretive activity. As explained by one of our informants:

“Service innovation does not just happen in dialogue with customers, but in the interpretation of the problem and challenge. This triggers innovation in the dialogue internally in the service firm, and within specialist communities.” (Expert panel, CEO).

We observe this pattern in Verco. In its early years, beginning in the 1860s, Verco only delivered standardized-provided services (classification services) which focused on efficiency. As the firm's experience and knowledge in providing standardized-provided services accumulated, the professionals went on to develop customized-provided services (e.g. risk-management services) and/or standardized-co-produced services (e.g. HIM). Finally, they became known as experts within their fields and began to provide customized-co-produced services (e.g. concept development of LNG ships). Thus, the knowledge and experience gained in one service provision type allowed opportunities for the development of other service provision types.

Thus, the learning and knowledge accumulation capability primarily stems from the firm's provision of standardized-provided services (efficiency), through which the IPSF gains the legitimacy and reputation (experience) to contribute more novel and advanced problem solving for their customers (expertise). As such the learning and knowledge accumulation capability resembles the learning mechanisms identified by Zollo and Winter (2002), where experience is accumulated and knowledge is articulated and codified in order to modify, renew, and create new services and service systems. This finding is contrary to the established understanding of how PSFs develop, i.e. expertise, experience and efficiency (Maister 1993; Mintzberg et al. 1988; Winch and Schneider 1993) even though it lead to the outcome of craft excellence through new services and service systems as identified by Mintzberg et al. (1988).

For the *capability of scaling and expanding the service portfolio*, the relationship between the different types of services provided were observed to go in the opposite direction, which is similar to the process described by Mintzberg et al. (1988), Maister (1993) and Winch

and Schneider (1993)—namely, that expertise leads to experience which leads to efficiency. To conceptualize the scaling and expanding capability, customized–co-produced services can (i) spin-off the recognition of other customer needs, leading to the initiation or change of customized-provided services, and (ii) lead to the development of new methods for how customized-provided services initiate or renew standardized–co-produced services. This dynamic can be observed through the formalization of processes, ICT systems, professional training, expert networks enabling knowledge-sharing among employees, and finally, describing, packaging, and commercializing the innovation into a new standardized-provided service offering. The scaling and expansion capability helps the IPSF offer the new service provision, often developed in one location, throughout the global organization. This process is often supported by the development of new service systems and ICT (Breunig et al. 2014; Chen et al. 2009; Segal-Horn and Dean 2009). Thus, this capability resembles what Teece (2007) calls seizing opportunities, i.e. ensuring that there are structures, procedures, designs, and incentives for taking advantage of the opportunity. Two quotes from our informants exemplify the scaling and expanding capability:

“The LNG project is a typical innovation project in Verco. We extend what we know from before, join forces with different partners, and based on this develop new services that can be launched in the international market as a classification service.” (Operations Technology and Services Director)

and

“In order to develop our competence in this field, we have developed, with partners, two concept ships fuelled with LNG. This is done in order to investigate to what extent LNG fuel on

ships is technically possible and economically sustainable. Further, we also conduct different feasibility studies for different customers, and are involved in the development of international standards for classification of LNG ships. The aim with these projects is to develop a classification service for LNG ships.” (Segment Director of LNG)

Customers and Verco perform customized–co-produced services together because the professionals in Verco are regarded as the most knowledgeable in their field. Verco developed this reputation by offering other types of services such as customized- and standardized-provided services. This capability is illustrated by Verco’s development of new services around the LNG-driven coasters. Together with partners and customers in customized–co-produced projects, Verco explored the optimal design of these ships (concept development). Learning and knowledge generated from these projects were used to develop customized-provided and standardized–co-produced services. Specifically, Verco began to develop standards for the classification of LNG ships and to perform feasibility studies for oil and gas companies regarding the placement of LNG fuel stations around the world. The last step in the development process was the inclusion of LNG ships in Verco’s traditional classification scheme. The LNG initiative in Verco resembles with Brady and Davies’ (2004) “base-moving projects”, i.e. novel initiatives that recombine resources in order to search, discover and test new market opportunities and/or experiment with new technologies.

CONCLUSION, IMPLICATIONS, AND OPPORTUNITIES FOR FUTURE RESEARCH

In this paper, we aimed to answer two research questions: How do activities in the different types of services contribute to innovation in IPSFs? And, what capabilities leverage

innovation in these firms? Our findings show that different service types provide various opportunities for experience and knowledge accumulation, which lead to innovations (Figure 2). To take advantage of these learning opportunities, the IPSF needs certain operational and dynamic capabilities (Figure 3). The operational capabilities that enable the IPSF to perform an activity in a consistent way over time are understanding of customer needs, internal learning, formalization, external and relational learning, commercialization and integration. Further, we identified two dynamic capabilities driving innovation in IPSFs: learning and knowledge accumulation capability and scaling and expanding capability. These capabilities enable spill-over effects and trade-offs between different service provisions, which lead to the creation, modification, and renewal of services and service systems. Thus, this study contributes to the capability literature by exposing the relationship between learning from service provision and innovation. Operational and dynamic capabilities leverage the learning and experiences in service provision leading to innovation.

The study contributes to research on innovation in project-based organizations (Brady and Davies 2004; Davies and Brady 2000) by exposing the variation in the antecedents of innovation in IPSFs emerging from different service provisions. We display the relationship between operational and dynamic capabilities showing how operational capabilities improve and routinize service provision and how dynamic capabilities contribute to spill-over effects and trade-offs between different types of service provision. The two identified dynamic capabilities enable the IPSF to both thrive for craft excellence and commercial success, which is an extension of the current understanding of PSFs arguing that these firms either need to thrive for craft excellence or commercial success (Løwendahl 1997; Maister 1993; Mintzberg et al. 1988;

Winch and Schneider 1993); if not, they will be “stuck-in-the-middle” (Porter 1980). The life cycle of service provision (Maister 1993; Winch and Schneider 1993), identifies that firms initially offer expert services, develop experience-based services, and then evolve to offer efficiency-based services implicitly state that craft excellence (expertise) and commercial success (efficiency) as strategies are difficult to combine as they have different logics. Our findings questions this established view by showing that two different dynamics capabilities enable the IPSF to do both.

The managerial implications of this study are two-fold. First, service provisions are the main sources of innovation in IPSFs. Managers can impact the future through their (implicit or explicit) choices in developing different services and service systems. Firms may miss opportunities for innovating, resulting from existing service provisions, if they do not understand the inherent activities and experiences emerging from providing different types of services. Second, this study provides information for managers and experienced professionals on the capabilities to innovate. To enable the development of new services and service systems, IPSFs need to create learning and knowledge accumulation processes around standardized-provided services to sense opportunities in order to modify, renew and create services and service systems. For IPSFs, it is also important to expand new services to other locations by seizing business opportunities. This process starts with the ambition of scaling customized co-produced services.

This study has several limitations. First, we investigated the relationship between service provision and innovation in one type of IPSF, namely engineering service firms. As identified by Von Nordenflycht (2010), among others, there are variations among PSFs. Future research on analysing similarities and differences across IPSFs (Brock 2012) could test the theoretical

models presented in Figures 2 and 3. Future studies could also examine innovation through services from the perspective of the customer, rather than innovation in services within the service providers as we have done. Second, the focus in this paper has primarily been on how IPSFs innovate. A strongly related topic is the internationalization process which our study only has scratched the surface of. Third, we expose relationships between operational and dynamic capabilities in leveraging learning which lead to innovation in IPSFs. However, we do not know if some of these capabilities are more critical for change than others. Fourth, we do not explain how different types of innovation are integrated and institutionalized in the organization (Crossan, Lane, and White 1999). During the integration and institutionalization of innovations within the organization, several tensions may occur between the old and the new.

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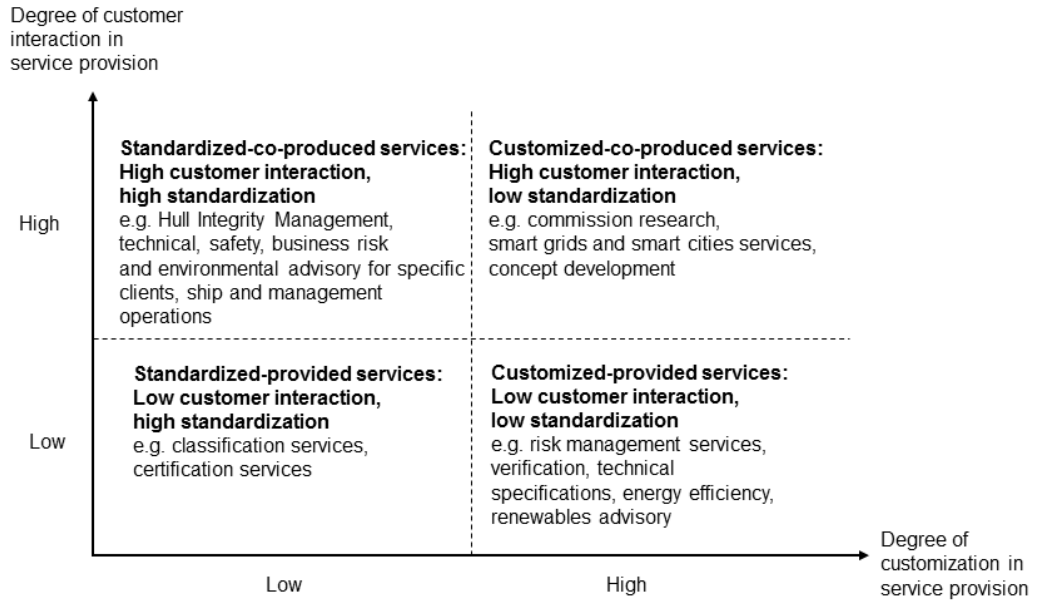


Figure 1. Service provision in IPSFs.

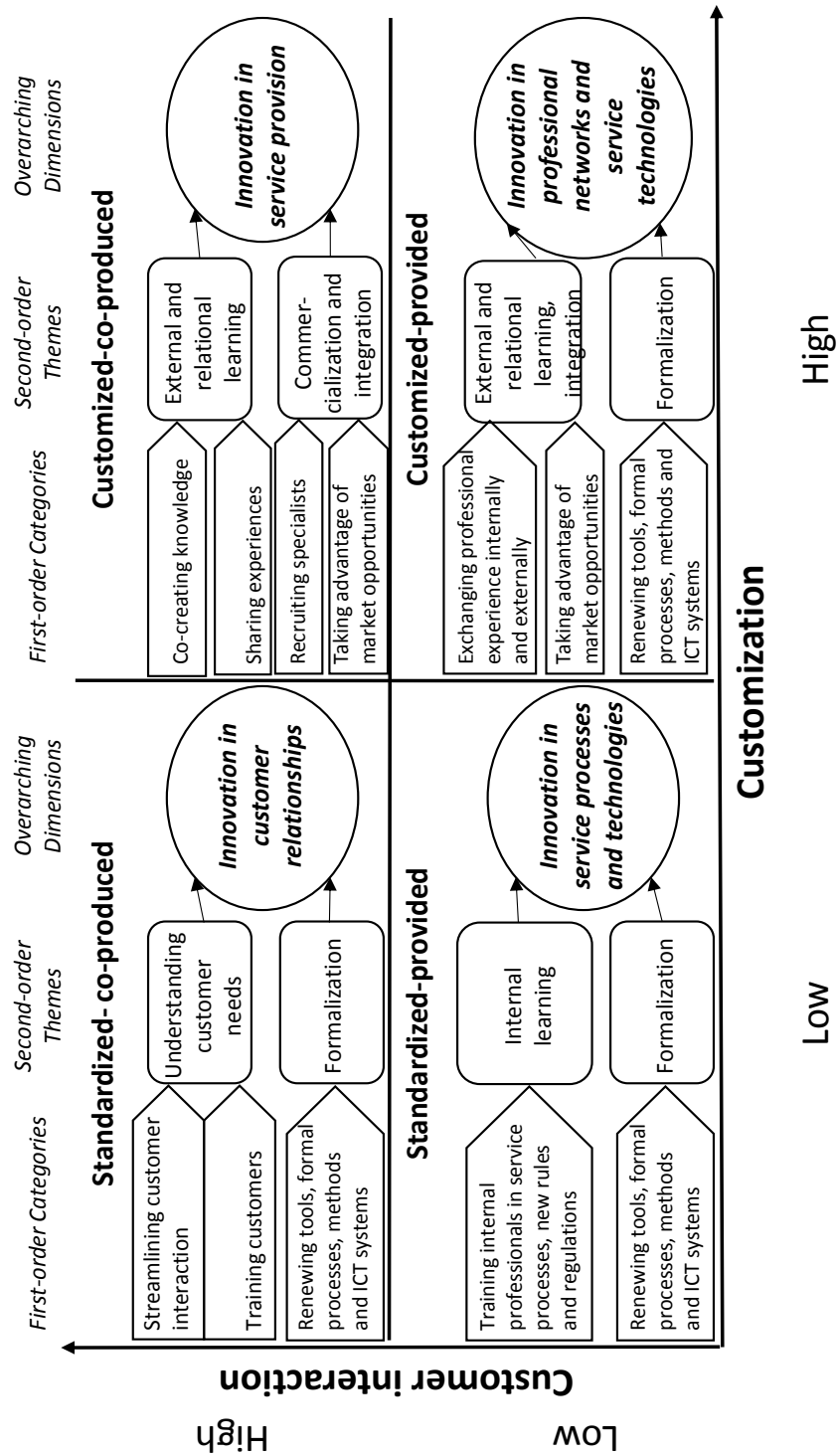


Figure 2. Service provision and innovation in IPSFs.

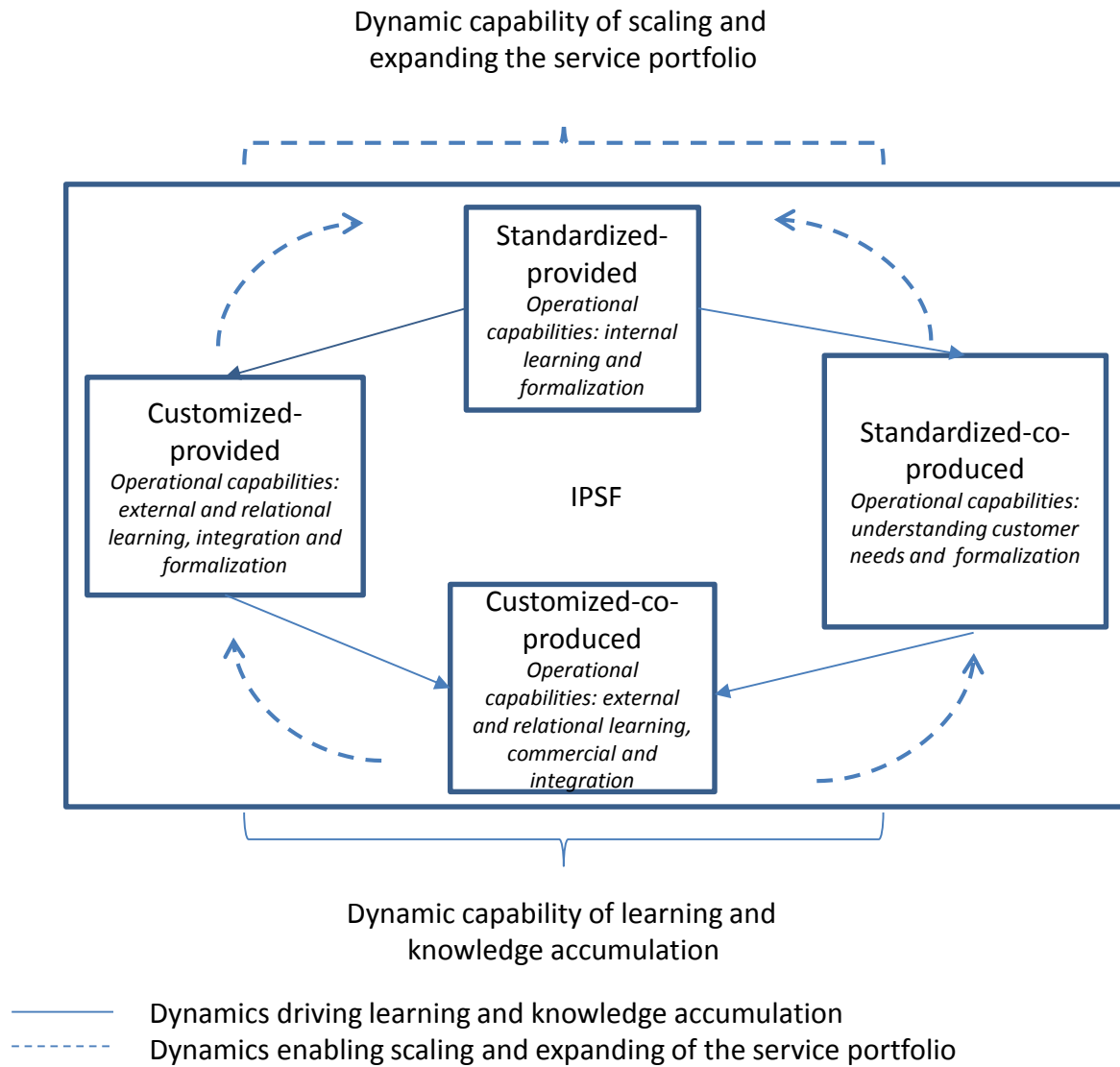


Figure 3. Innovative capabilities in IPSFs.

Appendix 1. Data collection in Verco

Place	Year	Interviews and other methods
Høvik, Norway	2003	5 interviews; Observation at service desk, discussions with management and PMs
Houston, USA	2003	1 interview; Observation of video conference and training
Milan, Italy	2004	6 interviews; Participant observation at a 2-day internal workshop
Glasgow, Scotland	2004	4 interviews
London, UK	2004	5 interviews; Participant observation at a 2-day internal workshop
Shanghai, China	2004	11 interviews; Participant observation at a 2-day gathering for 18 Asian employees and at a 2-day internal workshop
Høvik	2004	2 group interviews with 11 informants
Singapore	2007	5 interviews; Observation at super-user training workshop
Rio, Brazil	2007	4 interviews; Observation at super-user training workshop
Kuala Lumpur, Malaysia	2007	6 interviews; Observation at super-user training workshop
Houston	2007	3 interviews; Phone interviews
Shanghai	2008	10 interviews; Observation at super-user training workshop
Høvik	2008	2 interviews; Meetings with management, document reviews, 2-day observation at global super-user gathering
Sandefjord, Norway	2008	1 group interview with 5 informants
Oslo, Norway	2008	8 interviews; social network and CV analyses, discussions with HR management
Høvik	2008	10 interviews
Aberdeen, Scotland	2009	1 group interview with 5 informants
Høvik	2009	2 group interviews with 4 informants and 8 informants, respectively
Seattle, USA	2009	1 group interview with 5 informants
Aberdeen	2009	5 interviews
Seattle	2009	5 interviews
Oslo	2009	Observation at top management meeting
Oslo	2011	3 interviews; Discussions with innovation manager
Oslo	2011	Discussions with 6 experts on innovation in professional service firms in 2 meetings
<i>13 places</i>	<i>7 years</i>	<i>93 interviews, 7 group interviews with 38 participants; 9 observations at 2-day gatherings/workshops, observation of daily work, meetings with management, and document reviews</i>

Appendix 2. Data supporting interpretations of innovation

Theme	Representative quotes
<i>Innovation in service processes and technologies (Standardized-provided services)</i>	
Internal learning	<p>“Over the past few years, the number of ships in operation has increased a lot. Recruiting skilled professionals to all parts of the industry has become a challenge. Nothing can replace on-board training when it comes to achieving experience and improving knowledge, but the 3D simulator is the closest we can come onshore.” (Manager)</p> <p>“For training of new employees, we need simplified material” (Manager).</p>
Internal formalization	<p>“Procedure or something new of value for others, we raise it at a technical meeting, held every two weeks, to the rest of the section. As with stuff coming from Norway. If it is for the rest of Verco, we can raise an offshore class memorandum. The technical lead, will raise the memo. He helps to write the memo, which goes in the intranet. And everyone within Verco class will see it. ‘Do you get recognition for it?’ It is [recognition]! Part of professional identity. Become more and more within offshore class. Someone calls, saw your memo, I have similar problem, can you advice? Not financial reward, but recognition.” (Senior surveyor)</p>
<i>Innovation in customer relationships (Standardized-co-produced services)</i>	
Understanding customer needs	<p>“For new customers, we visit them, and the lab is checked quality-wise. We go through a phase with the customer to evaluate if the quality system is good enough and to build trust. Then, we follow up every second year. It is very important to meet the customers personally. There are production criteria to follow, and we visit the factories that produce the products. Business relations are understood as friends, as we build relationships.” (TBM engineer)</p> <p>“It is often the case that we are more theorists than our customers standing there with pipes and valves. It is not certain that they have read the standard to comply with, so it's something we can bring to them. They expect that we know. It goes prestige in it - we've got with us the last revision of the standard. Otherwise we are bullied - and that goes both ways”. (A professional)</p>
Formalization	<p>“The development of the new service was organized as an internal network project. The ideas for the HIM service came from internal professionals and surveyors. Customers have not been involved in the development of the HIM service, but several of the most important customers of Verco have asked for this kind of service, because if the whole fleet of MOUs is orange [the level before the assessment of the different components are classified as red] it can lead to the installation shutting down and the company gets major problems.” (Project Leader for development of the HIM extranet application)</p>
<i>Innovation in professional networks and service technologies (Customized-provided services)</i>	

External and relational learning and integration	“It is the people who make the difference between safety and danger in shipping. Recognizing this issue, we work together with the Malaysian Maritime Academy and MISC Berhad to further enhance maritime education and training.” (Regional Manager)
Formalization	“Mentoring is two roles: the technical and the process (the softer skills and problem solving). From technical learning and new technology...I keep seeing new processes. In Verco, we are learning all the time...as a consultant I am often a catalyst...” (Senior Engineer)
<i>Innovation in service provision (Customized-co-produced services)</i>	
External and relational learning	“Very few companies could put together that kind of expertise; we can guarantee that we can deliver a natural gas plant. Knowing the internal network is absolutely essential. The team comes together at the customer site, investigates together, and the service provision happens there and then.” (Expert Engineer)
Commercial and integration	“I have to be open to new problems; see the possibilities that are challenging the ordinary and known. This is the challenge. The approach cannot be described, but the solution can. I have to look for creative solutions, and I cannot be too detail-oriented.” (Senior Engineer)