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Service innovation in product-centric firms: A multidimensional business model perspective

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Abstract

Purpose—This article investigates the nature and characteristics of business model elements required for successful service innovation. The authors examine which unique resources and capabilities product-centric firms should develop and deploy to pursue service innovation.

Design/methodology/approach—Data collected from several research projects support iterations across empirical data and theory, in an abductive process. Empirical data come from product-centric firms; interviews and focus groups were the main data collection methods.

Findings—Specific resources and capabilities are needed for the proposed business model elements, as defined by the overarching strategy and structure. Firms can approach the process of service innovation from different starting points and sequences, depending on the context.

Research limitations/implications—Because it takes a synthesizing approach, this research lacks some detail. By taking a business model approach with a holistic perspective, it forgoes detailed descriptions to provide greater breadth.

Practical implications—Managers can use business models as tools to visualize changes, which should increase internal transparency, understanding, and awareness of service opportunities and necessary changes. Dependencies exist among elements; a change in one element likely affects the others. This study provides insights into which efforts are necessary and offers managers a guiding framework.

Originality/value—By providing a multidimensional perspective on service innovation, this study merges various previous research into a synthesized discussion. Combining a resources and capabilities perspective with a business model framework also leads to new insights regarding service innovation and associated activities.

Paper type—Research paper

Keywords—Service innovation, business model, service infusion, capabilities, servitization, product-centric firms

“People say we can survive without manufacturing ... that we can have a services economy. But we can't be only about hairdressers and laundrettes. An awful lot of services now are linked to manufacturing.”

—Feike Sijbesma, CEO of DSM (Milne, 2010)

Introduction

The phrase, “We live in a service economy,” has become ubiquitous. Everywhere in the world, the service sector is growing, such that it accounts for 70% or more of the gross domestic product (GDP) in countries such as the United States, United Kingdom, France, and Germany, even as the manufacturing sector steadily declines (IMD World Competitiveness Yearbook, 2012). The decrease of manufacturing's share of GDP largely reflects lowering prices of goods relative to services (*The Economist*, 2005). Regardless of sector size or importance though, the division between service and manufacturing may be artificial. The service sector seemingly has become a catch-all for everything that does not qualify as manufacturing (Gummesson, 2012), yet product-centric firms have always provided services (Vargo and Morgan, 2005), as Levitt's (1972) claim that “everybody is in service” demonstrates. Consider IBM, a product-centric firm frequently used as an example of a manufacturer that has transitioned to service provision: in 1940, its product revenues were \$12.2 million, with service revenues of \$34.1 million (McNeill, 1944). Even for identical output, the same activity could be classified as goods or services, depending on the responsibilities of the firm in the production process (Hill, 1977). From an innovation perspective, such classifications are thus irrelevant—and even misleading—in the effort to understand value creation and the success and failure of service innovations.

Even as we acknowledge these arguments, we note that the service component is growing in many product-centric firms, referred to as “service infusion in manufacturing” (Gustafsson *et al.*, 2010; Kowalkowski *et al.*, 2012; Ostrom *et al.*, 2010) or “servitization of manufacturing” (Baines *et al.*, 2009; Vandermerwe and Rada, 1998). According to the CEO of Siemens, Europe’s largest engineering group, in reference to innovative services, “You will see different business models evolving around this.... In terms of competitiveness, this is a key factor where you can differentiate yourself” (Schäfer and Milne, 2010). Yet service infusion is no straight path forward; despite the strategic importance of services, product-centric firms frequently struggle with service innovation (Chirumalla, 2013; Gebauer *et al.*, 2005; Ulaga and Reinartz, 2011).

We contend that such challenges derive from the product-centric mental models that drive manufacturers’ logic for doing business (see also Strandvik *et al.*, 2012) and their stubborn embrace of the “invention model,” which is centered on structured, bricks-and-mortar product development processes and platforms (Ostrom *et al.*, 2010). Despite substantial growth in service innovation research (for an overview, see Carlborg *et al.*, 2013), we still lack insights into service innovation processes in product-centric firms (Ostrom *et al.*, 2010). In heavily engineering-driven firms, innovation still tends to be synonymous with new products or manufacturing processes (cf., Abernathy and Townsend, 1975; Utterback and Abernathy, 1975). Even if a firm can use its business model and innovation resources and capabilities to take advantage from current product-based opportunities, firms seldom understand how the resources and capabilities that underpin manufacturing extend to enable service innovation (Spring and Araujo, 2013; Ulaga and Reinartz, 2011). When they do, their resources and capabilities may be insufficient—or even counterproductive—for taking advantage of opportunities for service innovation. Therefore, firms must develop service-related resources and capabilities (den Hertog *et al.*, 2010; Fischer *et al.*, 2010; Martin and Horne, 1993) and reconfigure fundamental elements of their business models (Amit and Zott, 2012; Neu and Brown, 2008) to adopt a broad, multidimensional view on service innovation (Gallouj and Weinstein, 1997; Maglio and Spohrer, 2008; Roth and Menor, 2003; Windrum and Garcia-Goñi, 2008) that resonates with an integrated perspective on service innovation (Coombs and Miles, 2000; Gallouj and Savona, 2010; Gallouj and Windrum, 2009; Ordanini and Parasuraman, 2011; Rubalcaba *et al.*, 2012). This perspective integrates not only the uniqueness or newness of the service but also innovations in other elements of the business model (Amara *et al.*, 2009; Bessant and Davies, 2007; Drejer, 2004; Gallouj, 2002; Toivonen

and Touminen, 2009; Yang, 2007), such as the service delivery process, customer interfaces, and the value network (de Jong and Vermeulen, 2003; Nenonen and Storbacka, 2010).

By adopting such a synthesis perspective, we investigate the business model elements that are required for successful service innovation. In particular, we examine which unique resources and capabilities product-centric firms need to develop and deploy if they want to pursue service innovation. We investigate these questions with an abductive research process (Storbacka *et al.*, 2013), drawing simultaneously on empirical research, the resource-based view of the firm (Barney, 1991; Barney *et al.*, 2001; Peteraf, 1993), and emerging bodies of business model and service innovation research. Although our research context pertains to manufacturing, the proposed service business model and most of its underlying resources and capabilities are generic and relevant to pure service players as well.

Conceptual Background

Service innovation: Toward a multidimensional concept

Innovation unfolds over time and can take many forms (Koput, 1997). From a service perspective,¹ innovation refers to any recombination of resources that creates new benefits for any actor—customer, developer, or others—in the business network. The early Schumpeterian innovation model “of the lone entrepreneur bringing innovations to markets has been superseded by a rich picture of different actors working together in iterative processes of trial and error” (Laursen and Salter, 2005, p. 132), yet most views on innovation continue to assert that it provides benefits (e.g., differentiation, profit) to its developer (Schumpeter, 1912/2002; see also Toivonen and Tuominen, 2009). Instead, many manufacturers struggle to earn profits from their service provision (e.g., Baveja *et al.*, 2004; Stanley and Wojcik, 2005), such that service innovation creates benefits for customers and channel partners, whereas the developer might suffer from sacrifices that exceed its modest benefits. For innovation to be economically sustainable, manufacturers must be able to capture an equitable share of the value created.

Service innovation traditionally has emphasized the development of new service offerings and concepts (Michel *et al.*, 2008; Rubalcaba *et al.*, 2012), including how to generate new ideas for service offerings and develop customer-oriented options (de Brentani,

¹ A service perspective on value creation (Edvardsson *et al.*, 2005) corresponds to relatively new concepts such as the service logic (Grönroos, 2006; Grönroos and Ravald, 2011; Kingman-Brundage *et al.*, 1995; Normann, 2001) and service-dominant logic (Lusch and Vargo, 2006; Vargo and Lusch, 2004). However, this view had been expressed already in Aristotle’s (384-322 B.C.E.) thinking: Use value has a purely subjective meaning and can vary across individuals and over time; exchange value derives from use value, as expressed through market demand (Gordon, 1964).

1995; Kelly and Storey, 2000; Lee and Chen, 2009; Nijssen *et al.*, 2006; Olsen and Sallis, 2006). For example, little research makes a distinction between service innovation and new service development (NSD), yet for firms to succeed in their service innovation, they cannot simply develop one new service after the other but instead must broaden their horizons and alter their starting points.

Traditional frameworks separate process from product innovation, yet in services, these two concepts are intertwined. In the search for an alternative framework (Droege *et al.*, 2009), Gallouj and Windrum (2009) suggest an integrated approach that includes non-technological aspects (e.g., services, processes, knowledge, business models) of service innovation processes, along with technological (product) forms. Such a perspective suggests a synthesis approach (Coombs and Miles, 2000) that attempts to combine manufacturing-oriented innovation research with service innovation to achieve a more unified framework (Gallouj and Savona, 2010; Gallouj and Windrum, 2009). Other researchers affirm a broad, multidimensional interpretation of service innovation (den Hertog *et al.*, 2010; Ostrom *et al.*, 2010). We thus see a trend in which service innovation becomes an organization-wide challenge (Carlborg *et al.*, 2013), such that managers must adopt a holistic approach to their business and address all elements of the firm's business model.

Business model: Multidimensional framework

A business model tells the firm's "story" for how to make money, who customers are, and what customer value that is most important to address (Magretta, 2002). Its plot should also include revenue model(s), structures, activities, processes, customer relationships, and the firm's position within the value network (or ecosystem) (Chesbrough, 2007). Finally, the story describes activities performed by a firm, as an activity system (Amit and Zott, 2010).

Although we can conceive of generic business models, each firm has its own, unique model that recounts how it creates and captures value (appropriation mechanisms). Thus business models offer useful analysis frameworks to use to understand the firm and its component parts (Amit and Zott, 2001; Chesbrough and Rosenbloom, 2002; Kindström, 2010). Holistic business model approaches in turn can help create competitive advantages by reducing imitability; competitors find it difficult to isolate and copy individual elements of an integrated business (Chesbrough, 2007; Kindström, 2010). This feature is particularly pronounced in our study context, because many service innovations are easier to imitate than are product innovations (Gebauer *et al.*, 2008).

We propose that firms that systematically analyze and adjust their business model elements, in accordance with both internal and external stimuli, are better positioned to

succeed with their service innovation activities, for two main reasons. First, a coherent business model that exhibits consistency across elements has greater potential to create long-term competitive advantages (Chesbrough, 2007). That is, it is far more challenging to imitate a well-functioning business model that features aligned elements than it is to copy single elements. Second, successful service infusion implies that firms address all elements of their business model and understand how they connect (Galbraith, 2002; Neu and Brown, 2008). An intended, strategic realignment toward services thus should be mirrored in changes throughout the business model, in what might be termed a service-based business model (Kindström, 2010). A successful change to one element depends on corresponding changes in and/or the realignment of other elements.

Some dynamic changes to the business model over time must be initiated for a firm to succeed (Teece, 2007). Technology becomes obsolete, customer demands change, and new value propositions emerge. Thus services become part of both business and value propositions. The changes might emanate from different actors, varied starting points, and different parts of the firm. The process of changing a business model in turn constitutes a business model innovation process. This terminology has gained prominence in research initiatives (see e.g., Chesbrough, 2010; Amit and Zott, 2012), though it remains somewhat undefined and vague. We regard business model innovation as the process of aligning and/or changing the business model and its inherent parts, in response to internal and external stimuli.

Method

We adopt a synthesizing research process, similar to that performed by Storbacka *et al.* (2013), such that we draw on data collected from four independent research projects: three finalized projects on service infusion in manufacturing, financed by the Swedish Governmental Agency for Innovation Systems and conducted in 2004–2006, 2006–2009, and 2010–2013, as well as one ongoing service innovation project, financed by the Knowledge Foundation. We selected firms that (1) extensively pursued service innovation activities, (2) strategically worked with service infusion initiatives, and (3) openly granted access to key respondents at different hierarchical levels (including customers). In addition, we sought a sample that would yield qualitative richness and diverse data. Accordingly, we identified firms with which we had collaborated throughout our research projects; some firms participated in one project only, whereas others took part in several. The firms were ABB Robotics, Ericsson, Linde Gas, Metso, Saab Group, Sandvik Coromant, SKF, Toyota Material Handling Europe, Volvo Group, and Xylem. They represent industries such as avionics and defense, commercial vehicles, fluid handling, forklift trucks, industrial gas, industrial

machinery, mining and construction equipment, roll bearings, and telecom. Their customers included leading multinationals, as well as small and medium-sized firms. Some participating firms were not selected for this particular study, because they did not fulfill one or more of the three research criteria.

Altogether, this study is based on more than 100 in-depth interviews, most of which were carried out by the authors, and more than 20 workshops and focus group meetings with multiple respondents from one or several firms. The interviews were recorded and transcribed; respondents typically reviewed the material (case write-ups) to help minimize any potential misunderstandings. Respondents tended to be managers at different hierarchical positions, representing different organizational units, such as service development, service delivery, sales, marketing, top management, product development, pricing, and key accounts. The data collection also focused on documents such as annual reports and internal firm material, including management presentations, product information, and market analyses.

This synthesizing research process supported iterations between empirical data and theory, in an abductive process (Dubois and Gadde, 2002; Kovács and Spens, 2005). Following systematic combining, we grouped the empirical material into emerging themes to ensure a qualitative pattern-matching logic in developing the findings (Eisenhardt, 1989). This process should ensure a strong grounding in both empirical reality and managerial challenges, as well as providing in-depth considerations of the theoretical frameworks. We did not collect new empirical data for this research; rather, our study relies on merging previously collected data into emerging themes, structured by a dual focus on service innovation and business model research.

In the cross-case analyses, certain patterns emerged related to service innovation; the business model concept served as a structuring framework to capture distinct elements that appeared essential to the success of service innovation. This cross-case analysis reflected individual case analyses of the participating firms. To minimize bias, we performed the individual analyses before collaboratively merging them.

Detailed methodologies of the research conducted for the various research projects and the findings for individual case firms (related to service infusion) appear in 14 previously published scientific articles (e.g., Kindström, 2010; Kindström and Kowalkowski, 2009; Kindström *et al.*, 2012; Kindström *et al.*, 2013; Kowalkowski, 2011; Kowalkowski *et al.*, 2011a; Kowalkowski *et al.*, 2011b; Kowalkowski, *et al.*, 2012; Nordin *et al.*, 2011) and a doctoral dissertation (Kowalkowski, 2008), as well as several managerially oriented books. In some cases, the data were pooled with external manufacturing firm data collected in other

research to gain further insights (Gebauer and Kowalkowski, 2012; Kowalkowski *et al.*, 2013).

A business model for service innovation

To conceptualize a service business model, we begin with 10 fundamental business model elements: strategy, structure, offering, revenue mechanism, development process, sales process, delivery process, customer relationships, value network, and culture. That is, we derive the elements of the service business model from our analyses and insights gained from studies of product-centric firms, but these elements are generic and relevant to pure service players. The key is to build strong business model elements for service innovation and achieve alignment among them. Because product-centric firms and pure service players have different starting points, their requirements might differ partially though. The label “product-centric” implies that the firm, regardless of its share of services, primarily perceives itself as an entity that develops and sells physical goods. Pursuing successful service innovation means breaking free from this trajectory, a challenge that pure service players do not face. However, as we argue, their shared characteristics are more notable than distinct ones. Figure 1 illustrates the elements of the service business model we have identified.² Before examining the eight vertical elements and their underlying resources in detail, we discuss the overarching strategy and structure elements.

----INSERT FIGURE 1 AROUND HERE-----

Strategy

Achieving alignment between strategy and structure is a dynamic, transformational process that is critical for all firms, including product-centric ones that pursue service infusion (Davies *et al.*, 2007; Galbraith, 2002; Gebauer, 2008; Gebauer *et al.*, 2010; Reinartz and Ulaga, 2008). Service innovation initiatives, particularly those in incumbent firms, tend to take time before they can make a major impact (Fang *et al.*, 2008), and managers tend to underestimate the associated complexities. Thus firms must maintain a long-term focus and create internal awareness and a “sense of urgency” strategically. In several firms, we identify a *business cycle paradox*; that is, in times of prosperity (e.g., before the 2008 financial crisis and its aftermath), the focus tends to be on how to capitalize on the core (product) offering,

² Innovation traditionally is considered an outcome and a process (e.g., Howells, 2004; Koput, 1997; Van de Ven, 1986), so the first vertical business model elements pertain to outcomes (i.e., offering and revenue model) and processes (i.e., three service processes).

but during recessions, few resources are available to invest in service innovation. The lack of long-term investments then fails to reduce vulnerability to future recessions (i.e., services are generally countercyclical); instead, the focus is on saving the product business.

Frequently, strategizing for service innovation in product-centric firms appears to offer a well-defined, rational process. However, service innovation initiatives may be emergent, reactive responses to new customer demands or other exogenous changes (i.e., network triggers, Spring and Araujo, 2013). The longer-term time horizon makes it difficult if not impossible for decision makers to understand all the strategic challenges ahead, because “successful service strategy involves continuous modifications, adaptability, the seizing of ad hoc innovation, a continuous recalibration of opportunities, and the management of intertwining goals” (Kowalkowski *et al.*, 2012, p. 765).

Strategic decisions also set the foundation for future possible service innovation activities. Therefore, the firm should define whether service infusion implies a transition from products to services (i.e., outsourcing of manufacturing) or is a matter of expanding into service and broadening the range of products and services offered. The latter route appeared in many of the firms we analyzed; it implies the product business will remain the focus for most parts of the organization. Furthermore, the primary purpose of the service might be to support and strengthen the traditional product business or develop a competitive service business on its own; the latter provides a much better breeding ground for service. Finally, firms can decide whether to provide service only for their own products or also provide what Raddats and Easingwood (2010) label vendor-agnostic services, which are more challenging but also can spur innovativeness.

Structure

An inadequate organizational structure inhibits service innovation; an appropriate structure facilitates it. Thus service innovation may require firms to change their organizational structure. For product-centric firms, establishing separate service units within existing product units is generally a first step but rarely a long-term solution. Despite equal formal authority, it is often difficult for service divisions to achieve equal attention and commitment in a product-centric unit (Gebauer and Kowalkowski, 2012). A logical second step for many firms is thus the establishment of a distinct business unit with profit-and-loss accounting and responsibility for strategic service development (Oliva *et al.*, 2012). To pursue collaborative activities with customers, firms such as Ericsson and Toyota Material Handling go even further and establish specific, customer-focused units that can be supported by a key account management approach (Gebauer and Kowalkowski, 2012). Such hybrid

organizational approaches require close collaboration between units—in product-centric firms, it includes linkages between product and service units (Neu and Brown, 2008)—including shared understanding of customers and market conditions. Close collaboration between the service and product units also helps clarify common approaches to address customer needs and prevents conflicts between the product and service businesses (Gebauer and Kowalkowski, 2012).

Another requirement is to find a structure and associated roles that provide a balance between exploitation (i.e., using existing capabilities efficiently) and exploration (i.e., creating new offerings and market spaces that stretch capabilities) (Day, 2007; March, 1991). Exploitation tends to be more vital for basic services, whereas exploration focuses on more advanced ones (Westerlund and Rajala, 2010); both are essential for extensive services (Kowalkowski *et al.*, 2011a). Exploitation benefits from global integration, and exploration benefits from local responsiveness (Prahalad and Doz, 1988), especially when a firm provides services. For effective leveraging and sharing of technical and customer-specific knowledge and development and deployment of new services, firms must balance local and central forces and avoid either autonomous local units or rigid, centralized structures (Bartlett and Ghoshal, 2000). In turn, formal structures and various forms of informal structures are essential (Kowalkowski *et al.*, 2011a).

Resources and capabilities for service innovation

Strategy and structure are two elements that span eight elements, each linked to distinct, underlying resources and capabilities. Addressing these elements requires the development and deployment of distinct resources and capabilities that foster service innovation. Departing from Ulaga and Reinartz's (2011) view on resources and capabilities, which is based on the resource-based view of the firm, we assert that resources are productive assets the firm can use, while capabilities are what the firm can do. "Resources per se do not confer competitive advantage but must be transformed into capabilities to do so" (p. 6). However, whereas the resource-based view takes a firm-centric view (e.g., Barney, 1991; Peteraf, 1993), we argue that firms do not have to own resources; they might access them through other actors in their network. Håkansson and Snehota (2006) even argue that a firm's most valuable resource is its relationships with other actors in the network.

Table 1 integrates the resources and capabilities we have identified into an overall service innovation framework. The interconnectedness across business model elements means that some resources and capabilities underpin more than one element. None of the resources and capabilities are a *sine qua non* of service innovation in isolation; however, they are

generally interrelated, and the more of them the firm possesses and is able to deploy, the better its chances for innovation success. Whereas product-centric firms can possess resources and capabilities that pure service players do not have, offering them distinct advantages (Ulaga and Reinartz, 2011), the same values, norms, and attitudes that support a particular capability and help the firm succeed in one discipline (e.g., manufacturing) can become a core rigidity and constrain it in another (e.g., services) (Leonard-Barton, 1992). Therefore, service innovation-specific resources and capabilities are needed.

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Offering

The third business model element, the offering, is traditionally associated with service innovation. Services exhibit great diversity, from basic field services and inspection to extensive customer solutions that integrate a wide range of internal and third-party services and products. Several resources and capabilities favor the success of service innovation. The first resource, which most product-centric firms possess, is an existing customer base. Customers do not go straight from being strangers to close partners (Johnson and Selnes, 2004), so an existing customer base, albeit only for product sales, is needed. Firms then can use this resource to shift to more advanced services gradually. Another key asset is the installed base of products, which product-centric firms can employ to systematically collect product usage and process data (Ulaga and Reinartz, 2011). The analyzed data can explicate each customer's process and identify new service opportunities. Particularly if the total installed base greatly exceeds the number of installations with a single customer, the firm can obtain a unique information advantage over pure service players and customers. Service innovation also increasingly relies on new information and communication technologies (ICT) (Gago and Rubalcaba, 2007; Holmström *et al.*, 2010; Rust and Thompson, 2006), which catalyze service innovation in product-centric firms (Kowalkowski *et al.*, 2013). Bundling technology into the products also must address the systems and applications used for service provision. Therefore, ICT capabilities are required to exploit internal and external technological opportunities. Yet a major challenge, particularly for heavily engineering-driven firms, is to avoid the temptation to put technology rather than the customer in the driver's seat when developing services.

Because the requirements for different services in the firm's portfolio vary greatly, the firm must understand what services to offer, how to develop a coherent portfolio, and how

extensive its service portfolio should be—what we refer to as offering portfolio management capability. Demand varies across markets, so managers must decide how standardized services should be. A second capability entails product–service integration: With a base in manufacturing and frequent bundling of services and products into more extensive offerings, firms should foster and employ strategic linkages between their services and products to achieve synergies for value creation (Johansson and Olhager, 2006; Kowalkowski, 2011). Furthermore, as Dachs *et al.* (2013) empirically show, service innovation can trigger product innovation, and vice versa. A design-to-service capability also is needed to design components and products for the service market (Ulaga and Reinartz, 2011). Although more durable components and clever designs may increase product prices or reduce manufacturing efficiency, it also can unlock new service opportunities, reduce lifecycle costs, and improve serviceability in the field, where operating conditions can be much tougher than in the plant where the products are assembled (Kowalkowski, 2011). Feedback from service operations thus is an important information source for product development (Goh and McMahon, 2009). Finally, the firm must have customer needing interpretation capabilities. Customer needing—a concept proposed by Strandvik *et al.* (2012)—is the mental model of what value-in-use they intend to achieve and acquire through a specific task, and it must match the supplier’s offering. Customer needings can be very different across markets and time. If firms understand their customers, they can influence customer needings (Payne *et al.*, 2008), such as with innovative services that create new demand (Biggemann *et al.*, 2013).

Revenue model

Product usage and process data are key resources for revenue models, which then can become better aligned with the customer’s value creation processes, including availability-based and performance-based contracts. Extensive knowledge of the technical system or subsystem of which the service is part is a related resource. The service often gets interlinked with other services, products, and subsystems that set the scope for what can be offered and how the firm can charge for it. Seamless offerings (Wise and Baumgartner, 1999; Kowalkowski *et al.*, 2011a) can provide the firm with increased flexibility regarding possible revenue models.

Pricing capability is needed to determine how to charge for new services and possibly change the revenue model of existing services, such as moving from free to fee (Pauwels and Weiss, 2008; Witell and Löfgren, 2013). Many product-centric firms that traditionally gave away services for free to support their product sales struggle to change their revenue models and start charging for their value facilitation and cocreation (Kindström and Kowalkowski,

2009; Reinartz and Ulaga, 2008). To alter revenue models or introduce new ones, firms also need a value visualization capability. They can choose from various strategies and methods that might convince potential customers of the value-in-use and thus the benefits of the revenue model (Anderson *et al.*, 2007; Kindström *et al.*, 2012). Finally, a risk assessment and mitigation capability is required (Ulaga and Reinartz, 2011) to manage the risks associated with service provision, particularly if the firm offers advanced services with dynamic, output-based revenue models or an extensive service portfolio with a diverse set of revenue models.

Service typology

To understand key similarities and differences between services, it is beneficial to classify services according to relevant criteria (Lovelock, 1983). One such classification is the service focus (Antioco *et al.*, 2008; Eggert *et al.*, 2013; Mathieu, 2001a). Many basic and traditional industrial services are product oriented, so their purpose is to improve or restore the functionality of the product, such as through maintenance and repair. Other services are process oriented; their purpose is to improve the customer's processes. Process-oriented services might relate to a specific product, such as the optimization of a manufacturing process, or they might be independent of any products, such as educating customer employees about quality control methods. Another fundamental difference between services is the revenue model (i.e., nature of the value proposition; Ulaga and Reinartz, 2011). Services sold as a deed, such as repair of a broken machine or a training session for operators, have input-based revenue models that focus on the delivery and performance of a particular deed (i.e., input to an activity), regardless of the customer's actual value-in-use. Services sold with availability or performance as their starting points have output-based revenue models and focus on the achieved outcome. The elements needed to achieve this outcome (i.e., input needed) is of secondary importance. However, output-based services might include input-based service components, such as a fixed price, service-level agreement. Services such as maintenance and repair, if offered alone, would be regarded as input based. By combining the two dimensions—service focus and revenue model—we obtain a typology for services (see Figure 2).

----INSERT FIGURE 2 AROUND HERE-----

Through the recombination and integration of service components and products, various innovative offerings can be developed. The most advanced are customer solutions.

Solutions are long-term relational processes (Tuli *et al.*, 2007), in which the firm integrates different competences to create tailored offerings that solve customer-specific, strategic problems, and the revenue model largely reflects the customer's value-in-use (Storbacka, 2011). The more the firm provides solutions and other customized services, the greater its value potential, but also the greater its complexity and risk (Nordin *et al.*, 2011). More resources, capabilities, and activities (internal and external) must be integrated and coordinated, and the focus shifts from the firm's delivery processes to the customer's value-creation processes.

A wide range of services also implies greater operational and financial risk (though the strategic risk is reduced to some extent; Nordin *et al.*, 2011). The firm must be able to manage traditional pricing schemes and revenue mechanisms in parallel with new methods and models. In the case of traditional, input-based revenue mechanisms, the firm gets paid per service hour and units sold. The services are sold as deeds, without any direct link to or feedback from the customer's value creation process. Output-based revenue mechanisms instead rely on either fixed (e.g., availability, usage) or dynamic (e.g., performance, results, gain sharing) prices. If a customer signs a fixed price agreement, the supplier receives the same amount every month, regardless of the number of service hours, components, or spares needed. Such revenue mechanisms provide a clear incentive for the supplier to improve its service productivity.

Finally, regarding the service typology in Figure 2, our findings indicate that firms are not limited to a predefined set of service innovation trajectories, from less to more complex, as prior research generally suggests (e.g., Mathieu, 2001b; Matthyssens and Vandembemt, 2010; Penttinen and Palmer, 2007). Instead, service innovation takes place throughout the service typology, both planned and ad hoc (Kowalkowski *et al.*, 2012), and "reversed" service infusion trajectories, from more to less advanced services, are possible too (Finne *et al.*, 2013).

Development process

Service development, sales, and delivery are three processes critical for the success of service innovation initiatives. To the extent that product-centric firms work systematically with service innovation, it generally involves concept development, with several similarities with new product development (NPD). As one senior manager expressed it, "business development has always been synonymous with product development." Yet all three service processes must be addressed. Whereas NPD projects are heavy at the back, successful NSD projects need to be heavy at the front; that is, they must develop the service concept and ensure its rollout (Kindström and Kowalkowski, 2009). Many firms, including world-leading

manufacturers, fail to commercialize their novel services due to their insufficient knowledge and skills, resources, and commitment in the sales and delivery phases of the innovation process. The risk of failure is particularly high if the firm blueprints complex NPD models, without recognizing the differences between product and service development.³ The adoption of an NSD strategy also has substantial performance effects (Edvardsson *et al.*, 2013). Firms such as the Volvo Group therefore develop distinct NSD processes and strategies, out of the recognition that rigid structures, processes, and routines—common to NPD projects—fail to account for the flexibility requirements for successful service development. In this sense, NSD models need a more flexible, iterative process, with extensive customer involvement (e.g., co-design methodologies; Durugbo, 2013), to ensure sufficient resources and competences for sales and delivery, as well as cross-functional and local-central involvement. Lead users for ideation (including imaginary value experiences; Helkkula *et al.*, 2012), co-design, evaluation, and implementation and dedicated service development roles with necessary authority (service champions; Martin and Horne, 1993) are additional key resources for successful NSD.

To take advantage of users and not just identify the “right” customers in NSD and pilot projects, the firm needs the capability to engage actively with them throughout all stages of the customer experience (Vandermerwe, 1994). An internal sensing capability also refers to the ability to detect and support decentralized service initiatives (Kindström *et al.*, 2013). Whereas product development tends to be managed centrally and driven by technology, service development often takes place locally in interaction with key customers. Service innovation rarely is a planned NSD process; rather, services are developed ad hoc (Dolfsma, 2011; Gallouj & Weinstein, 1997; Kowalkowski *et al.*, 2012). In multinational firms in particular, it can be difficult for central service managers to develop a comprehensive overview and understanding of local service activities. Local services can be “invisible”—in the sense that they are not formalized or visible in internal business systems and thus not possible to measure (Kindström and Kowalkowski, 2009). Formalization and replication

³ Although we take a synthesis perspective, we argue—in line with a demarcation perspective—that NSD requires different methods and processes than NPD. Goods and services are two different animals; service is hypernymic to goods, which are appliances used in service provision and does not create value *per se* (Lusch and Vargo, 2006). Even if revenue models are similar for both, it is difficult to ignore that products are things, whereas services are acts and processes (Grönroos, 2000; Rathmell, 1966). Specific mechanisms for service provision (i.e., goods) require specific development methods and processes (e.g., ICT development), but this claim does not contradict a synthesis perspective. At a high level of abstraction, the overall characteristics can be the same, but the management of offerings on a lower level of abstraction (e.g., physical components; product-focused and input-based self-service offerings; process-focused, output-based, people-intensive services) may need distinct *modus operandi*.

capabilities are therefore critical for formalizing, specifying, and standardizing services, as well as to take advantage of what Davies and Brady (2000) call economies of repetition, to deliver future services at lower costs and more effectively (Biggemann *et al.*, 2013). The latter includes making professional expertise concrete and systematizing processes and methods (Jaakkola, 2011).

Sales process

A major hurdle for product-centric firms to overcome is finding a way to sell their novel services. Edvardsson *et al.* (2013) determine that, of more than 500 NSD projects, the rate of new services introduced to the market and then withdrawn due to low sales was as high as 43%. Despite the common opinion that “what gets measured gets done,” to the frustration of service managers, incentive systems and metrics frequently are still product centric. Alignment between the incentive systems and the strategic service objectives of the firm thus is needed to promote service sales and change the behavior of a product-centric sales force (Reinartz and Ulaga, 2008; Shah *et al.*, 2006). Other critical resources include customer involvement (customers must provide correct information to elaborate the value proposition) and inputs from the field service organization (e.g., new sales opportunities). Field technicians interact frequently with customers, and customers tend to trust them more (especially if they are located full time on customer sites), which makes them a key resource for service sales (Kowalkowski, 2008; Ulaga and Reinartz, 2011). Back-office specialist support is another increasingly important resource, comprising not only traditional tools, such as customer relationship management systems, but also sophisticated support, such as SKF’s Documented Solution Program. Together with the customer, the firm’s representative can generate a bottom-line figure to predict total estimated savings and possible performance improvements.

As with the revenue model, value visualization capability is needed in advance to be convincing about the potential value-in-use (see also Anderson *et al.*, 2007; Terho *et al.*, 2011). Not only are most salespeople unfamiliar with and uncomfortable communicating the value of services, but customers also find this type of value difficult to grasp and evaluate in advance (Kindström *et al.*, 2012). For extensive service sales, particularly those combining products with services, an internal coordination capability is required (Gebauer and Kowalkowski, 2012). Coordination between the sales and field service organizations becomes essential, often leading to increased involvement of the service organization in the sales process. For example, to sell long-term rental plans, a Toyota service sales manager (service organization), a sales account manager (sales organization), and a project manager might

work together. In addition, rental managers may work alongside their colleagues to ensure that the sales force has the necessary skills and is comfortable selling rental contracts (Kowalkowski, 2008). Finally, customer needing interpretation capability, which includes systematic listening skills, is critical to gaining an understanding of customers' problems, needs, and wants. Traditional product salespeople often do not fit the competence profile required (Ulaga and Reinartz, 2011). When services become more important, the salesperson takes on a clearer role as a customer resource, working closely with the customer as a problem solver. The sales process is not necessarily more complex but is longer and requires interactions with more decision makers at different levels in the customer organization.

Delivery process

A field service network is a prerequisite for successful service delivery. In many cases, it includes both the internal service organization and external service partners (i.e., hybrid approach). Recruiting and maintaining skilled technicians can prove challenging due to scarce human resources, particularly for remote locations such as mines in the Amazon or far northern Scandinavia. An adaptable back-office infrastructure with clever ICT systems can enable not only more cost-efficient operations but also higher service quality, through better resource allocation and more accurate information sharing among field technicians. Customer involvement is another key resource; many services involve frequent (or continuous) interactions and active value co-creation. Service delivery should be viewed as an ongoing customer–supplier relationship (Tuli *et al.*, 2007), in which trust and commitment are key routes for receiving customer feedback throughout the delivery process.

Capacity utilization and prognostication capability help address the challenges of demand fluctuation and service supply constraints, which are characteristic of many services (Lovelock, 1983). To smooth out the ups and downs of demand, firms can strive for long-term service-level arrangements, in which the supplier controls and schedules preventive maintenance. Many field services can be scheduled a year in advance. To maximize expertise skills, Metso assigns global specialist teams to provide knowledge-intensive services to mining customers worldwide. Capacity utilization in turn leads to the next capability: determining and designing internal–external arrangements for service delivery. Services can be delivered through an internal arrangement, an external arrangement, or a hybrid. For example, a firm might provide services in-house in one market and work with partners in another. It also can choose to provide some services in-house, particularly strategically important ones, and let partners provide services that are less important or that the firm lacks the resources to provide. Factors that determine the organizational arrangement can be

classified as firm-, market-, or offering-specific (Kowalkowski *et al.*, 2011b). If the firm understands the pros and cons of each arrangement, it can design an arrangement and delivery process that fits it. From a service innovation point of view, *ceteris paribus*, an internal arrangement is preferable (Kowalkowski *et al.*, 2011a); firms like Toyota Material Handling have deliberately internalized most of their service provision.

Customer relationships

Customer interaction stability facilitates the development of strong customer relationships on both firm and personal levels. It refers to the duration for which customer representatives are assigned to a customer (Tuli *et al.*, 2007). A related resource is the field service organization, where reps work together with customers. Although firms may opt for service provision mainly through external partners, “owning” the customer interface through an in-house service organization is a key asset for product-centric firms (Kowalkowski, 2008). Tuli *et al.* (2007) highlight customer counseling and adaptiveness as key factors for successful customer solutions; we contend that these resources are vital for less complex services too. Customers’ provision of information and guidance about their operations, policies, and political landscape helps the supplier provide better services and improve customer satisfaction and relationship strength. Even if the supplier firm could offer competitive services with potentially high value-in-use, the customer’s purchasing strategy, processes, and organizational structure might hinder the deal. An in-depth understanding of the buying center, the relationships of its members, and the internal political landscape therefore is needed. Furthermore, adaptiveness by the supplier and the customer frequently is required; it implies that the actors “make adaptations to bring about initial fit between their needs and capabilities, but adaptation also may be necessary in an ongoing relationship as the exchanging parties are exposed to changing business conditions” (Hallén *et al.*, 1991, p. 30).

A customer embeddedness capability refers to the firm’s ability to develop close, long-term relationships, which is a prerequisite for many services (cf., relational capital; Kohtamäki *et al.*, 2013). To increase embeddedness, firms must understand customer needs and be able to issue segment- and customer-specific value propositions (Anderson and Narus, 1991; Storbacka *et al.*, 2013). Even as the firm defines focus markets or segments for different types of services, it should recognize that customers are not necessarily willing to invest in relationships with all the firms they interact with; even if the supplier has a relational intention, the customer might not (Grönroos, 1997; Zolkiewski 2004). To strengthen relationships and seize new service opportunities ahead of competitors, firms must act proactively. However, firms have limited resources and must prioritize which proactive

endeavors to pursue. Proactivity has positive connotations (Crant, 2000), but there also are advantages of reactive behavior, as long as it signals a genuine willingness to respond to changing customer needs (and can help the firm avoid the negative effects of hasty decisions). There are benefits and harms of both proactive and reactive behaviors (Kowalkowski, 2008); firms must master both (acting before service failure or during the service recovery process) to determine how to act in different situations; that is, they need a proactive–reactive balancing capability.

Finally, not all relationships are profitable (Storbacka *et al.*, 1994) and firms need to assess the profitability of their account customers and customer segments, as well as understanding the overall return on relationships (Gummesson, 2004; Grönroos and Helle, 2012). Although long-term customer relationships and customer embeddedness grow more important as product-centric firms infuse services into their offerings, firms should not focus solely on creating close relationships at the expense of acquiring new ones. Many key customers are large firms with massive bargaining power that aim for continuous price reductions, which puts pressure on service margins and aggravates the relationship. Thus, firms should manage customer relationship portfolios using lifetime value potential and strive for a dynamic customer portfolio with a combination of close customer relationships and more distant relationships, with the potential to develop to closer, more long-term ones (Johnson and Selnes 2004), as well as customers of different size (and thus varying purchasing power).

Value network

A firm's resources include those it can exploit from other actors in its value network (Araujo *et al.*, 2003). A distribution network is a powerful resource for firms that operate through dealers and service partners to mobilize value creation. In addition to providing service sales and delivery, it can offer critical information about customers, service operations, and the market. For service innovation, a challenge is to achieve dedication to new service initiatives and loyalty to the firm (though some managers perceive distributors as more professional and business oriented than local service and sales representatives and therefore prefer external arrangements). A disadvantage of an external arrangement is the lack of a direct customer interface, which offers a key resource for service innovation. Without a direct customer interface, it becomes difficult to develop the relationship and succeed with new services. Other network-related resources that benefit service innovation are a specialist supplier base to access resources for innovation, such as software and hardware specialist skills, and influencer relationships to understand and influence a diverse range of actors,

including business press and media, environmental groups, political and government agencies, unions, industry bodies, regulatory bodies, and financial and investor groups (Payne *et al.*, 2005).

Orchestration is an overarching value network capability, referring to an ability to manage and transform the service system, especially external actors that are central to service performance. It includes the ability to extend the resource base into new markets and services, incorporate complementary resources and co-specialization, and reconfigure roles, resources, locus of control, and power in the network (Kindström *et al.*, 2013). A critical issue when collaborating is that all actors perceive value creation and appropriation as equitable (Wagner *et al.*, 2010); that is, costs and revenues—and other benefits and sacrifices, such as risk, responsibilities, and customer relationships—must be equitably divided when new services are developed and launched. A prerequisite for such successful orchestration is partner knowledge capability. Even many world-class firms lack fundamental service-related knowledge about their dealers and pure service partners. Firms might know their partners' strengths and weaknesses regarding the product business but lack fundamental views of their competence and commitment to new service innovation initiatives. Success demands competence and commitment not only internally in local sales companies but also among partners in the value network.

Finally, a network dynamics understanding capability is needed to reveal how other actors likely respond to new service initiatives. For example, through a service maneuver, product-centric firms can enter into direct competition with pure service players (Kowalkowski *et al.*, 2011b), and the risk is particularly high when firms offer advanced services, such as process-management consulting (Antioco *et al.*, 2008). Firms that move into their customer's domain, either without prior agreement or too assertively, may encounter competition and conflict with customers (Davies *et al.*, 2006). Innovative services, particularly advanced ones like customer solutions, also have market-shaping effects and create new customer needs (Storbacka, 2011), which evokes reactions from other customers, competitors, and various other actors in the network (Biggemann *et al.*, 2013).

Culture

Culture is a “softer” business model element than many other factors, and many firms struggle with this intangible element. Yet it remains key to successful service innovation; whereas large-scale cultural change requires time, some measures can prompt shorter-term effects. Firms can create internal awareness of the importance and potential of adding services. In product-centric firms, services often appear merely as add-ons to the core product offering

or a necessary evil for future product sales (Kowalkowski, 2008; Robinson *et al.*, 2002). Terms such as “aftermarket” (Cohen *et al.*, 2006), “after-sales service” (e.g., value chain metaphor, Porter, 1980), and “post-purchase marketing” (Burger and Cann 1995) reinforce the notion that the very *raison d’être* of services is to support product sales. Replacing them with terms such as “services” and “service solutions” signals a shift in mindset. The signal can be reinforced by market communication, such as a CEO’s annual statement that emphasizes services, and internal communications, such as corporate newsletters (Kowalkowski, 2011).

A service culture demands a long-term orientation, which can be challenging because a long-term view rarely matches short-term financial goals (Aspen Institute, 2009; Payne *et al.*, 2008). However, relationship investments and interactions do not create customer value alone (Korkman, 2006); it is not long-term relationships as such that should be emphasized but rather the attitudes and perspective toward the long term (Lusch and Brown 1996). Service champions are also valuable, because they try to nurture and protect new services, from idea stage to launch. Our findings support Martin and Horne’s (1993) argument that firms should let service champions stay and manage the service into the launch phase (sales and delivery). However, senior management and other key decision makers also should be champions for service infusion and innovation and define clear, measurable, service-related targets (Kindström, 2010). The latter point relates to the service-oriented incentive system we discussed previously.

To drive change and establish and foster a service culture, a service leadership capability is required. Established, engineering-driven firms often are unwilling to change from their prevailing product-centric practices, norms, and values. Leadership is needed to attract and retain key individuals working with service. Successful firms might be unable to change direction until they stand on a “burning product platform,” as the telecom firm Nokia exemplified in 2011 (Holmlund and Strandvik, 2011). The root causes of such incumbent inertia include lock-in to a specific set of fixed resources, organizational inflexibility, and reluctance to cannibalize existing (product) offerings (Lieberman and Montgomery, 1998). Strategic renewal then is required to reconfigure the resource base of the firm and acquire service innovation resources and capabilities (Kindström *et al.*, 2013). Service leadership also must address the issue of organizational inflexibility; across firms, it is a root cause of restrained service innovation.

A litmus test for determining whether a firm is truly a service firm is whether it still sells services to protect and enhance its product business or as a focus on enabling customer

value creation, such that it is willing to cannibalize its product business if needed to craft a better overall customer value proposition. Such behavior requires leadership skills together with a service logic translation capability, which is the ability to change mental models and cause the organization (not just its service units) to view service as a business logic and perspective on value creation. For example, the firm might change from a product to a process perspective for service improvements, shifting from a fire-fighting culture with overtime heroes to a proactive culture (Cronemyr and Witell, 2010), a path that firms like SKF have pursued. A similar, more extensive example might be the reconsideration of the purpose of firm activity, from making things to facilitating customers in their value-creation processes (Grönroos, 2006; Vargo and Lusch, 2008). Too often, researchers equate service infusion in manufacturing with a shift from a product-centric to a service (dominant) logic. We argue that they are distinct transitions, the former linked to the offering of the business model, and the latter primarily focused on culture. A firm can launch many new services while maintaining its product-centric business logic and managing its service business in a product-like manner. Similarly, many pure-service players adhere to a product-centric logic of maximizing the sale of “productized services,” without a genuine customer focus.

Product–service balancing thus is the final capability for service innovation, specifically for product-centric firms. A constant challenge for the firms we reviewed was the need to balance assets related to product and service innovation, to secure the interests of both product and service units, and thereby balance the interests of a product business and a people business (Kindström *et al.*, 2013). As firms increasingly offer advanced services, combining services and products, they find it necessary to add systemic characteristics and integration aspects. The tension between the two cultures is a constant challenge for product-centric firms—particularly those that choose to integrate goods and services (Gebauer and Friedli, 2005; Nordin, 2005; Oliva *et al.*, 2012). It is especially evident in firms that only recently have begun to focus on their service business. The product business is a core activity for product-centric firms (and must be so), such that a product-oriented core of resources and capabilities (manufacturing, R&D activities) demand ongoing, parallel management of the product and service business (Kindström *et al.*, 2013).

Discussion

Managerial implications

A strategic realignment toward investments, both strategically and operationally, in service innovation activities must be mirrored by changes throughout the business model, such that it becomes nearly a merged business model innovation process. Successful change

in one element depends on corresponding changes in and realignment of other elements. For example, to provide a new specialist service, a firm might create a distinct unit responsible for its delivery, as well as a new revenue mechanism. New customer touch points and a new sales approach also might be required. Increased customer understanding is certainly needed, as is the ability to develop relationships with new members of the buying center. In general, too much emphasis is placed on new service development, without providing sufficient clarity about innovations in other business model elements. Because the inadequate alignment of elements inhibits service innovation, these shortcomings can explain why so many new initiatives fail. Service infusion processes also differ among firms and over time, as may be reflected in the magnitude of change in the business model elements. A radical change likely includes all elements of the business model; a more incremental change might imply a shorter and more focused change, limited to certain elements. The starting point also differs: A firm with an established, in-house service organization can exploit this resource and focus on elements other than the structure or delivery process. Another firm might have a strong service concept but lack necessary service processes, capabilities, and structures to sell and deliver it. Yet another firm might have strong customer relationships that it can harness to develop customized services, launched on the basis of its unique customer insights.

Managers can use business models, and a business model innovation perspective, to visualize how and when changes might occur, which should increase internal transparency, understanding, and awareness of service opportunities and necessary changes. It is important to understand the potential dependencies among elements; a change in one likely affects the others. Therefore, the initial step in business model innovation is to determine the current situation and identify the target position, which presents the “big picture” and supports a discussion of what the business model should look like, once the target position is reached. These insights give managers a better understanding of which major changes need to take place, in which elements, and in what sequence. Such insights can facilitate service infusion initiatives and strengthen the firm’s service innovation capabilities.

Research directions

Service innovation is gaining momentum in many research areas and various directions. Our research indicates that for business service innovation, multiple aspects remain to be addressed. Baron *et al.* (2013) also cite new areas, in what they call a new phase of service research, emphasizing service infusion and the management of a service culture.

From a theoretical perspective, a particularly interesting question is the nature and characteristics of innovation in the latter parts of the service innovation process. By focusing

on these aspects, researchers can provide new knowledge and also guide firms with regard to service delivery (e.g., IT-enabled methods) and efficient service development. As firms infuse more services and embark on more service innovation activities, they can approach the process of service innovation from different starting points and in various sequences, depending on their particular contexts. A knowledge gap in this area offers interesting opportunities: How should firms develop their service innovation activities? Where should they focus their effort to achieve their goals? Similarly we note a lack of research centered on business model innovation processes; if taken far enough, investments in service innovation can realign the business model altogether toward a more service-based version (Kindström, 2010).

With the business model approach, we derive interesting avenues for research that starts from a holistic perspective incorporating these new areas (see Baron *et al.*, 2013). First, as changes occur in different elements, finding the evolutionary patterns by which these service innovation–driven changes unfold over time promises great potential. Second, establishing appropriate starting points for each pattern, depending on various contingencies, will be of great interest for practitioners. Third, as other scholars also have pointed out, furthering understanding of the consequences of employing a multidimensional perspective of service innovation and consequences, both positive and negative, can uncover important issues. The conceptual foundations of service innovation are becoming better researched, and a natural consequence is an expansion into assessments of the effects on profits, revenues, and costs due to an increased focus in service innovation. A related question is the development of decision support systems for top management struggling to get a handle on the process.

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Figures

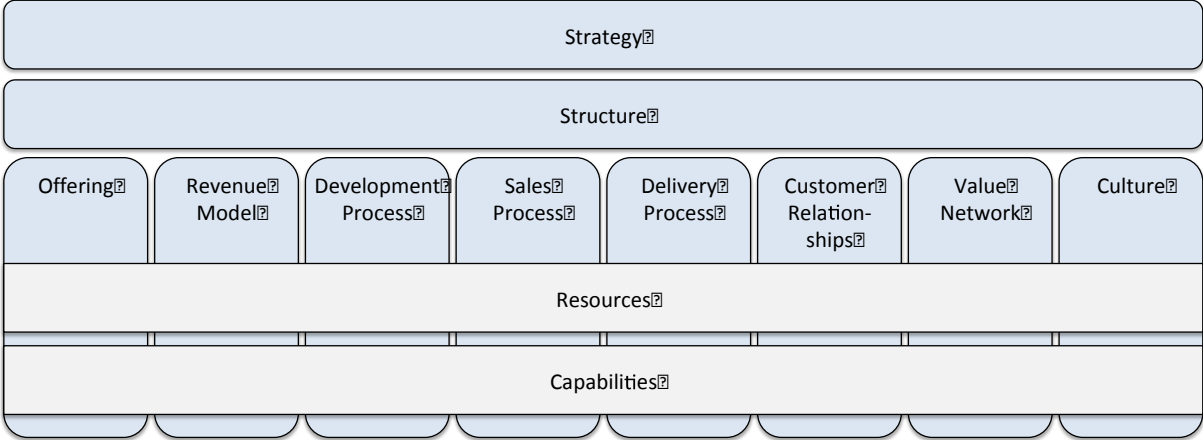


Figure 1. Service business model.

Customer process	Process Support Services E.g. Engineering, training, process simulation	Process Availability Services E.g. Rental plans, fleet management, service contracts	Customer Solutions E.g. Gain-sharing and outcome-based contracts
	Product Lifecycle Services E.g. Spare parts provision, repair, safety inspection	Product Availability Services E.g. preventive maintenance, remote monitoring	Product Performance Services E.g. Reconditioning, systems integration, customized software
Service focus	Input based	Output based: Availability	Output based: Performance
Product			
	Revenue model		

Figure 2. Typology for service offerings (based on Ulaga and Reinartz, 2011, p. 16).

Tables

Business model element	Resources for service innovation	Capabilities for service innovation
Offering	Customer base Product usage and process data ICT deftness	Offering portfolio management capability Product-service integration capability Design-to-service capability Customer needing interpretation capability
Revenue model	Product usage and process data System knowledge Seamless offering	Pricing capability Value visualization capability Risk assessment and mitigation capability
Development process	Service development process and strategy Lead customers Dedicated service development roles	User involvement and engagement capability Internal sensing capability Formalization and replication capability
Sales process	Service-oriented incentive system Customer involvement Field service organization Back-office specialist support	Value visualization capability Internal coordination capability Customer needing interpretation capability
Delivery process	Field service network Back-office infrastructure Customer involvement	Capacity utilization and prognostication capability Internal-external design capability
Customer relationships	Customer interactor stability Field service organization Customer counseling and adaptiveness	Customer embeddedness capability Proactive-reactive balancing capability Customer portfolio management capability
Value network	Distributor network Customer interface Specialist supplier base Influencer relationships	Orchestration capability Partner knowledge capability Network dynamics understanding capability
Culture	Service awareness Long-term orientation Service champions Service-oriented incentive system	Service leadership capability Service logic translation capability Product-service balancing capability

Table 1. Resources and capabilities for successful service innovation.

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