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Characterizing service networks for moving from products to solutions

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ABSTRACT

Manufacturers of capital goods may not be able to master internally all the relevant service activities for moving from products to solutions. As well, it is rarely economically viable for them to do so. Consequently, they increasingly resort to complex service networks that embrace traditional product-orientated and vertically-integrated supplier–customer relationships. Through multiple case studies this paper identifies four different types of service networks involved in the provision of solutions, and the capabilities necessary for forming and utilizing such networks. The types are: a). vertical after-sales service network, b). horizontal outsourcing service network, c). vertical life-cycle service network, and d). horizontal integration service network. Analyzed through the perspective of the "focal firm", these network types promote understanding of the movement towards providing integrated solutions for products and services. The service components included in the solution drive the formation of the network along the vertical and horizontal dimensions. The formation and utilization of each service networks type require a specific set of dynamic capabilities (to initiate a specific network formation), and operational capabilities (that allow the network firms to develop, integrate and deliver the service components of the solution), discussed in the paper.

1. Introduction

Manufacturers of capital goods are moving from selling products to providing solutions (Jacob & Ulaga, 2008; Wise & Baumgartner, 1999). They depart from the traditional concept of designing, manufacturing and selling products to offer innovative combinations of *products* and *services* (Davies, Brady, & Hobday, 2007). Extending the service offering is an important trigger for providing solutions (Helander & Möller, 2007; Tuli, Kohli, & Bharadwaj, 2007).

It may be beyond the capabilities of individual manufacturing firms, or not make economic sense, to master internally all the activities needed to provide services. This study provides two direct examples of this. The first is Rolls-Royce's "power-by-the-hour" solution, where customers pay a fixed warranty and operational fee for the effective run time of their jet engines (Koudal, 2006). The entire solution package of Rolls-Royce encompasses the jet engine in question and services such as installation, maintenance, repair and modernization. The services are provided through a complex service network comprising specialized parts suppliers (such as Volvo Aero) and maintenance specialists (such as Lufthansa Technik). The second is Alstom, who formed a strategic partnership with Transmashholding, the main rail rolling stock manufacturer in Russia, to offer services to the Russian railway market. Transmashholding provides integration services in order to customize Alstom's offering to suit the needs of the Russian market.

Similar evidence can be found in the secondary data of other multinational enterprises such as Ericsson Operating Systems, General Electric, IBM, John Deere and Siemens (Davies et al., 2007; Ericsson, 2010; General Electric, 2010; John Deere, 2010; Siemens, 2010). All these companies extend the traditional, vertically-integrated, supplier–customer relationship with service networks thus enabling them to provide services, that play a key role in the offer of solutions.

Despite such evidence, most literature concentrating on service offerings as a part of solutions consider it to be the effort of a single firm (e.g. Davies, 2004; Gebauer, Fleisch, & Friedli, 2005; Neu & Brown, 2005). For example, Oliva and Kallenberg's (2003) transition from products to services is derived from individual companies moving along the stages of (1) consolidating services, (2) entering the installed base service market, (3) expanding to relationship-based and process-centered services and (4) taking over the end-user's operation. Some more recent contributions incorporate the network approach. Davies et al. (2007), for example, argue that other companies can provide service components as part of the solution. Companies identify, select and manage other firms across different supply chains that contribute to providing e.g. spare parts, repair, maintenance and design services (Johnson & Mena, 2008; Pawar, Beltagui, & Riedel, 2009).

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However, existing studies have not yet analyzed in-depth service networks in this context. The characterization, formation and utilization of service networks remain unclear from both empirical and theoretical perspectives. This paper addresses these issues with the standpoint of the "focal firm" in the service network (Halinen & Törnoos, 2005). With multiple case studies we classify the types of service networks as well as the capabilities necessary for forming and utilizing them.

The remainder of the paper is structured as follows: Section 2 discusses the existing literature, whilst the research method is presented in Section 3. The findings and their discussion are presented in Section 4. Finally, Section 5 describes and highlights the implications of the findings for practitioners and researchers.

2. Theoretical background

2.1. Extending the service offerings for moving from products to solutions

Solutions encapsulate the product and service components that are necessary to provide unified responses to operational and business needs of customers (Davies et al., 2007; Nordin & Kowalkowski, 2010; Sawhney, 2006; Tuli et al., 2007). The extension of service components in the total offering is a key trigger for providing solutions (Davies, 2004). The extension starts with supplying basic services for the installed base, such as spare parts, inspections, repair, maintenance and modernization. Further service components are operational services, where customers outsource their operational or maintenance activities (Gebauer, Edvardsson, Gustafsson, & Witell, 2010). Moreover, such outsourcing services lead to additional performance-guarantees as a component of the solution (Windahl & Lakemond, 2010). Performance-guarantees steer the revenue models towards pay-for-performance which, in turn, makes financial services necessary (Hünerberg & Hüttmann, 2003). Service components also encompass consulting services, addressing the customers' business needs, as well as design and construction services in order to fulfill technical requirements (Davies et al., 2007).

Together with downstream activities that face the customer directly, such as the above ones, upstream activities are also needed to provide these services, e.g. sourcing spare parts from suppliers or developing ad hoc installation services based on specific components included in the equipment provided. Upstream and downstream service activities reflect the vertical dimension of the value chain. The vertical dimension refers to collaborating firms that cover different hierarchical levels in the value chain. The horizontal dimension, on the other hand, refers to firms that are at the same level but are in different value chains. Additional service components are derived from the horizontal dimension of the value chain, where companies have the option of covering the value chain activities for their products alone or for products offered by competitors and complementary products, i.e. third-party products (Raddats & Easingwood, 2010). Finally, providing solutions requires some integration services (Davies, 2004). These include customization activities that ensure that all of the product and service components fit together and can be reconfigured according to the customers' needs.

2.2. Service networks

The literature conceptualizes networks through various concepts such as strategic business networks (Möller, Rajala, & Svahn, 2005), value networks (Möller & Svahn, 2003), value constellations and business systems (Normann & Ramirez, 1993), as well as business in networks (Håkansson & Snehota, 2006) and "service systems" (Maglio & Spohrer, 2008). The network is the basic locus of innovation throughout these research streams, and is the principal unit of analysis in business and marketing (Vargo, Maglio, & Akaka, 2008).

In the context of this study, the term "service networks" is employed. Service networks consist of a loosely coupled collection of upstream suppliers, downstream channels to markets and ancillary service providers (Basole & Rouse, 2008; Ritter, Wilkinson, & Johnston, 2004). The study focusses on describing the value proposition of the service network, the capabilities of the focal firm, the service components of the network and its structure along the vertical and horizontal dimensions.

In service networks, value is co-created by different actors, such as suppliers, original equipment manufacturers (OEMs), third-party service providers and customers (Kothandaraman & Wilson, 2001). Each actor contributes to the service offering (Vargo & Lusch, 2011). Their contribution to service provision focusses on their core competences and on cooperation with other network actors (Basole & Rouse, 2008). The provision of services is therefore a complex, value-creating, process enabled by multiple service providers (Ford et al., 1998; Matthyssens, Vandenbempt, & Weyns, 2009). A critical element is the co-ordination between units that still maintain their autonomy (Nassimbeni, 1998). Providing services, in fact, requires the coordination of value-creating processes in the manufacturing systems, maintenance systems, spare parts supply systems, logistic systems, etc. (Cohen, Agrawal, & Agrawal, 2006; Davies et al., 2007). Strong relationships between the different companies, their position in the network and their network horizon arguably enhance the provision of services (Windahl & Lakemond, 2006).

2.3. Capabilities for forming and utilizing service networks

The concept of "capabilities" refers to a company's ability to deploy its resources to achieve a desired end (Amit & Schoemaker, 1993). Capabilities can be categorized as operational and dynamic (Winter, 2003). Operational capabilities enable companies to earn a living under the condition of a specific business environment (Winter, 2003). Dynamic capabilities allow companies to respond to changes in the business environment (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997).

Operational capabilities refer to designing, manufacturing, selling and delivering product and service components and then integrating them into customer-specific solutions (Fischer, Gebauer, Ren, Gregory, & Fleisch, 2010; Windahl & Lakemond, 2010). These operational capabilities may call for other network actors in activities such as demand-forecasting, cross-firm R&D management, supply chain and customer relationship management (Möller & Svahn, 2003), thus ensuring that network actors can contribute to the value creation process.

Dynamic capabilities enable firms to address changes in the business environment (Teece, 2007). Dynamic capabilities include: (1) sensing opportunities and threats as well as the need to change, (2) seizing the opportunities sensed and (3) reconfiguring operational capabilities to maintain competitiveness (Teece, 2007). Focal network firms mobilize other actors to develop the capabilities necessary for the intended value contribution and also orchestrate the network actors (Möller & Svahn, 2003). The notions of sensing and seizing business opportunities across different network actors are closely related to "sense-making" in business networks (Möller, 2010). Sense-making refers to anticipating the potential of development paths by identifying and shaping opportunities before formulating strategic responses. It bridges the perception and interpretation of opportunities and threats by influencing the reconfiguration of capabilities amongst network actors (Henneberg, Naudé, & Mouzas, 2010; Möller, 2010).

2.4. Research gap and questions

Our literature review suggests that a network, rather than a single firm, drives the extension of the service components. However, most research has neglected the network perspective when addressing the provision of services associated to capital goods. It is assumed in this