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SERVICE INNOVATIONS IN MANUFACTURING FIRMS*

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SERVICE INNOVATIONS IN MANUFACTURING FIRMS

Abstract

Purpose: The purpose of this paper is to identify and describe certain critical dimensions related to service innovation in manufacturing firms. The paper focuses on dimensions related to the service transition, the offering and the development project.

Design/methodology/approach: A multiple case study was conducted in order to trace specific service innovations and to explore critical dimensions and events throughout their development. A total of 16 interviews were held, covering service innovations in SKF, Volvo Buses, and Volvo Trucks.

Findings: Each of the three service innovations studied are examples of recombinative innovations. While there are some differences in terms of what is innovative, a common theme is the bundling of technology and services. Recombinative innovation opens up the possibility to combine standardization and customization, which has been identified as a success factor for services in manufacturing companies.

Originality/value: Although a large number of manufacturing firms are introducing services to utilize the entire life-cycle of the installed base, there is a shortage of literature that includes elaborate empirical accounts of service innovations in manufacturing firms. The study expands the scope for viewing service innovation by not only focusing on the offering but also taking into account service transition and the development project.

Classification: Research paper

Keywords: service innovation, service transition, service development, case study

SERVICE INNOVATIONS IN MANUFACTURING FIRMS

Introduction

A silent revolution is taking place within the manufacturing industry – an increasing proportion of sales volumes and profit margins are being generated by services (Fang, Palmatier and Steenkamp, 2008). In highly competitive global markets, companies are using their resources to offer services that enhance the value of their offerings, which can in turn lead to competitive advantages (Matthyssens et al., 2006). In order to succeed in this regard, the resources or bundles of resources must be valuable, rare, inimitable, and non-substitutable (Barney, 1991). For manufacturing firms, such resources are often closely related to the company's advantage of knowing their own product better than their competitors (Oliva and Kallenberg, 2003). Accordingly, many manufacturing companies are developing their service offerings as they develop their organizations, and are striving towards an increased service orientation. As a result, service innovation is becoming more central.

The transition process from product orientation towards service orientation is closely related to a change in focus from transactions to customer relationships (Oliva and Kallenberg, 2003; Brax, 2005; Neu and Brown, 2008). Consequently, many companies are developing their service offerings and, with the exception of services that support the product (SSP), such as training or after-sales service, they offer services that support the customer (SSC), specifically, the customer's processes in relation to the product (Mathieu, 2001). Examples of such services might include taking over the customers' maintenance function or spare parts management, or providing advice on improving customers' operation processes (Gebauer, 2007). It has been argued that SSP no longer lead to a sustainable competitive advantage within many industries, thereby forcing companies to extend their service offerings with SSC (Mathieu, 2001).

Despite the increased importance of SSC and the creation of service innovations, many manufacturing firms experience an imbalance between a business strategy that focuses on service and the implementation of service development as a secondary business. This is exemplified by statistics from the Service Research and Innovation Initiative (SRII), which show that even though services comprise approximately 45% of revenues in the information technology industry, expenditure on services is estimated to represent only about 5% of total R&D budgets (Wood, 2007). Such an imbalance between the focus on products in the development process and services in the delivery process might hamper an organization's growth in terms of service. While some companies have attempted to introduce service innovations gradually, the leverage can be improved by access to new organizational models and work practices for developing and operationalizing service innovations. Literature on the issue, including empirical accounts of SSC in manufacturing firms, remains scarce (Gebauer, 2007). Empirical studies on the development of service innovations in manufacturing firms have centered on factors such as building customer relationships (Oliva and Kallenberg, 2003), customizing the offering (Mathieu, 2001), and organizing development activities (Gebauer, 2007; Gebauer et al., 2008). This paper argues that the successful development of service innovations cannot be viewed in isolation from factors related to the company's service transition. Therefore, a study of service innovations must expand the focus of the study, from factors related to the offering to factors related to the development project and the transition process.

The purpose of this paper is to identify and describe critical dimensions for the development of SSC innovations in manufacturing firms. The paper focuses particularly on the dimensions related to the service transition, the service offering, and the development projects that are critical for SSC innovations in manufacturing firms. The relationships among these three areas and their influence on the development of SSC innovations are

studied in order to provide greater understanding of the occurrence of SSC innovations in manufacturing firms. The empirical investigation examines three specific SSC innovations, developed at SKF, Volvo Buses, and Volvo Trucks. These service innovations have been studied in the context of the service transition that appeared in each of the case companies. An understanding of context-specific factors related to the service transition can be supported by case study research encompassing elaborate descriptions of empirical data (Eisenhardt, 1989; Dubois and Gadde, 2002). The data material on the three SSC innovations consists of 16 interviews. The paper begins with an account of the theoretical framework, followed by a description of the research methodology, and then descriptions of the three cases. The paper ends with discussions and conclusions.

Theoretical framework

Basically, innovation involves the development or improvement of goods or services (Johne and Storey, 1998). De Brentani (2001) differentiates between discontinuous innovations and incremental new services, depending on the innovation's newness to the market and technological newness. The present study argues that the traditional view, that high technological newness and high newness to market signifies a discontinuous innovation, does not apply to service innovation in manufacturing firms. Unlike technology in products, the technology related to services is neither new nor innovative; what is new is the way in which the service creates value for the customer. Following this line of reasoning, Michel et al. (2008) argue that an innovation is discontinuous if it significantly changes the way in which customers co-create value and if it significantly affects market size, price, revenue, or market share.

The view of this paper is that service innovation is not limited to the uniqueness or newness of the service, but that it also encompasses newness in other dimensions, such as

delivery system, client interfaces, and the nature of the seller-buyer relationship (de Jong and Vermeulen, 2003). Verma et al. (2008) argue that service innovation can refer to newness in the delivery of a benefit, the service concept, the business model, operations, technology, employee behavior, or the customer experience. As a consequence, the role of SSC innovations in manufacturing firms is best understood in the context of a firm's service transition, the offering and the development project.

Service transition

A product-based strategic orientation is the most common and stable among manufacturing firms, although capability-based strategies are growing in popularity (Cagliano et al., 2005). These strategies include improving and innovating capabilities, such as technology, knowledge and competence, which is consistent with a service orientation. Many manufacturing companies are striving to increase their service orientation, and the service transition can be described as an evolutionary change on a goods-to-services continuum (Davidsson et al. 2009). Several available models describe the transition as a change in the nature of the offering or in the organization of a service business (Bowen et al., 1989; Reinartz and Ulaga, 2008; Vandermerwe and Rada, 1988).

Oliva and Kallenberg (2003) describe a continuum that presents the transition process from a product orientation to a service orientation. Their research focuses on identifying the various positions that a company can adopt on the goods-to-services continuum, including (a) consolidating product-related services, (b) entering the installed base service market, (c) expanding to relationship-based services or process-centered services, and (d) taking over the end-users' operations. The transition from one position on the continuum to another is the result of simultaneous changes in organizational structure and culture, core processes, and customer relationships, all of which are necessary in order to deal

with new kinds of offerings. In a study of service transition in manufacturing firms, Fang et al. (2008) concluded that the critical mass for obtaining a sustainable pay-off from services is achieved when the services account for approximately 20–30% of the turnover.

There is a close relationship between the development of SSC and this transition from product orientation to service orientation, in terms of forming new core capabilities that lead to superior customer value and competitive advantages (Gebauer, 2007). SSC imply close customer relationships and good knowledge of customers' operations, since the focus is not just on making the product work but on offering productivity improvements and maximizing processes related to the product (Mathieu, 2001; Gebauer, 2008). Therefore, manufacturing companies must be sufficiently service oriented in order to succeed with this kind of service offering (Gebauer, 2007).

The offering

Firms that extend their offering to include services, rather than just products, move from an incomplete offering in a transaction-based customer relationship that is often product-focused, to a complete offering in a relational-based customer relationship (Penttinen and Palmer, 2007). The completeness of an offering is defined as bundling and extending products and/or services to meet customer needs (Penttinen and Palmer, 2007). In other words, products and/or services are bundled into an offering that, in itself, creates value for at least some customers (Stremersch and Tellis, 2002; Kowalkowski et al., 2009).

Another way for manufacturing firms to create new services is by using technological competences. There is consensus in the literature regarding the potential advantages of using technology or information technology in service innovations in manufacturing firms (Agnihotri et al., 2002; Neu and Brown, 2005; Wise and Baumgartner, 1999). Nonetheless, the introduction of technology-based services can be challenging for

many companies due to the potential reluctance of customers to replace personal contact with technical solutions. Customers may also be unconvinced about the financial benefits of the new service (Bitner et al., 2000). These factors have led to some companies struggling to sell their technological systems (Oliva and Kallenberg, 2003). Westergren and Jonsson (2004) identified a number of barriers associated with the process of selling new IT-related services. One important issue was that neither sales staff nor customers could recognize the added value of the services. It is difficult to justify the cost of a remote monitoring system, for example, when the existing system is reliable. Another issue was the complexity of the systems. Information handling is becoming increasingly comprehensive and the supplier must be familiar with the customer's entire process.

The development project

Martin and Horne (1992) observed that new service development was a strategic hurdle for manufacturing companies that are looking to increase their service orientation, and that service innovation 'just happens' (Martin and Horne, 1992). In other words, there was a lack of formal procedures in the studied companies and the development processes were ad hoc. The new services often consisted of improvements to current offerings and were driven by the market more than by technology. Furthermore, investments in new service development were minimal and ideas for new services often came from interaction between employees and customers. In their research on innovation processes in services, Gallouj and Weinstein (1997) viewed innovation as any change that affects one or more terms of one or more service characteristics. Based on this view, they identified six modes of innovation: radical innovation, improvement innovation, incremental innovation (innovation by substituting or adding characteristics), ad hoc innovation, recombinative innovation, and formalization innovation.

With specific regard to service innovations in manufacturing firms, few empirical studies have reported on critical dimensions of the innovation process. Mathieu (2001) compared the situation in which a service supports a product with the situation in which a service supports the customer. That study used the major European manufacturers in the micro-electronics industry as its empirical basis, and included interviews with the customers, distributors, and managers of these manufacturing firms. One of the study's main results was that the ability of suppliers to develop SSC is linked to the strength of the relationships they have formed with their customers. Mathieu (2001) also observed that capacity and willingness impact SSC offerings. Capacity encompasses factors such as resources, skills, and proximity to the customer, whereas willingness relates to company culture and strategic decisions.

Gebauer's (2007) study of German and Swiss machinery and the equipment manufacturing industry investigated the antecedents for SSC development. The study revealed the importance of organizing development activities, providing service manager decision-making authority at development gates, and creating an innovation culture in the service organization. Further, the effect that the two antecedents related to the development process have on overall profitability is greater than the effect of creating an innovation culture. Other factors shown by Gebauer (2007) to influence a SSC strategy are high managerial recognition and improved service orientation of both corporate culture and human resource management.

Widening the perspective from SSC to service innovation in general provides additional success factors for service innovation. Firstly, it is important that senior management constantly encourage service innovation. De Brentani (2001) highlights the importance of providing leadership to stimulate movement into new service areas. Secondly, research in service firms indicates that 'service champions' are often a success factor in

organizing for service innovation, as they can play a critical role at the implementation stage of a development project (de Jong and Vermeulen, 2003).

Research methodology

A multiple case study was conducted in order to study specific service innovations. The choice of research strategy was based on the applicability of case studies for understanding a specific setting (Eisenhardt, 1989; Dubois and Gadde, 2002). The case study for this paper was based on studies of archival records and interviews with originators of innovations, service development personnel, sales managers, service managers, and customers. A total of 16 interviews were conducted – seven at SKF, six at Volvo Buses, and three at Volvo Trucks – with each lasting approximately one to two hours. The interviews were conducted with the assistance of an interview guide, and were tape-recorded and transcribed. The interviews sought to obtain information in the following areas: service innovation, service development and its organization, the service's relationship to the product, sale and delivery of the service, and reasons for the service innovation's success or non-success. Data collection and data analysis was carried out by a research team in order to achieve complementary insights and enhanced confidence in the findings (Eisenhardt, 1989). The data analysis was based on detailed case study write-ups for each company, followed by a thematic analysis.

Service innovations were identified in each case company. The intention was to identify a service innovation that was (i) innovative, that is, the role of the customer had changed, and (ii) could be studied through interviews with key personnel. The three service innovations were Asset Efficiency Optimization (AEO) at SKF, Parts-on-line at Volvo Buses, and Fuelwatch at Volvo Trucks.

Empirical data

This section elaborates on the development of the service innovations by tracing their development and their market introduction and delivery. All service innovations are SSC.

SKF and Asset Efficiency Optimization

SKF has made services an explicit part of their offering. The company's five business areas are rolling bearings, seals, mechatronics, services, and lubrication systems. There is also a dedicated service division, which is primarily responsible for sales to the industrial aftermarket, mainly through a network of around 7,000 distributor locations. The division also supports customers with knowledge-based products and service solutions, such as consulting and mechanical services. The service division's sales in 2007 represented 33% of the SKF group's sales.

Asset Efficiency Optimization (AEO) is a service or a process that is designed to achieve maximum efficiency and effectiveness from work management activities. AEO can be considered as an umbrella term for optimizing a facility, and, accordingly, its content can vary among customers, ranging from a one-shot analysis of the customer's needs in terms of maintenance work to a long-term contract for SKF to design and execute parts of a company's maintenance activities.

With specific regard to the relationship between SKF and its customers, the value of AEO can be described by the terms 'taking responsibility' and 'creating security.' 'Taking responsibility' is, in this case, related to SKF's move towards performance-based contracts. The shift was from:

not only saying that it is good if you do it like this, but taking responsibility for it; we guarantee fewer stops. That was the revolutionary step, not only recommending, as we had done for many years, but taking responsibility. (Manager at SKF)

The move towards performance-based contracts is connected to another aspect of value, that of creating security for the customer. AEO has been developed over a long

period of time, partly in conjunction with the development of a service unit at SKF, so the description of the development of AEO will also contain parts of SKF's service transition. A common formal development process now exists for both services and products at SKF. The process is at a relatively general level and contains the following phases with intermediate business gates: prestudy, preparation, development of the offering, launch, and close-out. This general process is connected to a more detailed product development process that includes, for example, supportive tools. However, there is no formal counterpart to this detailed development process for service development.

In the 1970s SKF started to look at ways in which its service engineers could help customers. Services were provided for free, which was sometimes necessary to convince customers to buy SKF products. SKF's interest in condition monitoring started to grow, which, combined with a deliberate effort to obtain greater knowledge in this area, led to the acquisition of a number of companies specialized in condition monitoring.

In the late 1990s Sune Karlsson was appointed CEO of SKF. He had previously started ABB services and his background there was important in the service transition of SKF. During Karlsson's time as CEO, the services related to condition monitoring and reliability systems were presented to the board on a number of occasions as an important part of SKF's future development. The accomplishments achieved through AEO are also closely related to the culture of SKF, which focuses on solving customers' problem, even if the solution does not necessarily involve bearings.

A number of service companies were bought under Karlsson's leadership. By integrating these companies, which had competence in the consultancy area, the AEO concept was further broadened, with a focus on maintenance strategy. Although the company believed that the product itself was excellent, a key factor was the realization that it would not be possible to sell the condition monitoring systems unless customers were educated

about their value and value creation processes. Another contributor to the development of AEO was when the business model was changed so that products and services were charged for separately.

Volvo Buses and Parts-on-line

The focus at Volvo is on hard and soft products rather than on service, as such, which means that soft products are largely made up of traditional products. The hard products offered by Volvo Buses are buses, coaches and chassis. All the other offerings are soft products, including pure services such as repair services and service agreements, but also parts, software products, and merchandise. In 2006, 23% of sales came from soft products, and the growth of service is organic in a steady state.

The business models for many of the services at Volvo Buses focus on increasing customer loyalty. As an example, the business model of Parts-on-line was built on creating positive effects by improving trust and loyalty rather than by charging to set up the system for a specific customer. The direct effect caused by loyalty is an increase in the volume of spare parts from Volvo and hopefully, in the long run, the purchase of a new vehicle. Service innovation is driven by bundling services; service innovations are often built on the combination of a vehicle and a service.

The idea with Parts-on-line is that customers have direct access, through an Internet portal, to Volvo's parts supply system. This means that customers can order parts at any time without having to consider workshop opening hours. Volvo Buses initially targeted large customers for this service, since this was for whom the system had primarily been developed. The idea was as follows:

Many customers have excess storage of spare parts and such a service will allow us to help them and teach them what they need in their storage, and we can clean out the excess. (Manager at Volvo Buses)

Volvo Buses maintains a certain degree of skepticism about intangible services. Parts-on-line, however, is a service based on hard issues like spare parts, and the likelihood that the system will increase the sale of spare parts has led to greater acceptance of the service.

The technical solution within Parts-on-line has its origin in a large-scale project at Volvo that aimed to create an e-business system. Following the completion of this project, certain personnel at Volvo Buses felt that this knowledge could be leveraged and used as the basis for developing a new service. The necessary resources were not available at Volvo Buses at the time, so funding was obtained from other Volvo companies. Once the system was in place, the solution was tested with a key customer, whose solution has been used as a reference.

There is now a development process for new services at the company. The development process was originally introduced to develop new vehicles, but, due to the rigidity of this model, a development process for software was introduced later, and that model has been used to develop new soft products. Although a formal development project was formed during the development of Parts-on-line, it did not follow the suggested development process. Despite a business case being documented, the process was mainly continued on an ad hoc basis.

In practice, most projects are conducted with the involvement of a limited number of people. The development team in the Parts-on-line project consisted of six members. The number of people involved increases when it comes to the operationalization of the service.

Volvo Trucks and Fuelwatch

At Volvo Trucks, soft products are offered in different areas, such as spare parts, financial services, insurance, online services, and fuel optimization. In 2007 approximately one-quarter of the company's total turnover came from services, and its strategy is to increase this by 15% annually. At Volvo Trucks, as at other Volvo companies, services are considered to be an important area for future success. One interviewee said:

Nowadays everybody knows what soft products are and everybody is talking about their importance. (Manager at Volvo Trucks)

There appears to be an ongoing transition process towards the provision of more complete service offerings. Although Volvo Trucks seems to have been quite successful in developing its service offerings, the largest challenges reside within the organization.

From an organizational perspective, the transition process to service seems to have been somewhat slow. Members of the organization often have an 'inside-out' way of thinking, in accordance with the traditional concept of product development. For service development, however, an 'outside-in' perspective is considered necessary. Interviewees expressed difficulty in changing what had long been a successful business model.

The idea behind Fuelwatch is to reduce customers' fuel consumption and, consequently, cut fuel costs. This is achieved through a combination of six individual services that are packaged and sold under the Fuelwatch name. The innovative part of Fuelwatch was the combination of existing services into one offering. All of the services existed already, although they were offered by different units within Volvo Trucks. Furthermore, they were delivered separately at different locations, even in different countries.

Innovation in this case was less about developing completely new services and more about finding a new business model, including issues related to pricing and sales channels. The project started with a few enthusiastic people working with scarce resources to develop the idea of Fuelwatch. The work was accepted after a few months and developed into

a formal project. The development of Fuelwatch took place within the ‘Business solutions’ business unit, working with sales and support. Fuelwatch’s development in this particular business unit was more of a coincidence than as a part of any larger plan.

One of the challenges that came with the implementation of Fuelwatch was convincing the sales force of the benefits of selling services. Teaching the sales force how to sell and deliver the service has been a major challenge. It is difficult for someone to break old patterns and to start thinking in terms of service if they have sold trucks successfully for years. This has led to the creation of separate sales forces for trucks and for services.

Discussion

The three cases of service innovations – Asset Efficiency Optimization (AEO) at SKF, Parts-on-line at Volvo Buses and Fuelwatch at Volvo Trucks – help explain how manufacturing companies develop service innovations in practice. The results of the study have been summarized in Table 1, which presents critical dimensions related to the transition process, the offering and the development project. The three services, all examples of successful innovations, provide a foundation for understanding how SSC appear in manufacturing firms and how they are affected by a variety of dimensions that are not only related to the innovation itself.

- Insert Table 1 about here -

SKF has moved further in the transition process than Volvo Trucks and Volvo Buses, adapting itself for services to a greater extent by having a separate service division and sales teams dedicated to service. SKF also charges for individual services to a greater extent than the other two companies. Previous research has noted that a sufficient degree of service

orientation is necessary in order to succeed in the development of SSC (Gebauer, 2007). The results suggest that all three companies meet the minimum criterion concerning the degree of service orientation, but since SKF has reached further in the transition process (Oliva and Kallenberg, 2003), the company might be in a better position to leverage the effect of service innovations. As the case descriptions indicate, the service transition influences the development of individual service innovations. The case study companies have, in some cases, faced problems due to a low service orientation, such as in selling services and in funding development projects. It is possible to assume that reaching a certain position on the goods-to-services continuum (Oliva and Kallenberg, 2003) is necessary in order for a company to develop and implement SSC on a regular basis. One of the hurdles to be overcome is the setting up of a development organization and delivery systems for services. Such an investment will not become profitable until a certain amount of the turnover comes from services.

One similarity among the three SSC studied in terms of innovativeness is the bundling of technology and service. Each of the innovations can potentially be bundled differently and sold in different packages to fit the needs of individual customers. Such a strategy makes it possible to balance standardization and customization and, consequently, to reap the benefits of both strategies (Davies et al., 2007). Innovative SSC based on bundled products and services are linked to the transition towards service orientation (Gebauer, 2007). This transition implies a change from a transactional customer relationship to a relational one (Penttinen and Palmer, 2007). The separated service division and the dedicated sales teams at SKF provide the basis for relational customer relationships and for creating more complete offerings.

The service innovations of SKF and Volvo Trucks had innovative business models. With their new SSC, SKF started moving towards performance-based contracts,

thereby taking responsibility and creating security for their customers. In the case of Volvo Trucks, bundling its existing services forced the company to find a new business model, including issues related to pricing and sales channels. The relational aspect is noticeable in the business models, in which charges for services are based on long-term contracts. At Volvo Buses, on the other hand, there was no new business model for Parts-on-line and the service was often provided free in order to create loyalty.

Strong customer relationships and proximity to customers are considered to be critical dimensions of service innovations (Mathieu, 2001). The innovations here were, however, driven more by technological solutions that the companies failed to commercialize successfully than by strong customer orientation. Believing in their technological systems, the companies had to add customer focus and repackage their offerings before they were able to sell them. Thus, proximity to the customer has been crucial in the realization of the service innovations, rather than their sole driver. Neither the technological solutions nor the service components were, in themselves, particularly innovative. What was innovative was the bundling, which led to greater value for customers than if the services had been offered separately.

All three companies have defined development processes for services that are simplified versions of their development process for goods. However, the development of the three service innovations has not followed these processes. IT solutions used as a part of the services have been developed according to standard procedures, but the service processes and the intangible parts have been developed on a more ad hoc basis. This seems to echo the observation by Martin and Horne (1993) that “The process of new service development is not well defined, and does not adhere to conventional empirical mechanisms. Yet, new services come onto the market every day. ‘How?’ remains the critical question.” Admittedly, since a structured approach to service development in manufacturing firms is a relatively new area,

these companies have been formalizing their service development processes over time. The results of Gebauer (2007) appear to place more emphasis on the formal development process than the three case studies herein.

Capacity and willingness both impact SSC offerings in the manufacturing industry. Capacity includes resources, skills, and proximity to the customer, while willingness is the degree to which a company culture is supportive of SSC (Mathieu, 2001). Managerial recognition is one aspect that influences innovations of SSC (Gebauer, 2007) and this can be an important factor in developing such a culture. The innovations studied herein have been found to be connected to activities throughout the organization, and a higher degree of service orientation seems to contribute to a culture that is supportive of SSC innovations. The service innovations have also been affected by, for example, business models, sales of services, the relationship between services and products, and the role of senior management.

Conclusions

Theoretical implications

The theoretical contribution of this study should be seen in the light of the service transition of manufacturing firms (see, e.g., Fang et al., 2008). Despite growing interest in exploring various aspects of service innovation in manufacturing companies, empirical accounts remain in short supply. The study contributes to the existing knowledge base regarding the development of service innovations in manufacturing companies with its documentation and analysis of three service innovations. Further, it expands the scope for viewing service innovation, focusing on the offering but also on service transition and the development project.

This study shows that definitions of service innovation do not fully capture the phenomenon of SSC innovations in manufacturing firms. Traditional definitions focus on technological or market newness, while the technology used in the service innovations in this study is neither new nor innovative. However, the service innovations studied here do not fit the definition of discontinuous service innovations based on a service dominant logic (see, e.g., Michel et al., 2008). This is because services are sometimes not charged for separately, which means that there is a large embedded service profit in the goods of the manufacturer. In this case, changes in customer co-creation of value are present, but the influence of individual services on market size, prices, revenues, or market shares cannot be identified.

One way to analyze service innovations is to look at their different modes. All three service innovations examined in this study are examples of recombinative innovation (Gallouj and Weinstein, 1997), a major mode of innovation that is frequently used in services. This mode of innovation consists of both bundling and unbundling and requires that the characteristics of a product or service are carefully specified and broken down into subsets (Gallouj and Weinstein, 1997). Recombinative innovation is also related to standardization and customization, which has been identified as a success factor for services in manufacturing companies. If service innovations in manufacturing firms are viewed as recombinative innovations, this might open up avenues for identifying new definitions and theoretical models to understand this empirical phenomenon.

Naturally, the empirical investigation of service innovations in this study has certain limitations. One major limitation is the extent of the study, as the empirical part of the study contained only three service innovations. The critical dimensions identified herein must be verified through additional case studies, which might also reveal additional critical dimensions that are not present in this study's empirical material.

Managerial implications

When looking for the critical dimensions of SSC innovations, it is necessary to widen the scope from the offering to factors related to the service transition of the company to the development project. This may not seem critical for individual service innovations, but for the long-term development of a series of successful services it is important to simultaneously focus on dimensions related to the transition towards service orientation, the development project, and the offering.

First of all, any company can develop an idea for a successful SSC innovation, but to deliver it successfully over a longer period of time the company must have a sufficient degree of service orientation. This includes a focus not only on technological solutions but, even more importantly, a focus on customer relationships. The case study companies have found it challenging to implement a service orientation outside the service division or the service team.

Secondly, bundling of technological solutions and services has been a core characteristic of the studied SSC. In a manufacturing firm with a tradition of selling products, offerings that combine tangible and intangible components can be a natural step. Combined with a business model that charges for services, a sales organization with limited experience in selling intangible services might be offered a smooth way to eventually sell 'pure' services.

Finally, in order to develop new services to replace old ones, a company must build competence in its service development. In the manufacturing companies studied herein, SSC are not developed systematically and, accordingly, there is a lack of suitable development processes. Adjusting only the development process for products often seems to result in an unused model. Hence, it is evident that the development of SSC requires a

different approach than the development of products, based on a service orientation rather than a product orientation.

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TABLES AND FIGURES

Table 1. An overview of the three SSC innovations

	Dimensions	SKF	Volvo Buses	Volvo Trucks
Transition	Goods-to-Service continuum	Entering the installed base (IB) service market	Consolidation of product-related services	Consolidation of product-related services
	Separate Service Division	Yes	No	No
Offering	Innovation	Business Model Bundling	Bundling	Business Model Bundling
	Business Model	Charge for Services	Create Loyalty	Charge for Services
	Driver of innovation	Technological solutions	Technological solutions	Technological solutions
Development project	Formal Development process	Exists, but was not followed	Exists, but was not followed	Exists, but was not followed
	Senior management support	Yes	No	No