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# Services in product-oriented companies: past, present, and future

Servicios en empresas orientadas a productos: pasado, presente y futuro

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## I. INTRODUCTION

Services in product-oriented companies have become one of the most active research areas in the service domain (Ostrom *et al.*, 2010). The basic proposition is that traditional product-oriented companies shift from developing, manufacturing, and selling products towards innovating, selling, and delivering services (Davies, 2004; Oliva & Kallenberg, 2003; Neu & Brown, 2005; Gebauer *et al.*, 2010; Tukker, 2002; Vandermerwe & Rada, 1998; Ulaga & Reinartz, 2011). These products and services are combined into customer-specific solutions, in which the value contribution in terms of revenue, profit, and customer satisfaction are increasingly attributed to services.

There has been a sharp rise in academic contributions. Publication rate on services in product-oriented companies has reached about 100 articles per year (see **Figure 1**). Practitioners have become advocates for service business development. Historically, this service business development is associated with *IBM*. In the early 90s, *IBM's* mainframe business was in the maturity phase and *IBM's* entry in the early phase of emerging PC industry came too late. *IBM* was in a major crisis. *IBM's* shift from products to services ensured its survival. Until 2001, *IBM* increased the share of service revenue



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JEL CODES:  
M11, M21, M31

Received: 10 december 2015. Accepted: 14 January 2016



### EXECUTIVE SUMMARY

Services in product-oriented companies have become one of the most active research areas in the service domain. Practitioners have become advocates for service business development. Research domain on services in product-oriented companies remains open to a variety of conceptualizations and interpretations such as hybrid offerings, solution providers, transition from products to services, system suppliers, product-service systems (PSS), servitization. In this article, we reflect on the past, present, and future of service research in product-oriented companies. We explore the way in which the literature on services in product-oriented firms has been evolving and taking shape, expose the underlying key concepts, and describe future research directions.

### RESUMEN DEL ARTÍCULO

Los servicios en las empresas orientadas a servicios se han convertido en un ámbito de investigación muy activo en el ámbito de los servicios. Los profesionales abogan por el desarrollo de servicios. El dominio de investigación sobre servicios en empresas orientadas a productos está abierto a una variedad de conceptualizaciones e interpretaciones, como oferta híbrida, oferta de soluciones, transición de productos a servicios, proveedores de sistemas, sistemas producto-servicio, servitización. En este artículo, se plantea el pasado, presente y futuro de la investigación en servicios en empresas orientadas a productos. Se analiza la forma en la que la literatura en servicios en esta empresas ha surgido e ido tomando forma, destacando los conceptos clave y describiendo líneas futuras de investigación.

on the total revenue to 40%. Today, *IBM* is a technology company, in which two business units focus only on services. Global Technology Services (\$37.1 billion) and Global Business Services (\$17.8b) have generated 59% of the total revenue (\$92.8b) in 2014. Overall, services have become an important factor for revenue growth and profitability. Companies such as *ABB*, *Caterpillar*, *General Electric*, or *Rolls-Royce* have a strong service business growth. Today, service revenues account for nearly 50% of the total revenues.

However, research also pointed out that moving from products to services is not a one-way street. In some situations, companies might reduce their service orientation, or, in other words, deservitize

and decrease the value contribution of services (Finne *et al.*

2013) For example, Amazon was a service provider, but with its Kindle reader, it introduced its first product into the market and links this product to information services.

From the intensity of this research effort and the strong management interest, one might surmise that there exists a common theoretical perspective. This is still far from the case. Research domain on services in product-oriented companies remains open to a variety of conceptualizations and interpretations such as hybrid offerings, solution providers, transition from products to services, system suppliers, product-service systems (PSS), and servitization (Davies, 2004; Oliva & Kallenberg, 2003; Neu & Brown, 2005;

Gebauer *et al.*, 2010; Tukker, 2002; Vandermerwe & Rada, 1998; Ulaga & Reinartz, 2012). While such variations have contributed to the richness of the service research in product-oriented companies, they might constrain also progress on the theoretical front and prevent empirical work from cumulating.

In this article, we reflect on the past, present, and future of service research in product-oriented companies. Section 2 explores the way in which the literature on services in product-oriented firms has been evolving and taking shape. Section 3 exposes the underlying key concepts and research domains. Sections 4 and 5 describe future research directions in terms of necessary theoretical perspectives, relevant research questions, and promising empirical fields. The article ends with a conclusion.

***From the intensity of this research effort and the strong management interest, one might surmise that there exists a common theoretical perspective***

## 2. LEVOLUTION OF THE RESEARCH DOMAIN ON SERVICES IN PRODUCT-ORIENTED COMPANIES

Our interpretation of the evolution of the research domain is based on the articles published. Analyzing the number and content of articles suggest that two tipping points divide the evolution of service research in product-oriented companies into three phases.

### Phase 1: Minor topic in Business-to-Business (B2B) Marketing.

Phase 1 starts with the early contribution in late 80s and continues until the late 90s. Publication rate remains relatively low in Phase 1. The corresponding articles consider services as customer service. Customer service is an important part of the B2B marketing and buyer-seller-relationship. Services are an add-on to the product. They augment the product offering, increase customer satisfaction

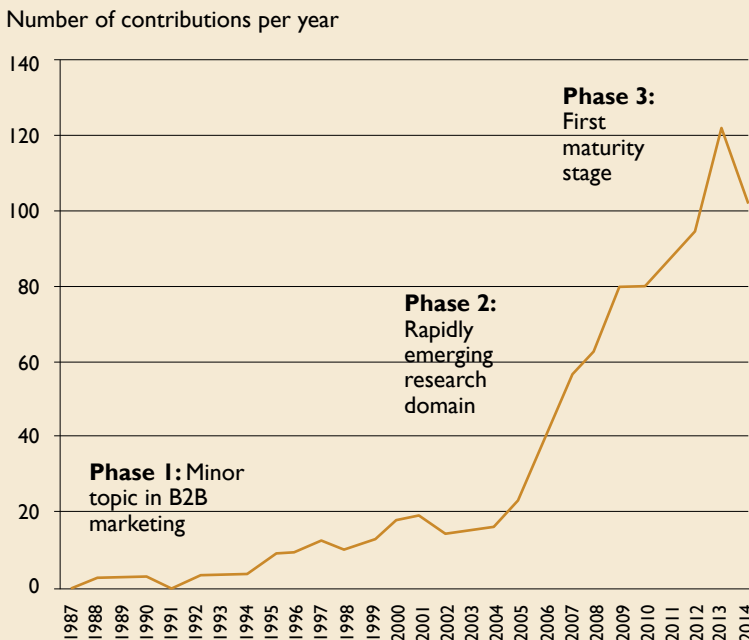
#### KEY WORDS

Services, Product-oriented companies, Product-service-system, Solutions, Service strategy, Research questions

#### PALABRAS CLAVE

Servicios, Empresas orientadas a productos, Sistemas producto-servicio, Soluciones, Estrategia de servicios, Preguntas de investigación

Figure 1. Evolution of the research domain on services in product-oriented companies<sup>2</sup>.



<sup>2</sup>Your query : ((REF("Managing the transition from products to services") OR TITLE-ABS-KEY("Product service systems") OR TITLE-ABS-KEY("Industrial services") OR TITLE-ABS-KEY("Transition from products to services") OR TITLE-ABS-KEY("Service business development") OR TITLE-ABS-KEY("Solution provider") OR REF("A framework for analyzing customer service orientations in manufacturing") OR REF("Restructuring towards a service orientation: the strategic challenges") OR REF("Go downstream: the new imperative in manufacturing") OR TITLE-ABS-KEY("Servitization") OR TITLE-ABS-KEY("The role of soft factors in implementing a service-oriented strategy in industrial marketing companies") OR REF("Service strategies within the manufacturing sector: benefits, costs and partnership") OR TITLE-ABS-KEY("After sales service")) AND DOCTYPE(ar) AND SUBJAREA(MULT OR ARTS OR BUSI OR DECI OR ECON OR PSYC OR SOCI) AND PUBYEAR > 1987 AND PUBYEAR < 2015)

and strengthen customer loyalty (Bowen *et al.*, 1989, Martin & Horne, 1992, Vandermerwe & Rada, 1988).

**Phase 2:** *Rapidly emerging research domain.* Phase 2 starts around 2000 and ends 2009. The former emphasis on customer service is replaced with other types of services (e.g., after-sales services, value-added services, services supporting the product, or services supporting the customer). Research shifts emphasis from services to augment the product offering to service growth (Mathieu, 2001a; Wise & Baumgartner, 1998). Companies increase the share of service revenue on the total revenue. These service revenues are highly profitable and compensate for eroding product margin (Cohen *et al.*, 2007). Confronted with the tendency that products become a commodity, services become a new source of competitive advantages.

A prominent example is Oliva and Kallenberg's (2003) transition line from products to service. On one extreme, the authors assume a product manufacturer, which produces core products, with services purely as an add-on to the product. Product-oriented companies use services as one of the main differentiating factors in the product marketing strategy. Profits and revenue are generated mainly through the company's core products and the contribution of services is quite low in terms of revenue, profit and customer satisfaction. At the other extreme, the authors assume a service provider whose products are merely an add-on to services. Products represent only a small part of total value contribution. The main share of total value contribution stems from services (e.g. share of service revenue to total revenue is more than 30%). Further conceptualizations include solution providers, servitization, product-service-systems (PSS), or service business development.

Besides this variety of research domains, phase 2 also led to the recognition that services in product-oriented companies are far from easy. A „service paradox“ discussion emerges, in which companies invested in extending service business leading to increased service offering and higher costs but these investments do not generate the corresponding higher returns (Gebauer *et al.*, 2005; Brax, 2005, Neely 2009).

**Phase 3:** *First maturity stage.* Phase 3 started around 2010 when the number of research contributions has reach a level of maturity with around 100 articles per year. On one hand, phase 3 embeds the discussion on services in product-oriented companies into other



management theories. Ulaga and Reinartz (2011), for example, argue that service and product form hybrid offerings. According to the resource-based view, creating competitive advantages through hybrid offering requires resources and capabilities for deploying them. Cusumano *et al.* (2015) link services in product-oriented companies to the industry lifecycle. Gebauer *et al.* (2011) integrate service differentiation into innovativeness and customer centricity for increasing company performance (Gebauer *et al.*, 2005).

### 3. KEY CONCEPTS ON SERVICES IN PRODUCT-ORIENTED COMPANIES

#### 3.1. Service business development in product-oriented companies

Service business development in product-oriented companies is one of the key concepts. This concept defines different types of services and addresses the value proposition related to the services offered. This concept discusses specific types of service offerings and the bundling of products and services (Martin & Horne, 1992). Service offerings follow a specific sequence starting with basic customer service and continuing towards more complex and more advanced services (Baines & Lightfoot, 2013). There is variety of service types. The most prominent and accepted distinction is about services supporting the product and services supporting the customers (Mathieu, 2001b). Beside this distinction, types of services range from customer service, after-sales services, operational services, customer support services, services for the installed base, advanced services or R&D-oriented services (Gebauer, 2008; Homburg *et al.*, 2003; Oliva & Kallenberg, 2003). Service offerings are aggregated into service strategies in product-oriented companies such as: customer service strategy, after-sales service strategy, customer-support service strategy, development partner, and outsourcing partner (Gebauer *et al.*, 2010; Windahl & Lakemond, 2006).

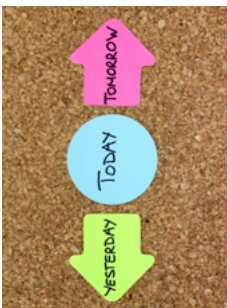
The *customer service strategy* augments the product by offering customer service. It is consistent with the belief that customer service enhances both the quality of the product and its reputation by increasing the general quality of the interaction between the buyer and seller (Mathieu, 2001a). The *after-sales service strategy* involves offering product-related services (or basic services for the installed base) with a few services as add-ons to the products. It ensures the



proper functioning of the product. It is similar to the notion of product services as well as entering the service market for the installed base (Mathieu, 2001a; Oliva & Kallenberg, 2003). The *customer support service strategy* attaches great importance to maintenance services such as preventive maintenance, maintenance agreements and process-oriented optimization. The focus is on preventing breakdowns instead of merely reacting when these events have occurred. Such prevention of failures and breakdowns increases the availability of the product within customer processes. Therefore, the value proposition is about increasing the efficiency and effectiveness of customer processes.

To succeed with the *customer support service strategy*, companies separate product and service business (Oliva *et al.*, 2012; Neu & Brown 2005). Service business becomes a strategic business unit (SBU), which takes over the responsibility for developing, promoting, selling, and delivering services. As a SBU, service business has its own profit-and-loss responsibility. *Wärtsilä Corporation*, a manufacturer of ship and plant engines established a separate SBU for services. This SBU has its own revenue and service target. In 2014, this SBU generated revenues of 1.9b Euro corresponding to 41% of *Wärtsilä's* total revenue. In this SBU, *Wärtsilä* set-up specific education programs for the technical and communication skills necessary to promote and deliver maintenance, optimization, and refurbishment services. *Wärtsilä* trains people to act in terms of preventing, but not as pure trouble-shooters. Incentives are based on Mean-Time-Between-Failure (MTBF) and not on Mean-Time-To-Repair (MTTR).

A *development partners'* value proposition is based on providing research and development (R&D)-oriented services in the phase prior to the actual acquisition of the product. A development partner does not only develop its own products but also offers customers its development competencies as a service. Such services allow development partners to align themselves as strategic partners of the customers. Creating customized designs or development allows specific knowledge to be transferred between the customer and development partner. This knowledge is hard to replicate and, in effect, excludes competitors from gaining access to the customer. *Bühler*, a manufacturer of diecasting equipment is a typical example. Instead of selling its diecasting equipment, *Bühler* develops the diecasting process for its customers including the robots and data



integration. *Bühler's* equipment is just one part of the solution (Fischer *et al.* 2012).

*Outsourcing partners* take on the responsibility of carrying out an entire customer process (Windahl & Lakemond 2006). Assuming responsibility for an entire customer process means that a customer pays exclusively for the service rendered. An outsourcing partner combines cost leadership with service and product differentiation in order to offer attractive prices for operational services. The aim is to assume the operating risk and full responsibility for the customer's operating processes. The value proposition is based on reducing the capital employed by the customer and managing the corresponding risks. *Dürr*, is a typical outsourcing partner. Instead of selling its paint finishing equipment, *Dürr* takes over the responsibility for operating and maintaining the equipment. Customers get paid for every painted car, or even, further for every painted square meter.

Independent from the actual service strategy, research highlights various factors to succeed with the shift from products to services. Service orientation can be triggered the organizational structure, human resources, or corporate culture. Service-orientation in the organizational structure can be extended by setting-up a separate business unit for services or integrating product and service business (Oliva & Kallenberg, 2003; Neu & Brown, 2005; Gebauer *et al.*, 2010). Human resources are discussed in terms of service mind-set and service competences (Homburg *et al.*, 2003; Neu & Brown 2005). These factors are linked to performance outcomes. Service orientation in organizational structures, corporate culture, and human resource management increases service revenues and profits. The technology provider, *Ericsson Operating Systems*, uses small anecdotes to facilitate more service-oriented values in the corporate culture. *Ericsson* argues that „selling services is just like selling seats in the airplane. You cannot sell the seats from yesterday. You always have to take the opportunities.“ In addition, *Ericsson* sets-up a Global Services Division in 1999. Its creation was a major step that the top management called “the evolution of services”. The evolution of service began by selling products and giving away services, and culminated with the total solution being sold as a service. Bearing this vision of the evolution of service in mind, the top management triggered *Ericsson's* transition from being a product manufacturer towards being a service provider. In 2010, *Ericsson* generated about 39% of its revenue through the provision of services.



### 3.2. Product-service systems (PSS)

Shifting from products to services corresponds with the idea on product-service systems (PSS). PSS consists of ‘tangible products and intangible services, which are combined to fulfill specific customer needs (Tukker, 2004). There are three types of PSS: product-oriented, user-oriented, and results-oriented. Product-oriented PSS is still mainly geared towards product sales, with some basic services as an add-on. Relevant services support product sales and ensure product functionality (Mathieu, 2001b; Tukker, 2004). In use-oriented PSS, product ownership remains with the provider. Product usage is made available as a service to actual users (Ulaga & Reinartz, 2011; Tukker, 2004). For example, Xerox remains responsible for operation & maintenance, while users pay for plain-paper copies (Cusumano *et al.*, 2015). Rolls-Royce’s power-by-the-hour service, where customers pay a fixed fee for actual usage rather than paying for jet engines and maintenance services individually, is another example of PSS. Result-oriented PSS means that customers and providers agree on a result and/or performance, and there is no pre-determined product involved. Value proposition focuses on the promise to achieve a certain customer performance. As a performance provider, companies build a profound knowledge of the customer’s core processes in order to manage customer operations (Helander & Möller, 2008, Windahl & Lakemond, 2006). An illustration is *Michelin Solutions* with its EFFITIRES™ and EFFIFUEL™ solutions. With EFFITIRES™, *Michelin Solutions* guarantees a certain price per very 1000 kilometer, the tire is actually used. In case of EFFIFUEL™, *Michelin Solutions* makes an agreement with customers for reducing the fuel consumption for trucks and busses. In both cases, *Michelin Solutions*’ customers no longer purchase tires, but rather sell usage (pay-per-kilometer) or performance (pay-per-reduction in fuel consumption).

### 3.3. Solution providers

Solution providers utilize innovative combinations of products and services, leading to high-value unified responses to the needs of the customer. Solution providers are successful in implementing and combing the different service strategies. The industrial automation division of *ABB* offers its customers “performance solutions”, i.e. solutions that are tailored according to the individual needs of the customer. The offerings can embrace (1) simple product-related



services associated with being an after-sales service provider, (2) maintenance services associated with a customer support service strategy, and (3) outsourcing the whole maintenance activities to *ABB*, which thus becomes an outsourcing partner. Again, *ABB*'s performance solutions are composed of implementing individual service strategies.

Relying on the implementation of the various service strategies allows solution providers to support customers throughout the whole life-cycle of the product, starting with the pre-sales phase and ending at the product usage phase. Solution providers also cover reconfiguration as well as the extension of service support in the customer's value activities. Solution providers include a large number of services in the overall package; since most services are customized to meet the needs of individual customers, solution providers also have to integrate products and services into customized solutions (Davies, 2004; Tuli *et al.*, 2007). Solution providers affect the services offered in the sales phase in two ways. Firstly, performance offerings change the revenue models, thereby making financial services necessary: "pay-for-performance" services, for example, require financial arrangements to be made so that the actual performance can be paid for. Payments for maintenance services are based on service-level agreements (SLAs) in which the benefits and/or sacrifices of achieving/missing the targets are shared between the supplier and the customer. Secondly, the increasing number of service components embraced by the solution requires the integration of services (Davies, 2004). These include customizing activities that ensure that all of the product and service components interact and can be reconfigured according to the needs of the customer. The emphasis is on integrating and not bundling product and services into customer-specific solutions.

Companies are concerned largely with capabilities for defining, delivering and selling solutions. Capabilities range from organizational structures to organizational competences, which should be aligned to enhance customer centricity (Galbraith, 2002). Solution providers move not along the continuum for products to services in a specific sequence of solutions. Instead, research discusses how the movement towards solutions influences the marketing activities. Marketing activities have to change from transactional to relational orientation (Tuli *et al.*, 2007). In the relational processes, marketing capabilities go beyond the pure

customer relationship management. Marketing competences have to ensure the in-depth understanding of customer requirements, appropriate customization and integration of products and services into customer-specific solutions and deployment of solutions in cooperation with the customers (Tuli *et al.*, 2007; Storbacka, 2011). For example, when Xerox introduced the new plain-paper copying machines in the 1960s, it remained responsible for maintaining them, while customers just paid for copier usage (e.g., pay-per-copy). Xerox's pay-per-use service converted new copying technologies into a business opportunity (Cusumano *et al.* 2015). Today, Xerox is positioned as a solution provider for business processes and document management solutions. In 2014, Xerox generated 54% of the total revenue (\$19b) through services. Xerox's business model has moved from pay-per-use to an annuity-based business model. Annuity-model provides significant recurring revenue and cash generation.

Ulaga & Reinartz (2011) describe resources and capabilities that are required to commercialize and provide hybrid offerings (solutions) successfully. Resources include data on product usage and process for the installed base, product development and manufacturing, sales and distribution network as well as customer service organization. Skills relate to data processing and interpretation, risk management and design-to-service. Capabilities required for selling a combination of products and services also contribute to the success of hybrid offerings.

### 3.4. Service Paradox

Increasing service revenues and profits require substantial investment into the service business (Brax, 2005; Gebauer *et al.* 2005). These investments might not always pay off leading to a situation where costs outperform expected service benefits. While financial service performance such as service revenue is discussed mostly, fewer articles concentrate of service profitability or even non-financial service performance such as customer loyalty and customer satisfaction (Homburg *et al.*, 2003 and Fang *et al.*, 2008).

The service paradox suggests that instead of moving along the continuum products to services, companies fail to stay on the transition track. They are unsuccessful in their service efforts and are confronted with the situation, in which companies invested in extending service business leading to increased service offering and higher costs but

these investments do not generate the corresponding higher returns.

*Airbus*, for example, was ambitious in extending the share of service revenue in its commercial airplane business. However, *Airbus* could not increase its share of service revenues to more than 4% between 2003 and 2014, despite of having a huge installed bases and a highly complex product. *Airbus'* competitor Boeing creates 15% of its revenues from services. Its suppliers for jet engines (e.g., General Electric, Rolls-Royce) and entertainment systems (e.g. Panasonic) increased the share of service revenue to about 50%.

One reason for the service paradox is that companies underestimate the complexity of the service business. Service demand can be very unpredictable. Basic services associated with the installed base are highly unpredictable, resulting in their demand being very sporadic. It is difficult to predict product failures that lead to basic services. When it does occur, a service employee must react as quickly as possible to the customer request. This makes the management of the service resources very complex. More advanced services become increasingly heterogeneous. Each of these services is highly customized, making it difficult to standardize the service elements and to control the cost of their delivery. Regarding the service knowledge, in the service business, companies offer services for 10-15 product generations. This implies that the products to be served may be up to 25 years old and use outdated software, mechanical components and technologies. Service business therefore has to ensure that it retains the technical competencies for serving such old product generations (Fischer *et al.*, 2012).

#### 4. SERVICES IN THE INDUSTRY LIFECYCLE

These various conceptualizations (e.g., service business development, PSS, solutions have been embedded into the discussion of the industry lifecycle. Future research could go beyond the maturity phase.

##### 4.1. Early, transition, and maturity phase

Early (ferment), Transition, and Maturity phase represent the three main industry lifecycle phases (Cusumano *et al.*, 2015). The early phase represents the beginning of an industry lifecycle, and it is characterized by a high level of uncertainty, since the technology is still being developed. Customers and producers are uncertain as to how the technology will perform. Companies often experiment



with different technical designs and business models to find the most suitable technologies in markets where both technology and customers are in a state of a flux. The transition phase describes the period from ferment to maturity, during which a dominant design emerges. Companies experience growing market demand around stabilized technologies and customer needs. Low levels of technology and market uncertainty characterize the maturity phase. Companies face an increasing product commoditization with the associated cost-based competition.

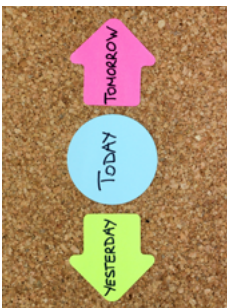
The research domains discussed above concentrate mostly on services as a countermeasure to product commoditization in the maturity phase (Cusumano *et al.*, 2015). Existing empirical work focuses mostly on the maturity phase. The general argument is that companies should shift from product-oriented to user-oriented and, finally, performance-oriented PSS (Tukker, 2004) when they reach the maturity phase.

Cusumano *et al.* (2015) propose the following relationship between industry lifecycle and PSS. Under extreme cases of uncertainty and high costs, some product firms will offer use-oriented PSS and are much more likely to offer product-oriented PSS during the early phase. Use-oriented and result-oriented PSS would play only a minor role.

For the transition phase, Cusumano *et al.* (2015) propose that user-oriented and result-oriented PSS play an even more minor role than in the ferment phase. During the maturity phase, companies would increasingly substitute the purchase of the product and services with use-oriented and result-oriented PSS. In the maturity phase, use-oriented and result-oriented PSS are argued to extend the product demand into new customer segments.

#### 4.2. Services in the early industry lifecycle: Example for the water sector

Our work in the water sector shows that manufacturers of decentralized water treatment systems concentrate on use-oriented PSS in the early phase of industry lifecycle. Decentralized water systems are used in particular in rural areas in low-income countries, where the population has no access to safe drinking water. Technologies such as reverse osmosis or ultrafiltration make it possible to construct small decentralized plants and allow a new industry arise.





The use-oriented PSS is about “water as a service” idea. Companies do not sell the system, but get paid for the cubic meter of water the equipment is producing. An illustration is the company *SwissFreshWater*. Instead of selling the equipment, *SwissFreshWater* installs, owns, and maintains the equipment in Senegal. These systems treat brackish water, which is barely drinkable and harms health due to the high salinity of people. *SwissFreshWater* remains the owner of the system. Local partners, who are entrepreneurs from the community, who has no access to safe and affordable drinking water, operate the system.

We identified the following resources and capabilities that are necessary to implement of use-oriented PSS (pay-per-use model). Resources include financial resources, technology resources, social capital and service resources. To deploy the financial resources, companies must develop the following capabilities. Due to the early stage of the industry life cycle, these companies should be able to attract funding from investors. Companies also need capabilities for developing financing mechanisms for use-oriented PSS in collaboration with banks. An essential component of the financial mechanism is risk management. Companies must be able to assess, evaluate, and mitigate the risks in the use-oriented PSS of an individual customer. The risks include uncertainties in operating and maintenance costs as well as the water sales. This risk should be included in the calculation of the “pay-per-use model.” This applies to both the “pay-per-use model,” a single system and the bundling of the risks across multiple systems.

To use the technological resources companies need to deploy the following capabilities: They must be able to develop multiple water treatment technologies, since it is not clear which technology and system becomes the dominant design in the emerging market. The need to manage multiple technologies has two consequences: On the one hand, companies need to build service capabilities for all technologies. The various technologies have different requirements in operation and maintenance, so that companies need to build a variety of service capabilities. On the other hand, the development of various technologies is difficult to finance. Therefore, companies minimize the value creation and specialize on the development and provision of core components. Most components come from suppliers, which should be involved in the use-oriented PSS. It means that supplier of the pump does not sell the pumps to the

manufacturer of water treatment systems, but is paid for each cubic meter of water pumped through the systems. Another capability of use-oriented PSS is the implementation of remote services. Remote services enable the monitoring of the operation and the water production. Because the data determine, how much drinking water was produced and how much the entrepreneur has to pay back to the manufacturer.

Social capital can be deployed through following capabilities: Companies need to be able to engage customers (entrepreneurs and/or communities) and end-customers (households) into an in-depth dialogue about technical, functional, easily perceivable needs as well as social, hardly pronounced and less tangible needs. These capabilities are about “sensing” the customer’s needs and then communicating and involving them (Kindström, 2010). Less tangible needs, for example, include the water distribution concept. Customers, who have a higher income, want to get the water delivered, to stand out socially over other household with lower incomes. However, they would not communicate this need directly. Households with very low income explain not easily that they sometimes cannot afford a whole 20-liter container with drinking water itself. Often they only have money for five liters of water. This means that the company should advice the entrepreneur operating the water business to offer water in smaller quantities.

Service resources can be deployed through following capabilities. Companies should be able to share responsibilities for operation and maintenance with the local partners. In addition, the company must be able, to customize the sharing of responsibilities according to the operation and maintenance skills of the local partners. Simultaneously, the service processes need to be standardized to be cost efficient (Kowalkowski *et al.*, 2015). Companies need to be able to build a services network to successfully deliver the necessary operation and maintenance services (Gebauer *et al.*, 2013). This is not easy, because companies still have a small installed base. Such a small number makes it difficult to establish a cost efficient spare-part-distribution network and field service organization. Continuous technological changes limit the knowledge of product reliability and usage, which makes it difficult to define spare parts and service requirements. The sales force faces frequent changes in customer needs, making it difficult to gain experience in sales practices for products and services.

Furthermore, companies concentrating on the early phase of the industry life cycle experience that investors focus on the number of installed systems creating pressure on selling use-oriented PSS. However, companies must avoid situations in which the service organization is not able to guarantee the costs of running and maintenance of the location the new customers. The agreed price per cubic meter of water and the water sales would then not cover the costs and the investments and costs of the systems cannot be recovered.

## 5. FUTURE RESEARCH ON SERVICES IN PRODUCT-ORIENTED COMPANIES

Identifying the resources and capabilities required for expanding the service business in the early stage of the industry life cycle is a first step to better understand the role of services in the industry life cycle. But more research is needed to answer following questions:

- What is the role of services for each of the stages of the industry life cycle?
- How do services increase the success of businesses in the individual stages?

Another future research questions is linked to a better foundation of strategic level. So far, research efforts have assumed that the services business grows organically (Kowalkowski *et al.*, 2015; Raddats, 2011). But companies can also grow externally. Rather than investing in their own service capabilities, companies can also acquire them externally. From a corporate perspective, it may make economic sense to acquire specialized service companies. For example, *Ericsson Operating Systems*, a manufacturer of equipment for mobile networks, bought *Edgecom*, a consulting firm for telecommunication companies, to expand its service portfolio. Equally interesting are M&As with other product manufacturers in order to increase the installed base. For example, *Bosch Packaging* relies on an acquisition strategy and has bought other manufacturers regularly in recent years (e.g. *Osgood Industries Inc.* (2015), *Tecor Machines and Systèmes SAS* (2013), *Industrial Pharmaceutical Resources Inc.*, *Eisai Machinery Co. Ltd.* (2012)). The number of installed machines for which services can be offered grows continuously. Companies can also achieve efficiency gains in the service organization. The installed base of a packaging machinery manufacturer can also be broadened through acquirement of



further manufacturers of machinery and equipment (for example automation, robotics, etc.) for the packaging process. The company widens the range of services for these machines and plants and is able to cover more customer needs. An interesting research question is:

- What is the role of mergers & acquisitions (M&As) during the expansion of the services business?

It is also interesting to better understand how services can create sustainable competitive advantages. Possible research questions are:

- How can companies create a direct competitive advantage through their service capabilities?
- How can companies develop these capabilities and turn them into their core competencies?

Sustainable competitive advantages arise not only from service capabilities, but from a combination of product and service capabilities (Ulaga & Reinartz, 2011). To better understand how services capabilities create competitive advantages, it is advisable not to look at services from an isolated perspective. Service capabilities and the resulting differentiation should be combined with other factors of competitive differentiation (for example market and customer orientation, innovation and product differentiation) (Gebauer *et al.*, 2011). Customers influence service capabilities. Specialized service capabilities are developed jointly together with customers, which form a barrier to entry for competitors. These specific skills cannot automatically be applied to other customers, since they are in a competition. Customers have little interest that other customers benefit from a solution that was developed exclusively for them. Such customization of competencies can be detrimental to strategic innovation. Strategic innovations enable new value constellations and open up radically new ways to satisfy customer needs. Customers do not necessarily appreciate such innovations and are often in favor of incremental improvements (Matthyssens & Vandendempt 2010). A research question would be:

- How does the transition from product manufacturer to service provider influence the ability for strategic innovation?

Strategic innovations play an important role in new technologies as it is the case for example with industry 4.0. Industry 4.0 is a collective term for technologies in the context of the fourth industrial revolution (Allmendinger & Lombreglia, 2005; Evans & Annunziata, 2012). It

includes the *Internet of Things*, smart grids, buildings, logistics and mobility, the digitization of business processes, cloud computing, etc. The intelligent factory is at the heart of these developments. Industry 4.0 changes the boundaries of industries. In recent years, manufacturers of tractors such as JohnDeer have invested in new technologies to make their products smarter. Using this intelligence, these companies can link up products and assess their condition in real time. This includes not only tractors, since all products that are used in an agricultural enterprise (for example harvesters, transplanter, soil management machines) can be linked up together. Embedding products into networks goes beyond the actual machine. Further, weather data as well as information on seeds or water supply are integrated in a virtual management system of a farm (Porter & Heppelmann, 2014). JohnDeer has taken a step in this direction with its MyJohnDeer Operations Center. The routes of machinery on the farm site or the variable application of seed and fertilizer are optimized through this approach. Research should take industry 4.0 into account when considering the transition from producer to service provider.

The transition from products to services alters the industrial boundaries and extends the boundaries of the enterprise, since companies expand their value activities and competences. This extension of competencies questions the focus on a few core competencies. Research on such transitions can make an important contribution to the discussion on the boundary of the enterprise and its core competencies. A research question would be:

- How does the transition from producer to service provider impact the boundaries of the firm?

The transition from product manufacturers to service providers not only affects companies in the industrialized markets. The example of *SwissFreshWater* shows that these transitions are also relevant for low-income countries. Because of the financial restrictions, customers in those countries do not invest in plants or buy products. They pay only for the performance or the usages as in result-oriented and use-oriented PSS.

For example, the company *Mobisol* realized that the rural population in low-income countries cannot afford the price of a private solar module. In *Mobisol's* PSS, solar modules and the electrical equipment are installed and pre-financed. Purchase of the module is made through small but frequent payments over





a period of three years. To minimize the transaction costs, these clients use mobile payment systems. *Mobisol* gives a guarantee for the entire system during the three years. The remote monitoring system of the solar module informs local technicians about technical malfunctions. After three years, the customer becomes the owner of the whole installment. Future research activities should deepen the understanding how the key concepts such as service business development, solutions, PSS and so on can be deployed in low-income countries and specially in industries in the early industry life-cycle. Promising future research question would be:

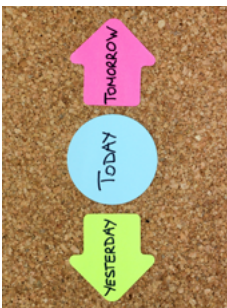
- How does the transition from producer to service provider occurs in the early industry lifecycle?
- How do product manufacturers from low-income countries deploy different PSS?

## 6. CONCLUSION

Product commoditization, stagnating product sales and declining product margins force product-oriented companies to look for new opportunities for achieving competitive advantages and differentiation. Extending the service business and shifting from manufacturing products to providing services is a promising way to create sustainable competitive advantages. The transition from products to services is often implemented with different service strategies that are being developed for the different phases of customer activities (pre-sales, sales, and after-sales). These strategies form the basis of product-, use- and result-oriented PSSs. Whether the transition to service provision succeeds depends on several factors. The set of required resources and capabilities varies according to the type of services and the value proposition.

The transition from a product manufacturer to a service provider is important for the success of a company not only in the maturity phase of the industry life cycle. But depending on the phase other success factors are important. For example, companies in the early stage of the industry life cycle have not a sufficiently broad installed base, cannot rely on already established structures and often have little experience in actual product usage. These factors influence what resources and capabilities are important for the company and determine on to which service strategies and PSS it should focus.

Future research questions concern the role of services in the industry life cycle. Questions arise also regarding business



strategies, strategic innovations and the role of service capabilities in the creation of sustainable competitive advantages. The increasing role of industry 4.0 and the growing number of potential companies in low-income countries represent also new areas that are currently opening up for research. The anecdotal examples in article also shows why the transition from a product manufacturer to a service provider across sectors has a high practical relevance for companies.

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## NOTES

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